20mph Zone Feasibility and Cost Estimate

Kendal

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Prepared for

Kendal Town Council

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Summary

Introduction

This report has been prepared by Markides Associates to consider the feasibility and costs associated with implementing 20mph speed limits throughout Kendal on behalf of Kendal Town Council. There are existing mandatory 20mph zones and one advisory 20mph zone in parts of Kendal.

Kendal Town Council wishes to implement a town-wide 20mph limit to:

- Encourage more walking and cycling for local journeys;
- Reduce road casualties and their severity;
- Improve air quality;
- Reduce health inequalities, including obesity among adults and children; and
- Reduce the dominance of vehicles on town roads.

A consistent town-wide 20mph limit will be simpler to sign and promote and will make it easier for local people to comprehend, leading to higher levels of compliance.

A survey of residents by Kendal Town Council in 2015 showed that 59% of those who responded were in favour of 20mph zones, with 34% opposed, and 5% undecided. There were differing views about whether the 20mph limits should be mandatory or advisory and whether they should be on all roads or selected roads.

Recent 20mph zone research

The report has reviewed existing policy and guidance, and the key findings of recent research on the implementation of 'signing-only' 20mph zones are that:

- Since government guidance on 20mph limits was amended in 2013, more than 50% of UK councils have introduced areas of 20mph speed limits based on signing.
- Local residents and other road users generally perceive the 20mph limits as beneficial for local residents, pedestrians, and cyclists. From a driver perspective, they make driving at a slower speed more acceptable.
- Following the introduction of 20mph limits (signed only) the median speed has fallen by just under 1 mph, with faster drivers reducing their speed more. Evidence shows that bigger speed reductions occur on faster roads, with higher volumes of traffic and providing a locally important strategic function.
- There is an established positive relationship between vehicle speed and injury collisions – the higher the speed, the more collisions and where collisions do occur, the higher the risk of a fatal injury at higher speeds. However based on the evidence available to date, the study found no significant change in collisions and casualties, in the short term, in the majority of the case study areas; however there were some indications of significant safety improvements in at least one case study area.

- In the case studies, while there continue to be a range of barriers which discourage walking and cycling, there were encouraging signs of a small (but significant) increase in use of active travel modes.
- The most effective schemes are likely to be those which are based on a broad integrated policy agenda (involving health, environment, urban planning, emergency services, education, community representatives, etc.). Longer-term 20mph schemes which are supported by complementary transport, health, environment and community policy and interventions are likely to deliver greater benefits.

Additional research on schemes previously implemented, classifies supporting measures according to:

- Education – explaining the importance of 20mph speed limits;
- Enlightenment – developing a broad vision for 20mph;
- Engagement – listening to local concerns;
- Encouragement – visual reminders for keeping to the limit; and
- Enforcement – warnings, sanctions, and penalties for breaking the limit

It is important that these measures are included as part of a broader package of introducing a 20mph scheme, thereby increasing local resident and motorist support and improving the level of observation of the new limit.

Speed data review in Kendal

This Kendal study also reviewed existing speed limits in the town. As part of the review of the current situation, an analysis of existing estimated speeds on different parts of the local road network has been undertaken based on OS Mastermap speed data.

The main points to note from this analysis are:

- The existing 20mph zones of Rinkfield, Kirkbarrow, Hallgarth, Queens Road, Castle Estate and Stricklandgate have recorded average speeds which are predominantly below 20mph;
- The existing '20's Plenty' area near Aikrigg has recorded average speeds which are predominantly below 20mph;
- Outside of these areas, recorded average speeds in other residential areas are predominantly below 20mph; and
- Close to the town centre, the recorded average speeds on the arterial routes are predominantly below 20mph, generally being below 24mph some way out from the town centre

Recommendations

On the basis that the roads identified above are considered appropriate for the implementation of 20mph speed limits, the study recommends that there is justification to implement a 'majority of the town' 20mph limit which includes both residential areas and

the town's arterial roads where these are in close proximity to the town centre. We have also considered an alternative option removing arterial roads from the 20mph zone, although we believe there are many advantages for including these. We have also assessed the introduction of a 20mph limit within the entire boundary of Kendal parish, although the analysis undertaken and initial consultation with Cumbria County Council (CCC) indicates that this may not be supported by CCC.

We have considered the broad cost implications of these options, and the conclusion is that the town-wide 20mph zone (with arterial routes included) would cost in the region of £44,000 while, that excluding the arterial roads would cost approximately £90,000. (These costs will increase if repeater signs and coloured surface entry signs are used, and do not include any 'traffic calming'). The costs should be confirmed with Cumbria County Council.

We recommend that the town council consider our report and then discuss their conclusions with the District Council and Cumbria County Council.

1. Introduction

Preamble

1.1.1 Markides Associates (MA) have been commissioned by Kendal Town Council (KTC) to undertake a study in relation to the proposed introduction of 20mph speed limits within the town of Kendal.

1.1.2 It is understood that KTC are already minded to introduce 20mph speed limits within Kendal but need to understand the costs associated with implementation. Specifically, the requirements of the study are:

- An overview of the costs of implementing 20mph on all Kendal roads (boundary similar to that of Kendal Parish);
- An overview of the costs of implementing 20mph on Kendal's arterial roads; and
- An overview of the practicalities and timescales of implementing a 20mph scheme for both options.

1.1.3 Previous studies in Kendal[1] have identified that the introduction of 20mph speed limits has general public support, whilst there is a considerable level of commuting by car which takes place within the town. Additionally, parts of the town are difficult to negotiate by bicycle and therefore it is considered that the introduction of 20mph speed limits will provide for a more walk and cycle-friendly environment.

1.1.4 Research from elsewhere in the UK shows that 20mph speed limits are generally supported, whilst the public generally perceive 20mph limits as being beneficial for local residents, as well as pedestrians and cyclists. Whilst the nature of roads where limits have been introduced means that in many cases lower speeds were already self-enforced, a reduction in the speed limit helps to reinforce this.

1.1.5 Feedback has also shown that there is recognition amongst the public that slower speeds are a contributory factor in terms of providing an environment more conducive to walking and cycling. Additionally, a reduction in the general speed means that, when collisions do occur, their impact is likely to be less severe.

1.1.6 Prior to identifying the costs and practicalities of implementing 20mph speed limits, it is firstly necessary to understand the characteristics (including speeds) of the local road network and its adjacent land uses. This will determine the feasibility of implementing 20mph speed limits.

1.1.7 As part of this study, initial contact was made with Cumbria County Council (the Local Highway Authority). At this stage, they confirmed general support for 20mph zones, but considered that on the arterial routes speeds were probably too high for them to support

[1] Kendal Town Council '20mph Speed Limit Survey 2015 Analysis Report'

these being 20 mph without the addition of traffic calming measures, which the Council would be unlikely to support. We recommend that this report be shared with the County to start discussions and confirm the cost estimates.

Report Format

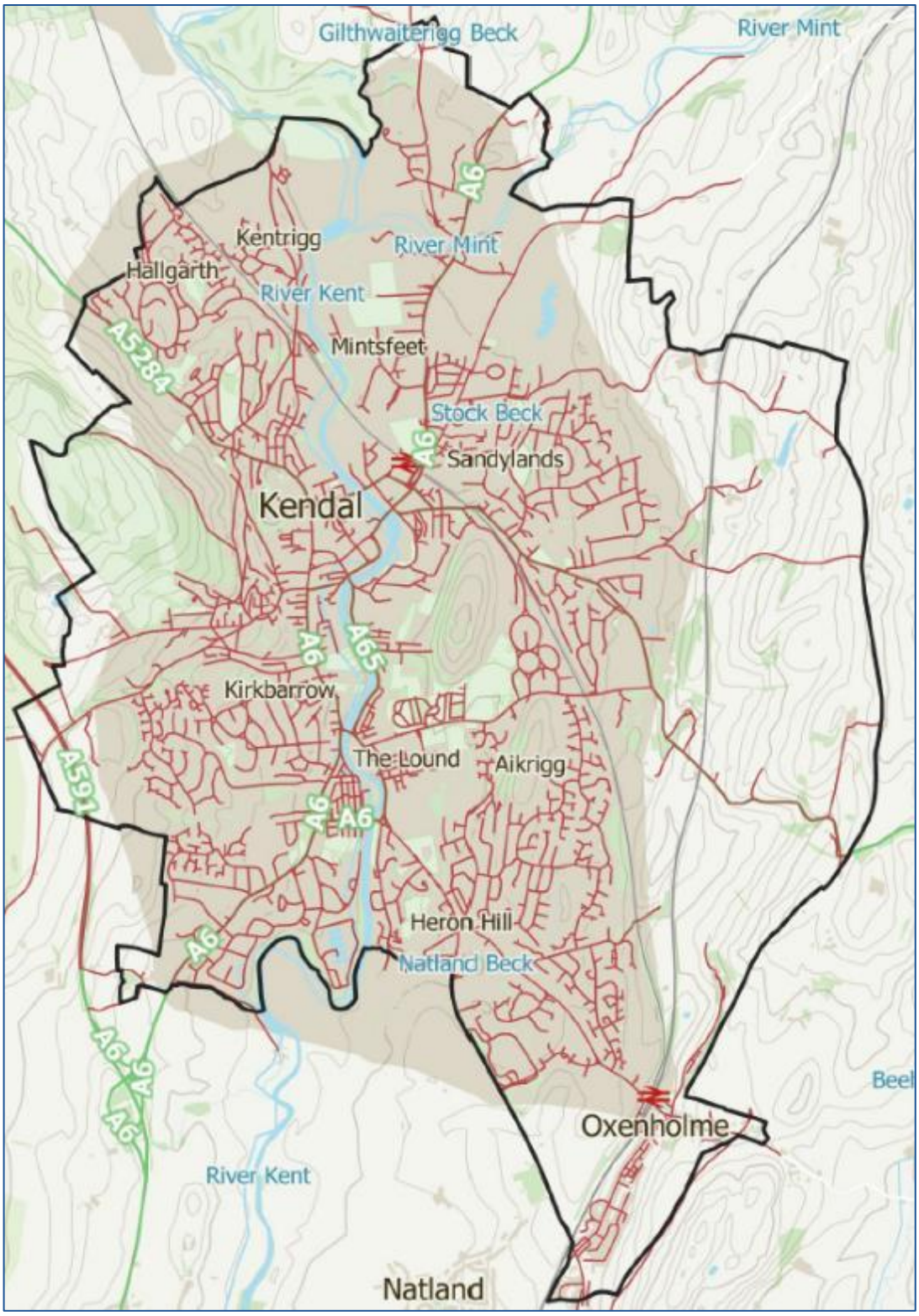
1.1.8 On this basis, this report is set out as follows:

- Section 2 – gives information on the Benefits and some of the wider considerations
- Section 3 – provides Background and policy guidance;
- Section 4 – assesses the Current situation.
- Section 5 – summarises 20mph Feasibility analysis.
- Section 6 – provides Cost analysis.
- Section 7 – considers Implementation; and
- Section 8 – gives a Summary and Conclusions.

Study Area

1.1.9 **Figure 1.1** below provides an illustration of Kendal's road network within the context of the parish boundary.

Figure 1.1 Study Area



2. Benefits and Wider Considerations

Introduction

2.1.1 Prior to considering the relevant policy and guidance in relation to the implementation of 20mph speed limits, this section considers some of the benefits and the wider considerations associated with their implementation, based upon research which has been undertaken elsewhere.

2.1.2 This includes reference to potential impact on journey times, as well as environmental considerations, with reference also made to Kendal's Air Quality Management Area (AQMA).

Journey Times

2.1.3 Whilst the introduction of 20mph speed limits can lead to longer journey times in some instances, consideration needs to be given to the existing recorded speeds of a road network to understand what, if any, impact a reduction in the speed limit is likely to have.

2.1.4 In many urban areas, average speeds are already at or below 20mph, especially at peak times, and therefore the introduction of a 20mph speed limit is unlikely to lead to an increase in journey times. However, the signing and any other measures associated with a 20mph speed limit can be expected to reinforce the message to drivers to keep their speeds low.

2.1.5 Information presented in a '*20mph Research Study*' undertaken by Atkins, AECOM and UCL for the DfT in November 2018 includes evidence from the analysis of journey-based speed data. This has shown that median[2] speeds have reduced by 0.7 mph in residential areas and 0.9 mph in city centre areas. This equated to a reduction in journey speeds of 3% in residential areas and 5% in city centre areas. On this basis, the report concluded that there was a minimal impact on journey times, with speed limit reductions adding less than half of a minute to a 2-mile trip and less than a minute to a 5 mile trip.

2.1.6 It is worth acknowledging that every road network is different, and urban road networks in particular have a number of features which can influence average journey time, irrespective of the speed limit. Such features include junctions, traffic signals and pedestrian crossings and the time taken to negotiate such features as part of a journey is likely to be longer at peak times.

2.1.7 In relation to this, there is also an argument to be made that, even though recorded average speeds may already be at or below 20mph, the introduction of a 20mph limit can encourage drivers to travel at a more consistent speed with less acceleration and deceleration between junctions and signals, but with there being no overall impact on the time taken to travel between one junction and another. This factor can also have environmental benefits, as discussed in further detail below.

[2]A median is a value separating the higher half from the lower half of a data sample

Environmental Impact

2.1.8 There are a number of factors to take into consideration in terms of the environmental impact of introducing a 20mph limit. Firstly, there is the change in vehicle speeds to consider, whilst the potential for mode shift away from cars, such that more walking and cycling trips are undertaken, is also a factor. As an additional consideration, there is the potential for vehicles to change route which may benefit some localised areas whilst adversely affect other localised areas, although with no overall change in emissions across a wider area.

2.1.9 The previous section touched on the reduced levels of acceleration and deceleration in 20mph areas. This is considered to result in a smoother driving style, which in itself is acknowledged as reducing particulate emissions from tyre and brake wear.

2.1.10 The '*20mph Research Study*' includes information which concludes that it would be incorrect to assume a 20mph speed restriction would be detrimental to ambient local air quality. The assessment by Williams (2013) is based on the estimated impact of a 20mph speed restriction on vehicles emissions on six routes in central London. **Table 2.1** summarises the modelled change in emissions of 20mph zones when compared to 30mph speed limits.

Table 2.1 Change in Emissions in 20mph Zones when compared to 30mph

	NOx	PM_{10}	CO_2
Petrol cars	+7.9%	-8.3%	+2.1%
Diesel cars	-8.2%	-8.2%	-0.9%

2.1.11 The Table confirms that in most cases, a reduction in emissions can be expected with the introduction of 20mph zones.

2.1.12 Added to this, is the recognition that speed restrictions are a way of increasing physical activity because faster moving vehicles in residential areas discourage people from walking and cycling. Obviously, any switch from car-based to walking/cycling-based trips has added potential to reduce emissions.

2.1.13 On the basis of the above, the proposal to expand the coverage of 20mph limits within Kendal fits in with the South Lakeland District Council Air Quality Action Plan and the fact that central Kendal is an Air Quality Management Area. In particular, the expansion of 20mph zones with a resultant switch to more sustainable travel modes would assist with the Action Plan's key priorities including Priority 1 (which includes measures to encourage sustainable travel choices).

Summary

2.1.14 Having considered both the journey time and environmental implications of 20mph zones, it is considered that there are additional benefits beyond simply reducing speeds and the severity of collisions. The potential encouragement of mode shift has wider benefits and the development of 20mph proposals can be seen in a wider positive context as part of a package promoting the concept to Kendal residents, beyond simply reducing traffic speeds.

3. Background and Policy Guidance

Key Legislation

3.1.1 Up until 1991, local authorities were not able to set speed limits below 20mph (according to the Road Traffic Regulation Act 1984). Subsequently, amendments to the Act and Department for Transport (DfT) Circulars have enabled reduced speeds to be applied where circumstances are appropriate.

3.1.2 Theses policy changes can be summarised as:

- **Circular Roads 4/90 (1990)** – requiring highway authorities to apply for consent from the Secretary of State to introduce a 20mph zone as part of a physically calmed 'zone' or on short sections of road with a proven crash record.
- **Amendment to Road Traffic Regulation Act 1984 (1990)** – allowing local authorities to designate 20mph speed limits without prior approval from the Secretary of State, enabling:
    - 20mph limits indicated by speed limit (and repeater signs only); and
    - 20mph zones, designed to be 'self-enforcing' through the introduction of traffic calming measures, such as speed humps and chicanes
- **Circular 01/2013 (2013)** – the most recent and current guidance which provides revised guidance on the setting of local speed limits, which is described in greater detail below.

DfT Circular 01/2013 (2013) Summary

3.1.3 This document advises traffic authorities to keep their speed limits under review with changing circumstances, and to consider the introduction of more 20mph limits and zones, over time, in urban areas and built-up village streets that are primarily residential, to ensure greater safety for pedestrians and cyclists.

3.1.4 The guidance acknowledges that 20mph zones are now relatively widespread, with more than 2,000 schemes in operation in England, most of which are 20mph zones.

3.1.5 It states that 20mph zones require traffic calming measures or repeater speed limit signing and/or roundel road markings at regular intervals. Additionally, the beginning and end of a zone is indicated by a terminal sign, with

zones usually covering several roads. (Note that later DfT guidance described below updates this)

3.1.6 A 20mph limit should be signed with a terminal and at least one repeater sign (although this requirement has since changed – see below) and does not have a requirement for traffic calming. They are like other local speed limits and normally apply to individual or small numbers of roads but are increasingly being applied to larger areas.

3.1.7 Clear evidence exists on the effect of reducing traffic speeds on the reduction of collisions and casualties as collision frequency is lower and where collisions do occur the risk of fatal injury is lower. Important benefits of 20mph schemes are acknowledged as including:

- quality of life and community benefits;
- encouragement of healthier and more sustainable travel modes, including cycling;
- environmental benefits;
- positive contributions to improving health and tacking obesity; and
- improving accessibility and tacking congestion

3.1.8 The guidance goes on to say that, based on the positive effects, traffic authorities can use their power to introduce 20mph speed limits or zones on:

- major streets where there are – or could be – significant numbers of journeys on foot, and/or where pedal cycle movements are an important consideration, and this outweighs the disadvantage of lower journey times for motorised traffic; and
- residential streets in cities, towns, and villages, particularly where the streets are being used by people on foot and on bicycles, there is community support, and the characteristics of the street are suitable

3.1.9 It states that evidence from successful 20mph schemes shows that the introduction of 20mph zones generally reduces average traffic speed by more than is the case when a signed-only 20mph speed limit is introduced. When planning a 20mph scheme, it is important to consider the full range of options and their benefits, both road safety and wider community and environmental benefits and costs, before making a decision as to the most appropriate method of introducing a 20mph scheme to meet the local objectives and the road conditions.

3.1.10 Finally, the guidance advises that a comprehensive and early consultation of all those who may be affected by the introduction of a 20mph scheme is an essential part of the implementation process, with this including local residents, all tiers of local government, the police and emergency services, public transport providers and any other relevant local groups.

3.1.11 In terms of Kendal, whilst it is understood that some aspects of this type of consultation has already taken place, further consultation is likely to be needed, although outside the remit of this study. The guidance also describes the difference between '20mph Zones' and '20mph Speed Limits' with these being considered in further detail below.

3.1.12 There is clear evidence of the effect of decreased traffic speeds on the reduction of collisions and casualties; collision frequency is lesser at lower speeds and where collisions do occur, there is a lesser risk of fatal injury at lower speeds. Research also shows that on urban roads with low average traffic speeds any 1 mph reduction in average speed can reduce the collision frequency by around 6% (Taylor, Lynam and Baruya, 2000).

3.1.13 There is also clear evidence confirming the greater chance of survival of pedestrians in collisions at lower speeds. Additional benefits of 20mph schemes include the encouragement of healthier and more sustainable transport modes such as walking and cycling, as well as quality of life and community benefits. Walking and cycling can make a very positive contribution to improving health and tackling obesity, improving accessibility, tackling congestion, reducing carbon emissions, and improving the local environment. There may also be environmental benefits as, generally, driving more slowly at a steady pace will save fuel and reduce pollution, unless an unnecessarily low gear is used.

3.1.14 20mph schemes are usually introduced as either 20mph limits (using only appropriate signing) or 20mph zones (where signing is generally accompanied by other traffic calming features).20mph zones are described as being very effective at reducing collisions and injuries.

20mph Zones

3.1.15 The DfT has made significant changes to facilitate and reduce the cost for providing 20mph zones in England. Traffic authorities can now place any of the following:

- repeater speed sign;
- a speed roundel road marking;
- a combination of both signs; and
- traffic calming features.

3.1.16 At least one traffic calming feature as defined in direction 16(2) TSRGD (Traffic Signs Regulation and General Directions) must be placed in a 20mph zone and the features and signing must still be placed at intervals not greater than 100 metres. Only where speeds are already constrained to be near the limit should local authorities consider placing the speed limit sign or a roundel marking, in addition to physical features within a zone.

3.1.17 Traffic authorities can now incorporate wider areas within a 20mph zone, by effectively signing 20mph speed limits on distributor roads where traffic calming features are not

suitable, or for small individual roads or stretches of road, where average speeds are already at or below 24mph.

20mph Speed Limits

3.1.18 Guidance advises that research into signed-only 20mph speed limits show that they generally lead to only small reductions in traffic speeds. As such, they are therefore considered to be most appropriate for areas where vehicle speeds are already low and if the average speed is already at or below 24mph on a road; introducing a 20mph speed limit through signing alone is likely to lead to general compliance with the new speed limit.

3.1.19 The implementation of 20 mph limits over many roads, which the previous Speed Limit Circular (01/2006) advised against, should be considered where average speeds at or below 24 mph are already achieved over a number of roads. Traffic authorities are already free to use additional measures in 20mph limits to achieve compliance, such as some traffic calming measures and vehicle activated signs, or safety cameras.

3.1.20 Based on this guidance therefore it is not necessary for all roads within the proposed 20mph limit to have an existing average speed of 24mph or below.

Signing Requirements

3.1.21 The current guidance states that authorities are required to install signage in accordance with the TSRGD when introducing a new speed limit.

3.1.22 Until September 2016, the following regulations applied:

- Terminal signs – 60 cm diameter signs were required at the start and end of the speed limit, with signs places on either side of the carriageway to form a gateway, and yellow backing boards recommended to provide additional emphasis; and
- Repeater signs – after an update to the guidance in 2011, the requirement was for at least one repeater sign, with no repeaters required on roads shorter than 200m. Additionally, the latest DfT Circular states that all English authorities can place a roundel marking as a repeater sign, thereby removing the need for an upright sign, and reducing unnecessary clutter.

3.1.23 Under new legislation, local authorities now have more flexibility to make their own decisions on how many speed limit signs are needed to inform drivers, although signage must still be sufficient to encourage compliance.

3.1.24 Within this guidance[3], three key changes were made, which are of relevance to 20mph signs:

[3] The Traffic Signs Regulations and General Directions 2016

- a minimum of one terminal sign (rather than two) is now required in each direction, located on either the driver's nearside or offside, as close as possible to the start and end of the 20mph limit;
- the requirement to place repeater signs has been removed; and
- only 20mph limit terminal signs on trunk or principal roads must be directly illuminated at night.

Case Studies

3.1.25 To provide some background and guidance to the proposals for Kendal, reference has been made to the '*20mph Research Study*' undertaken by Atkins, AECOM and UCL for the DfT in November 2018.

3.1.26 Part of this study included looking at a range of examples of previous schemes which have been implemented in the UK. The study identified that all of the area-wide residential schemes exclude some roads, typically strategic routes but in some cases also key bus routes, distributor roads, streets with non-residential frontages and wider roads where compliance is expected to be low.

3.1.27 Some authorities have included streets which were less suited to a 20mph limit, to avoid isolated 30mph roads and to provide consistency in signage and road user perceptions. This includes streets with higher average speeds before the introduction of the 20mph scheme.

Implications for Kendal

3.1.28 Taking account of the guidance described above, the first stage in identifying the cost of implementing 20mph scheme(s) on Kendal's roads it to provide an assessment of the current situation, particularly in terms of the existing road speeds. This is considered in the following section.

4. The Current Situation

Introduction

4.1.1 This Section of the report considers the current situation within Kendal in terms of land uses, existing speed limits and existing recorded vehicle speeds. A review of this information is necessary to understand the suitability of certain roads for the introduction of 20mph speed limits.

4.1.2 This assessment has been undertaken through a combination of desktop-based analysis, including a review of OS Mastermap speed data, as well as a site visit to Kendal.

Existing Speed Limits

4.1.3 Kendal already has some areas with 20mph mandatory limits including Rinkfield, Kirkbarrow, Hallgarth, Queens Road and the most recently introduced, the Castle Estate. The main shopping street of Stricklandgate also has a 20mph speed limit. Additionally, the residential area around Valley Drive also has a '*Twenty's Plenty*' advisory limit.

4.1.4 **Table 4.1** provides a summary of the characteristics of these areas.

Table 4.1 Existing Kendal 20mph Schemes – Signing and Lining

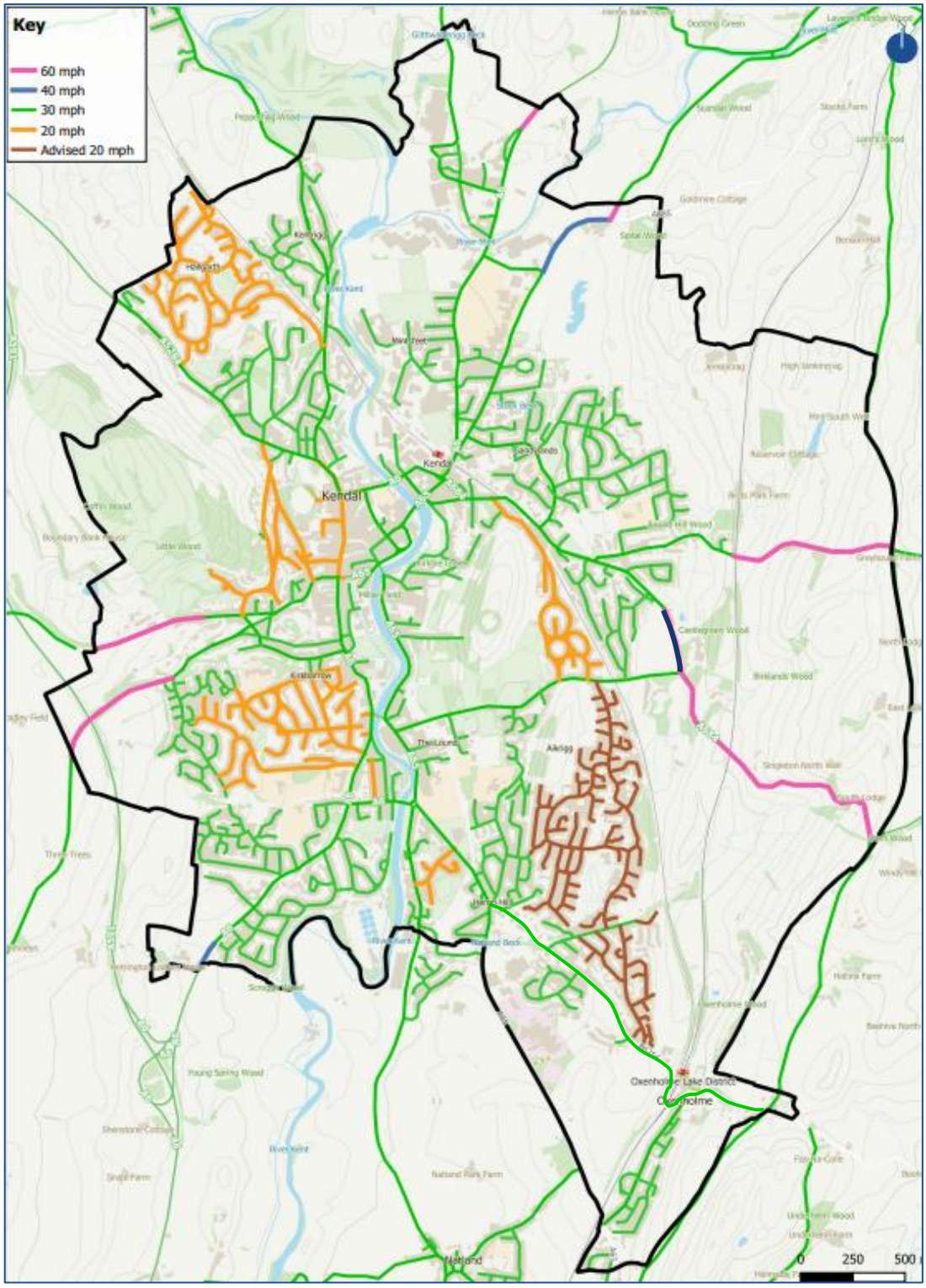
Area	Entry Signs	Repeater Signs	Roundels	High Friction Surfacing	Traffic Calming
Castle Estate	✓	✓			
Rinkfield	✓		✓		✓
Kirkbarrow	✓				✓
Hallgarth	✓		✓	✓	✓
Queens Road	✓		✓	✓	✓
Valley Dr Area '20's Plenty'	✓	✓			✓
Stricklandgate	✓	✓	✓	✓	

4.1.5 Outside of these areas, the existing speed limit on the remaining road network is primarily 30mph. There are small 40mph sections within the Kendal Parish boundary on the arterial roads of the A6 Shap Road, A685 Appleby Road, and the A684 Castle Green Road.

4.1.6 Closer to the parish boundary, the national speed limit applies on some of the roads, with this including Sedbergh Road, A684 Singleton Park Road, Brigsteer Road, Underbarrow Road and Gilthwaiterigg Lane.

4.1.7 **Figure 4.1** provides an illustration of these speed limits on the local road network.

Figure 4.1 Existing Speed Limits on Kendal's Roads



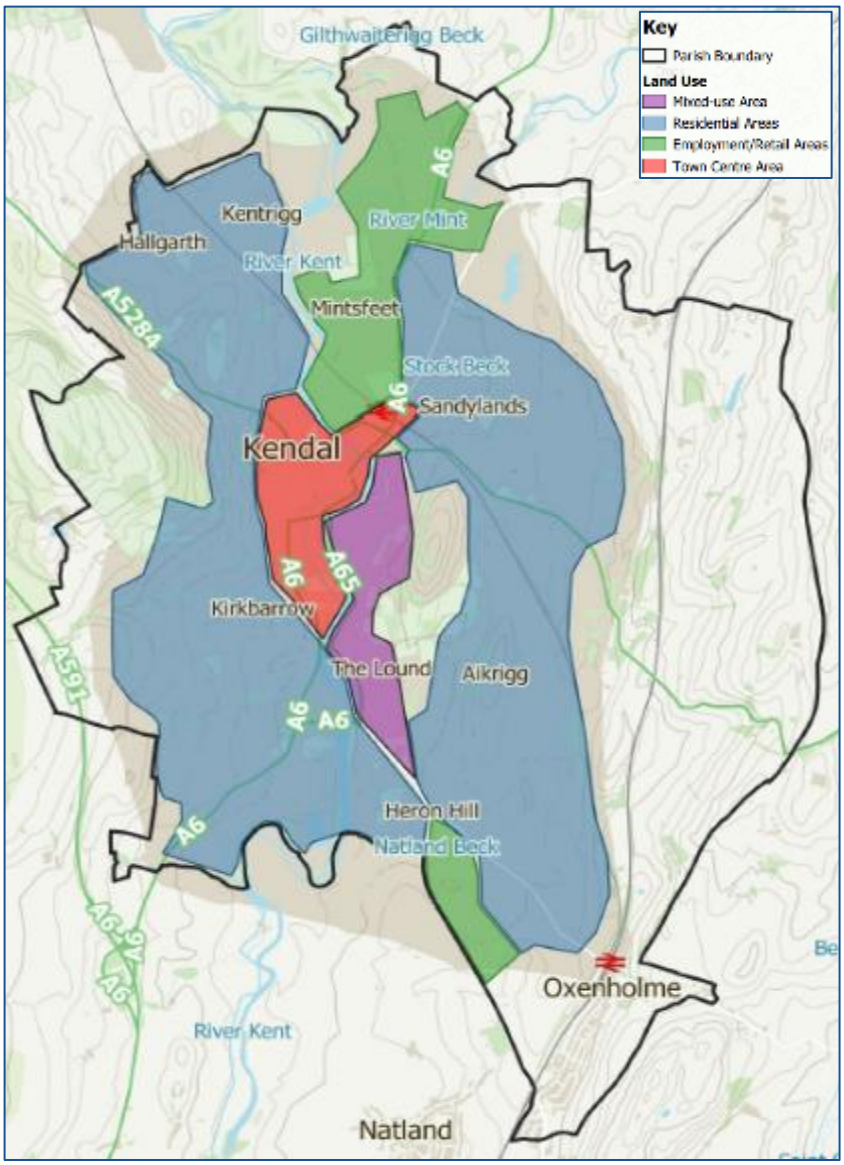
4.1.8 **Figure 4.1** confirms that, in terms of Kendal's road network, about 50% is already covered by either 20mph speed limits or '20's Plenty' advisory signage.

Land Uses

4.1.9 The primary shopping area is focussed in the area around Stricklandgate, whilst most development outside of this area is residential in character, including development adjacent to the town's arterial routes. The main existing employment sites are located to the north of the town centre in the area between the A6 Shap Road and the river Kent. On the northern periphery of the town there is a small retail park between the A6 Shap Road and the A685 Appleby Road.

4.1.10 Aside from these areas, the eastern side of the to the east of the river Kent is predominantly residential in character, with small pockets of employment and retail use. Within the parish boundary on the west side of the river Kent outside of the town centre, development is also predominantly residential in nature, with small areas of employment use. **Figure 4.2** provides a broad illustration of the existing land uses.

Figure 4.2 Land Uses within Kendal Parish Boundary

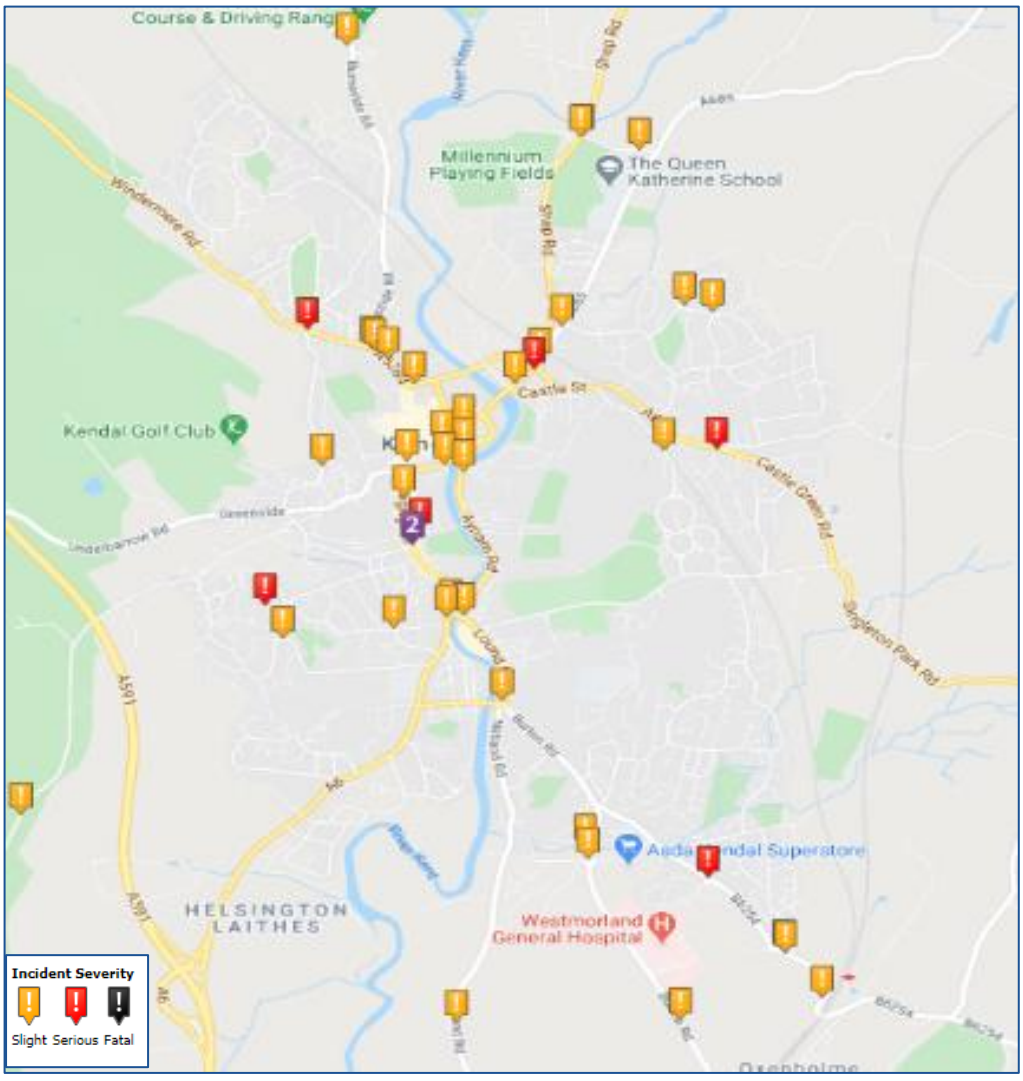


Collision Data

4.1.11 On the basis that the proposals for introducing additional 20mph limits are to provide an environment more conducive to walking and cycling, reference has been made to crashmap.co.uk to gain an indication of the existing pattern of collisions involving cyclists and pedestrians within Kendal. **Figure 4.3** below provides an illustration of the location and severity of collisions involving cyclists over the period 2015 to 2019 for which information is available. The Figure shows slight (shown yellow) and severe (shown red) collisions.

4.1.12 There is clear evidence of collisions predominantly taking place on the arterial routes, including routes close to the Town Centre. Whilst this is a reflection of the higher traffic flows on these routes, the directness of these routes and the lack of suitable alternatives for cyclists are likely to be factors in terms of their attractiveness to cyclists, which in turn leads to greater potential conflict with motor vehicles.

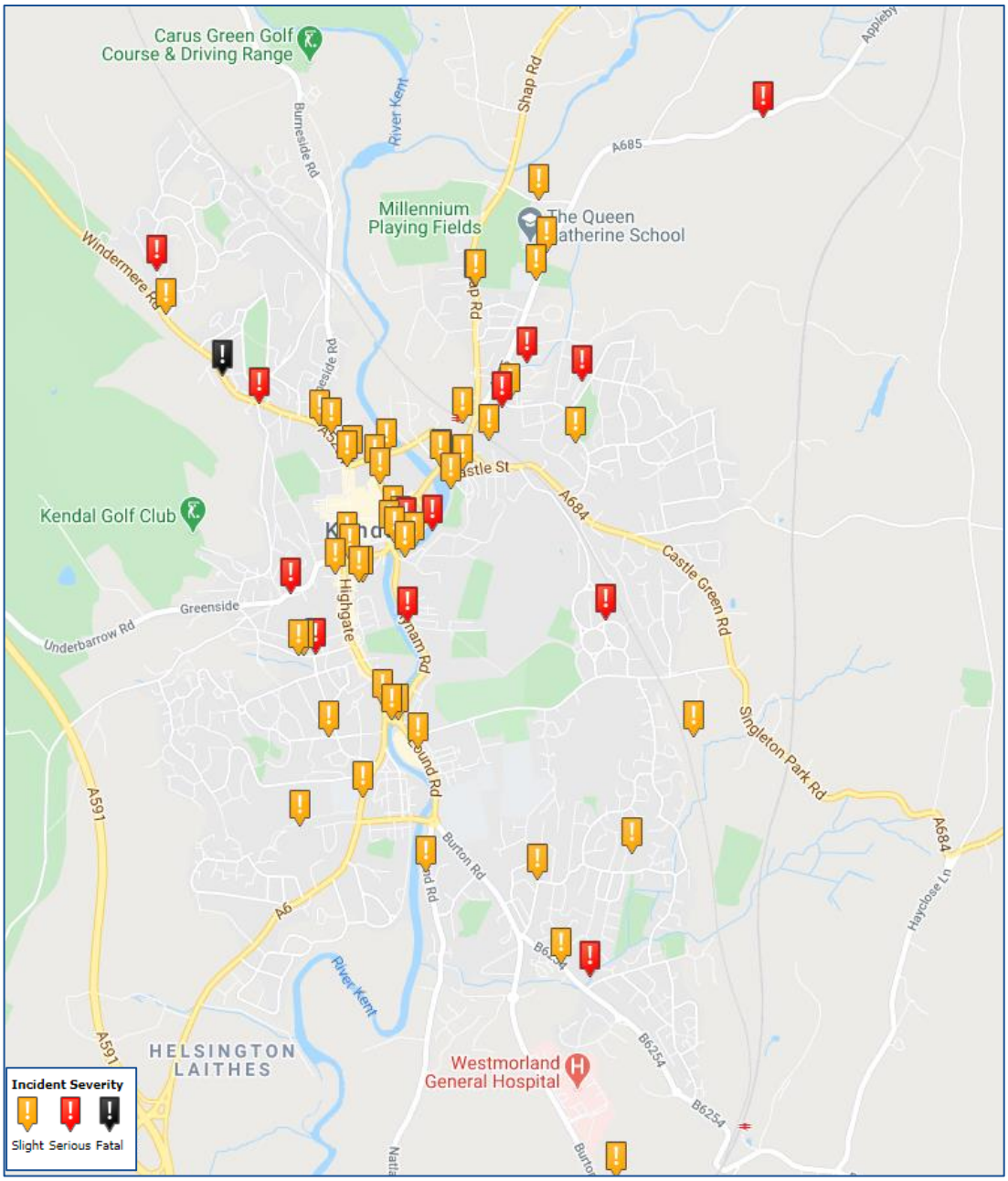
Figure 4.3 Collisions involving Cyclist Casualties, 2015-2019



Source: Crashmap.co.uk

4.1.13 **Figure 4.4** provides an illustration of collisions over the same period for pedestrians.

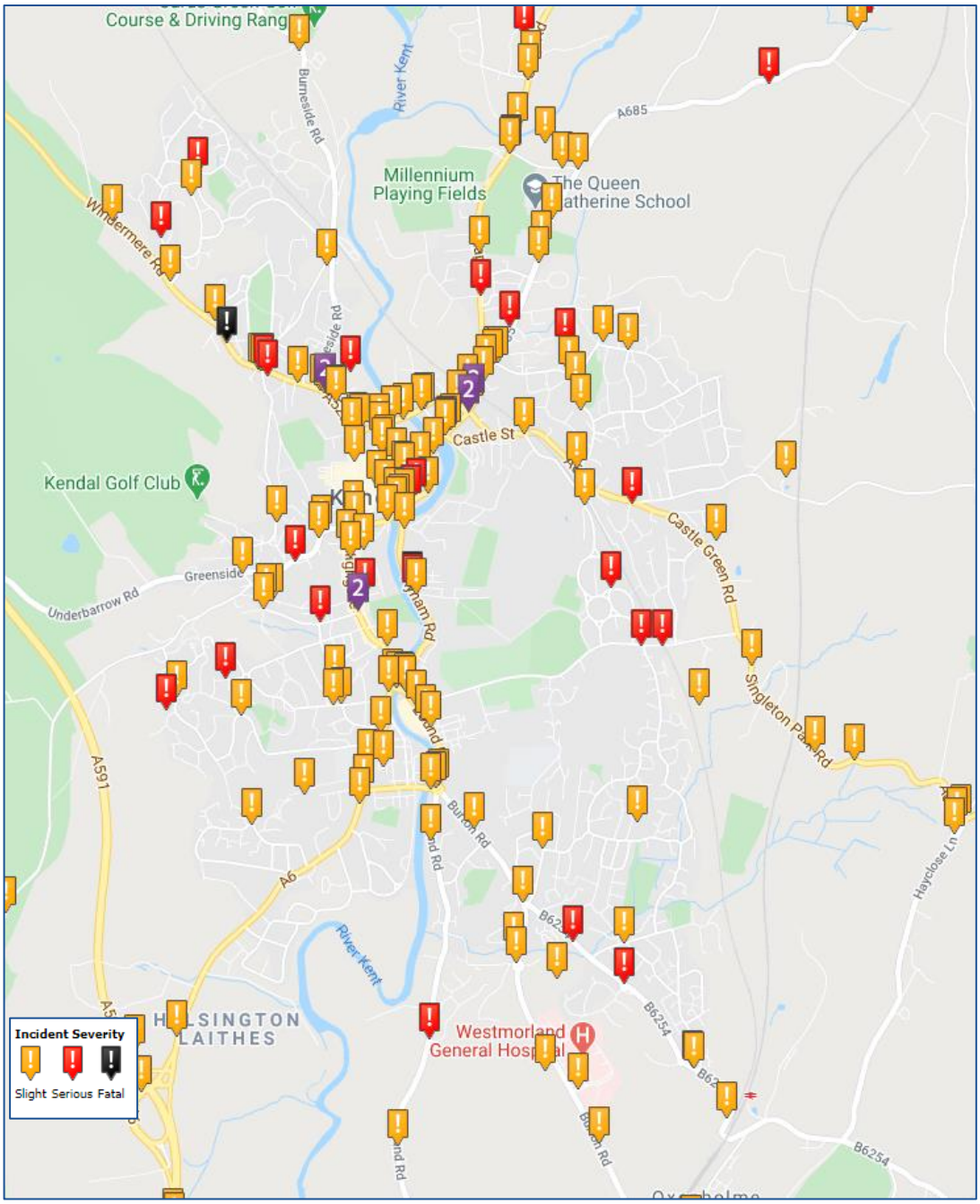
Figure 4.4 Collisions involving Pedestrian Casualties, 2015-2019



Source: Crashmap.co.uk

4.1.14 **Figure 4.5** provides an illustration of collisions over the same period for all road users.

Figure 4.5 All Collisions, 2015-2019



Source: Crashmap.co.uk

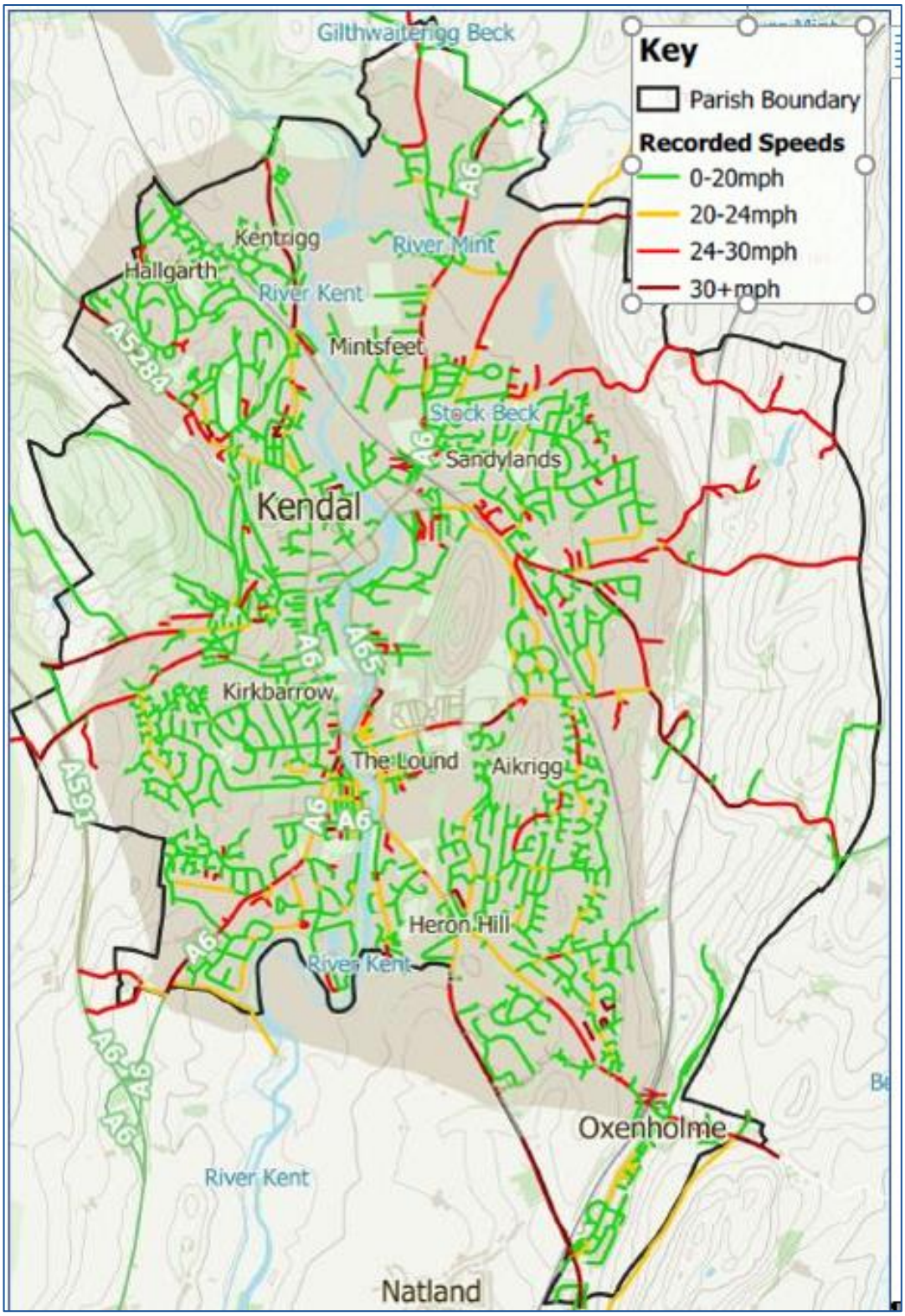
4.1.15 While the general pattern is for the majority of these to have taken place on the arterial routes, there is clear evidence of a number of slight and serious collisions within a number of different residential areas around the town. There was also a fatal collision on the A5284 Windermere Road.

4.1.16 This therefore reinforces the argument for reducing speeds within both residential areas and on arterial routes in order to reduce the number and severity of collisions.

Ordnance Survey Mastermap Speed Data

4.1.17 The OS Mastermap dataset uses mobile phone and GPS tracking to provide speed on different parts of streets within the road network. Analysis of this data has been undertaken to determine average speeds on different parts of the road network. The results of this analysis are summarised below, showing the average speeds for different parts of the town, including the average speed for the arterial routes.

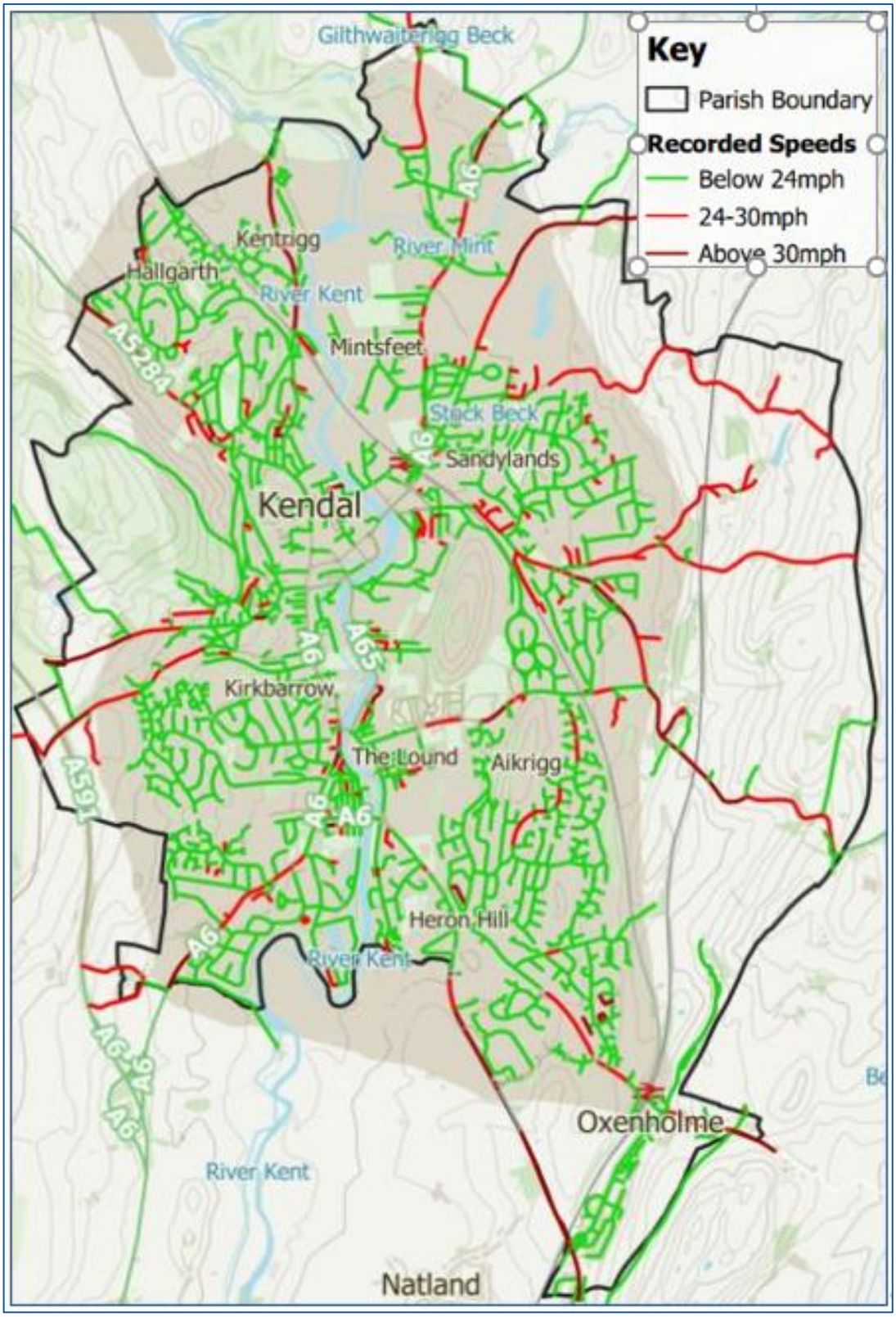
Figure 4.6 OS Mastermap Average Speed Data



Source: OS Mastermap

4.1.18 To simplify matters in line with relevant guidance, the drawing is recreated below, simply showing speeds below 24mph and within the 24-30mph and 30mph+ categories.

Figure 4.7 OS Mastermap Average Speed Data – Above and below 24mph threshold



Source: OS Mastermap

4.1.19 The average speed is estimated based on detailed historical speed information, which is collected annually by in-vehicle telematics devices and mapped to each unique OS Mastermap road link. The latest data is built from the period between April 1st 2019 and March 20th 2020 (just before lockdown) and comprises a sample size of approximately 135,000 vehicles which poll their location every second.

4.1.20 The average speed value is provided in both directions and provides a breakdown of speed travelled at different times of the day, these being:

- 07:00 – 09:00 Monday – Friday (Peak AM)
- 10:00 – 16:00 Monday – Friday (Off Peak)
- 16:00 – 19:00 Monday – Friday (Peak PM)
- 19:00 – 23:00 every day (Evening)
- 00:00 – 04:00 every day (Night Time)
- Weekend

4.1.21 In order to be representative of the situation across the week (as opposed to simply focussing on peak times, when speeds will be slower) the data has been by direction and across the different time periods of the full week in order to produce the information shown in **Figure 4.6** and **Figure 4.7**, this being an average speed for each section of road.

4.1.22 The analysis shows that for most of the residential areas and roads in and around the town centre, average speeds are already below 20mph, with small sections of road falling within the 20-24mph or 24-30mph categories.

4.1.23 As would be expected, for the arterial roads the speeds tend to be higher. These are predominantly within the 24-30mph category, with some sections of road (predominantly towards the edge of the parish boundary) within the 30+mph category.

4.1.24 However, the closer to the town centre, the lower the speeds are on the arterial roads, this is probably a function not just of more traffic but also more interaction at junctions, as well as more traffic signals and pedestrian crossings which reduce average speeds.

4.1.25 Based on this information, the following section considers in greater detail the implications in terms of expanding the existing 20mph speeds limits within Kendal, based upon the relevant policy and guidance already described.

5. 20mph Feasibility Analysis

Reference to Guidance

5.1.1 On the basis of the relevant guidance that average speeds should be below 24mph on the majority, but not necessarily all roads within a proposed 20mph zone, a review of the information presented in **Figure 4.6** and **Figure 4.7** confirms the following:

- The existing 20mph zones of Rinkfield, Kirkbarrow, Hallgarth, Queens Road, Castle Estate and Stricklandgate have recorded average speeds which are predominantly below 20mph;
- The existing '20's Plenty' area centred around Valley Drive has recorded average speeds which are predominantly below 20mph;
- Outside of these areas, recorded average speeds in other residential areas are predominantly below 20mph; and
- Close to the town centre, the recorded average speeds on the arterial routes are predominantly below 20mph, with recorded average speeds generally being below 24mph some way out from the town centre

5.1.2 On this basis, it is therefore suggested that it is appropriate to expand existing 20mph limits to cover most of the town, including parts of the arterial routes closer to the town centre. The speeds on the arterial routes are low within the town, and there are indications that many collisions involving cyclists take place on them, as well as high pedestrian activity in the centre. Limits on these roads would also enable a consistent message across most of the town. In our view there are therefore very good reasons to include these roads in any proposed 20mph limit.

5.1.3 In accordance with the guidance, it has been demonstrated that the average speeds within most of Kendal are already low (below 24mph) and therefore the introduction of a more widespread 20mph limit is considered most appropriate, generally without the need for physical measures.

Majority of Town 20mph Limit

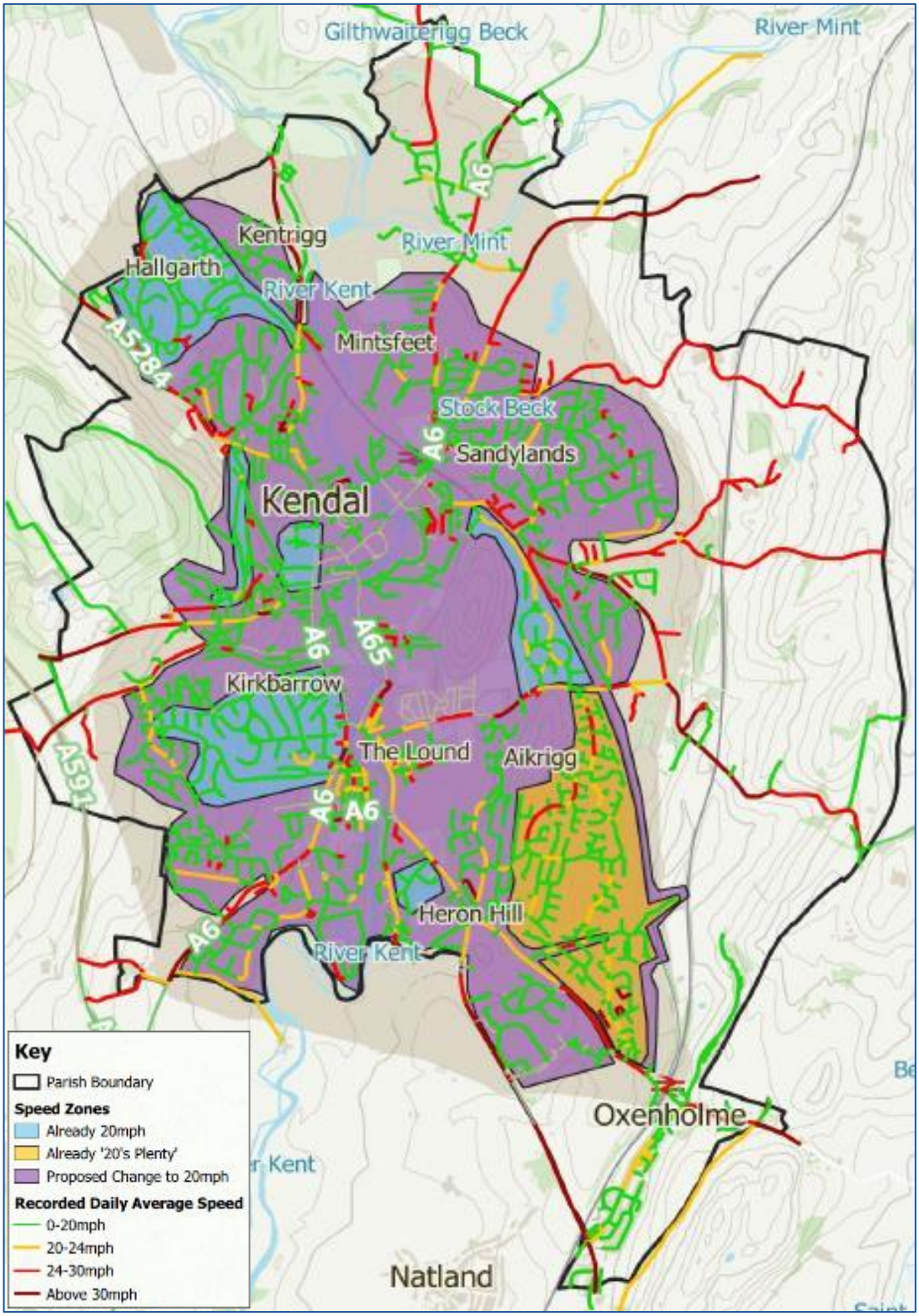
5.1.4 On the basis that there is justification to introduce a 20mph limit for the majority of the town that incorporates not only the residential areas, but sections of arterial roads which are close to the town centre, **Figure 5.1** provides an indicative proposal for this.

5.1.5 As previously described, the most recent guidance in terms of signage requirements advises that only one sign and pole need be located (either on the driver's nearside or offside) in each location, although there is of course a requirement to advise drivers of the changing speed limit in each direction. However for costing purposes we have assumed 2 signs on two separate posts for the arterial routes, and one sign for all other zone entry points

5.1.6 Additionally, it should be noted that terminal signs on principal roads should be illuminated at night in accordance with guidance, and this has been included in the costs. The most recent guidance also advises that the previous requirement for smaller repeater signs within

the speed limit area has been removed. Therefore, at this stage no allowance has been made for including these.

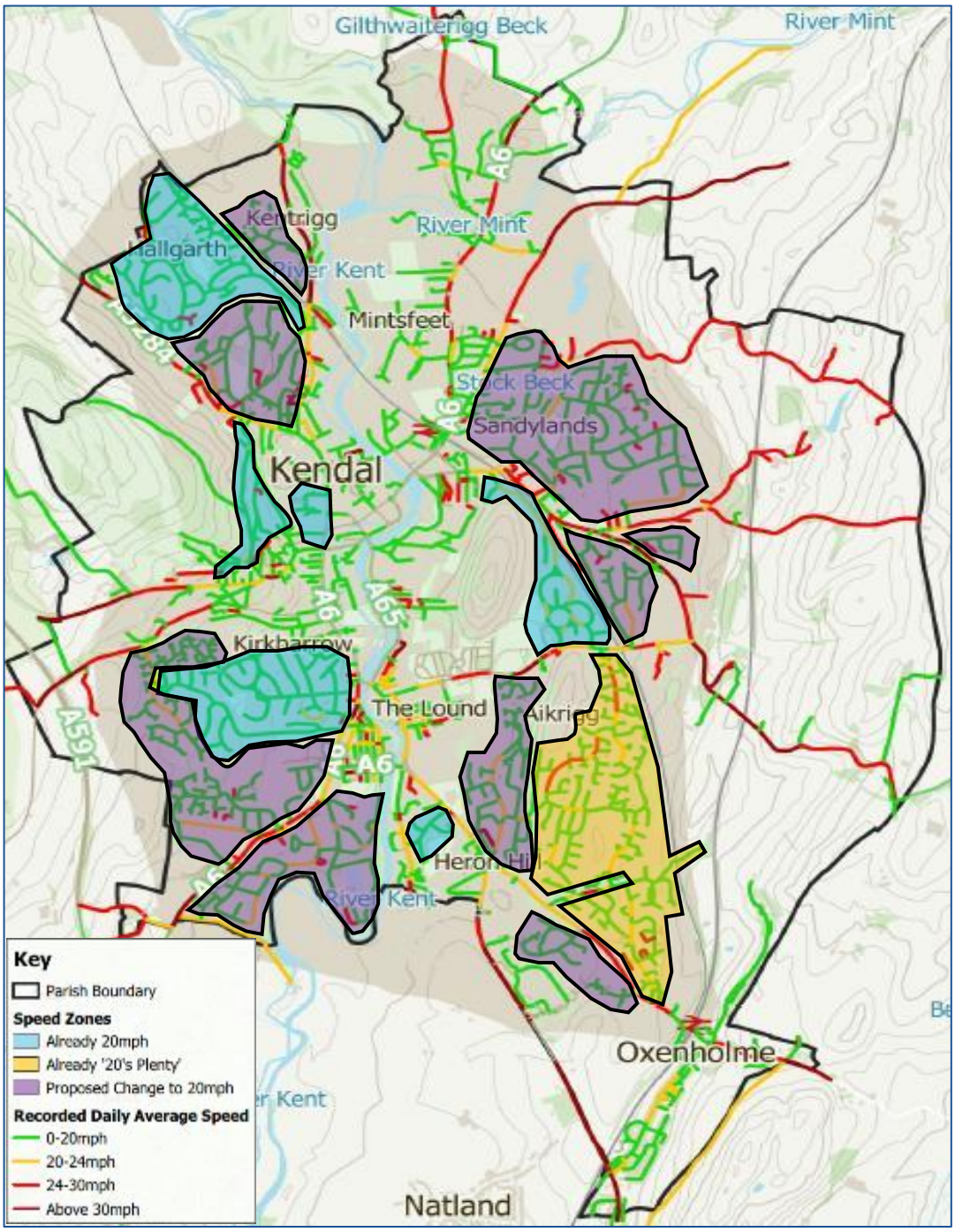
Figure 5.1 Proposed Majority of Town 20mph Speed Limit



Residential Areas

5.1.7 If the introduction of 20mph limits on the arterial routes is not accepted for any reason, consideration has also been given to simply expanding 20mph zones to include additional residential areas. **Figure 5.2** provides an indicative illustration of an expansion of 20mph residential zones, which excludes the key arterial routes. A few other areas have also been excluded mainly as they are small areas of streets close to arterial routes that are short and where speeds are already 20mph or less. These could be included but will increase the cost

Figure 5.2 Proposed 20mph Residential Zone Expansion



Town-wide 20mph Limit

5.1.8 Whilst the analysis has determined that there is justification for introducing a 20mph speed limit which covers much of the town, incorporating the town's arterial routes in and around the town centre, consideration has also been given to implementing a town-wide 20mph limit which covers all roads within the town's boundary.

5.1.9 This would mean moving some of the 20mph entry signs 'back' to the boundary, where current speed evidence is that speeds are higher than 24mph. There would be some consistency in this proposal, in that the entire town area would be subject to a 20mph limit. However there may also need to be some consideration of physical measures on some of the arterial routes to reduce speeds to close to 24mph. Initial consultation with Cumbria County Council has indicated that this is not be likely to be supported, but further discussions with the speed evidence would be useful.

5.1.10 A town-wide scheme would require terminal signs placed at 15 locations where roads enter/exit the Kendal Town parish boundary.

Cost Implications

5.1.11 It's worth noting that with the majority of the town option, the suggested locations of terminal signs on the arterial roads means that most residential areas fall inside the proposed town-wide speed limit area and this therefore removes the requirement to provide additional signage at the entry and exit points of residential estates.

5.1.12 In the scenario of simply expanding the amount of 20mph residential zones, this is therefore likely to mean more signage at entry and exit points to each residential area (some of which have more than 1 entry/exit point) which would otherwise be covered by arterial road signage in a town-wide scheme.

5.1.13 With the town-wide option, this would mean that all residential areas would fall within the town-wide zone and would therefore not require additional signage. However, a town-wide zone would require additional measures on the basis that it would incorporate sections of road which are currently subject to a 40mph speed limit of for which the national speed limit applies and for which recorded speeds are currently significantly in excess of the critical 24mph threshold. Some initial guidance on costs associated with this are considered in the following section.

5.1.14 An additional cost consideration is the cost associated with the removal of the existing signage associated with existing 20mph residential zones, where these are subsumed within a town-wide scheme. Some of these existing areas also have repeater signs, although it may be preferable to retain these.

6. Cost Analysis

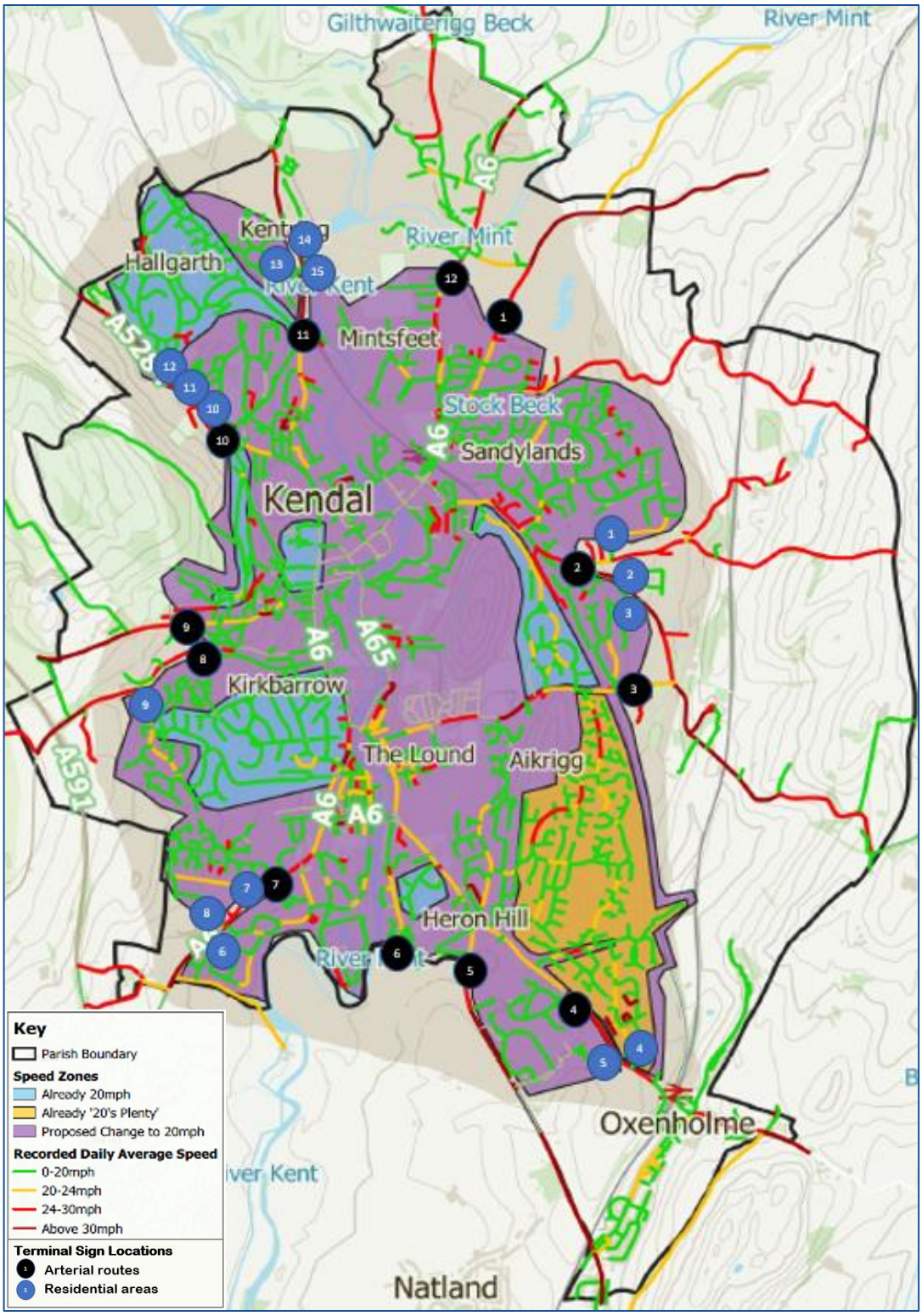
Introduction

6.1.1 This section provides an indicative cost assessment associated with the proposals considered in the previous section and in accordance with the latest guidance on signage requirements.

Majority of Town 20mph Scheme

6.1.2 **Figure 6.1** provides an overall illustration of where it is considered that signage (shown in black) will be required on the periphery of a town-wide 20mph speed limit, taking account of residential areas (shown in blue) which fall outside of the proposed town-wide area.

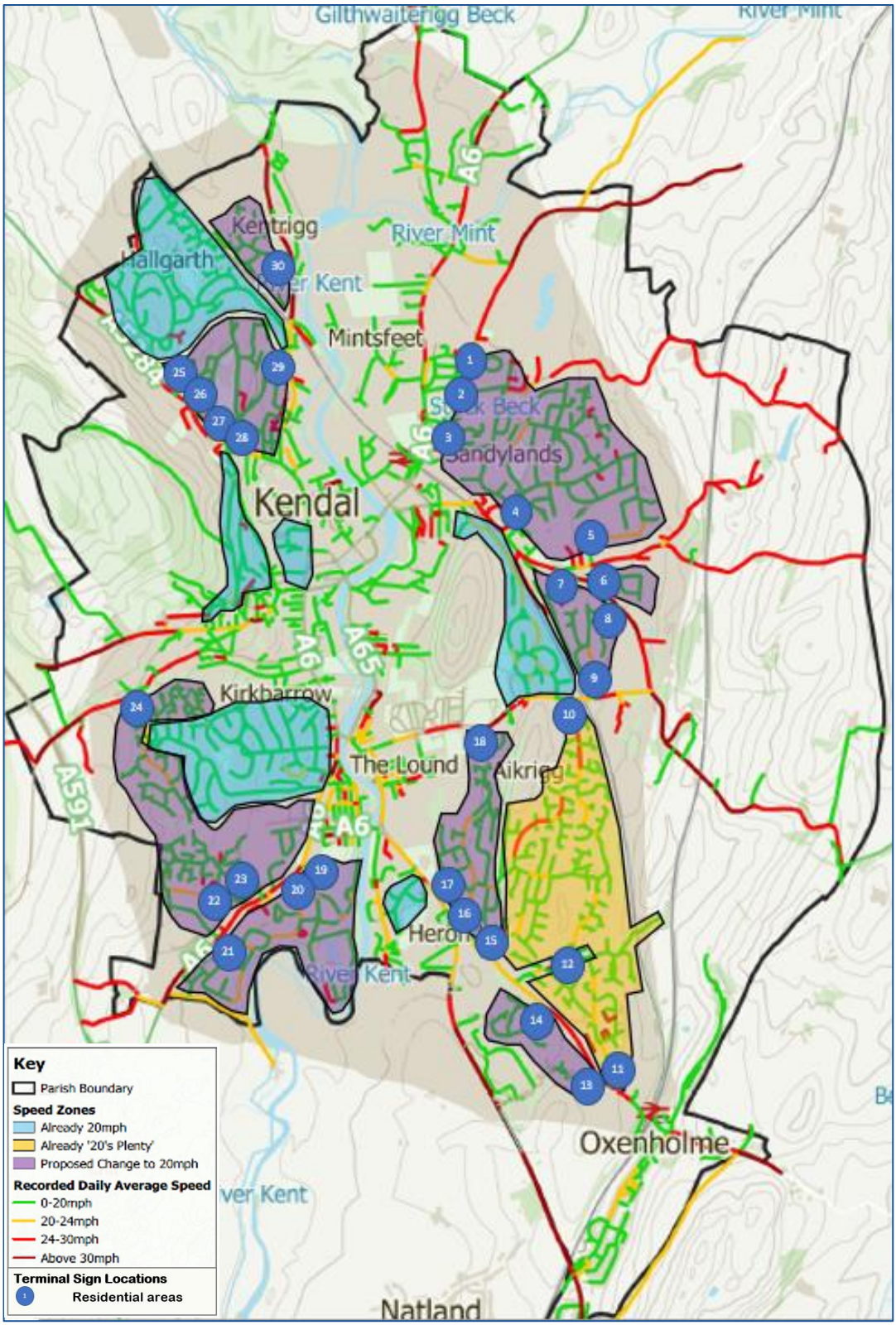
Figure 6.1 Proposed Majority of Town 20mph Speed Limit Sign Locations



Residential Zone Expansion Scheme

6.1.3 **Figure 6.2** provides an overall illustration of where it is considered that signage will be required based on expanding the coverage of residential areas with 20mph limits and excluding the arterial roads.

Figure 6.2 Proposed Expanded Residential 20mph Limit Sign Locations



Town-wide Scheme

6.1.4 A town-wide scheme would require less in terms of terminal signs at the entry and exit points than the two alternative schemes previously considered. However, due to the higher

recorded speeds on the town's arterial roads away from the centre, additional measures with associated costs would be required to assist with compliance.

6.1.5 Whilst, the two smaller schemes require signs (and in some cases lighting), as a minimum, there is a range of additional traffic calming measures which would need to be considered on the town's arterial routes towards the edge of the town boundary, in order to further enforce and encourage a reduction in speeds.

Cost Considerations

6.1.6 The cost estimates are based on the following assumptions from projects elsewhere where possible; we have sought confirmation from Cumbria County Council of these but have as yet had a response. All costs exclude VAT.

- Terminal sign (entry/exit signage) including post – £400
- Illumination (for principal roads) – £945 per sign
- High friction coloured surfacing with 20mph roundel (if added) - £3,000 per location
- Sign removal (of existing 20mph terminal signage within town-wide scheme) – £100
- 20 mph roundel on road if used - £100
- Traffic Regulation Orders (TROs) - £5,000 to draw up and advertise etc. each zone
- Design and tendering fee – 15%
- Contingency - 15%

6.1.7 In a town-wide scenario if additional traffic calming measures would be required on the town's arterial routes away from the centre, such measures could take a number of forms, ranging from speed activated traffic lights to physical measures such as road narrowings.

6.1.8 One such example which has been discussed with KTC is the introduction of speed activated traffic lights. These traffic lights respond to vehicle speeds where they exceed the limit. They tend to be located within a few hundred metres inside the speed limit in order to bring speeding vehicles to a halt and encourage observation of the speed limit within the built-up area of a town. Research from elsewhere indicates that the implementation of one set of speed activated traffic lights can cost in the region of £150,000.

6.1.9 The introduction of such measures on 15 entry/exit points to the town boundary would therefore be very expensive. However, they may be applicable in particularly sensitive locations where existing speeds are high and/or where there is a high level of pedestrian/cycle activity, as well as residential frontages to arterial routes.

6.1.10 Whilst this would require a much more detailed analysis incorporating traffic engineering considerations to identify appropriate traffic light locations, a high level review of recorded speeds and vulnerable road user collisions in conjunction with road frontage characteristics suggests that possible locations where this measure (or indeed any other traffic calming measure) might be appropriate would be:

- A684, Singleton Park Road/Castle Green Road;

- B6254 Oxenholme Road;
- A5284, Windermere Road; and
- Burneside Road.

6.1.11 Whilst speed vehicle activated traffic signs would be an effective option, another much less expensive option would be vehicle-activated signs. As well as being relatively cheap they can be installed where there is no electricity, relying on solar power instead.

6.1.12 These cost approximately £10,000 per sign and are therefore likely to be more feasible for more widespread implementation in the town, in particular at locations where current speeds may be higher or there are more accidents, for example the four locations noted above.

6.1.13 In summary, this demonstrates that there is a wide range of potential costs to consider in terms of additional traffic calming or speed reduction measures which would be required for a town-wide scheme. In the table below we give a range between some 5 vehicle actuated signs (£50,000) to having vehicle activated lights for the 4 routes identified as being more sensitive locations (£600,000).

6.1.14 **Table 6.1** provides a summary of the breakdown of these cost elements for the town-wide, majority of town and residential area expansion options, whilst more detailed cost analysis is included in **Appendix A** .

Table 6.1 20mph Scheme Cost Summary by Option

Cost Element	Town-wide	Majority of Town	Residential Expansion
Signs costs	£25,915	£28,570	£24,000
TROs	£5,000	£5,000	£45,000
Traffic calming	£50,000 - £600,000	-	-
Subtotal	£80,915 - £630,915	£33,570	£69,000
Design Fee (15%)	£12,137 - £94,637	£5,035.5	£10,350
+ Contingency (15%)	£12,137 - £94,637	£5,035.5	£10, 350
Total	**£105,190 - £820,190**	**£43, 641**	**£89,700**

6.1.15 The TRO cost for the 'residential expansion; is £45,000 on the basis that it is £5,000 for each of nine new 'zones' – but this cost may be able to be reduced.

6.1.16 These costs do not yet include 20 mph repeater signs of any kind and/or any high friction surfacing with 20 mph roundel at the entry/exit points of the changed speed limit to reinforce the change to drivers. On-street roundels would cost approximately £100 each, while the coloured high friction surfacing would be £3,000 per location – if these were introduced on all the arterial roads this would add £36,000 to the cost. No consultation costs, third party costs have been included. We would recommend that some element of these measures be included in all the above options.

7. Implementation

Introduction

7.1.1 In terms of implementing a 20mph scheme there are several key stages involved. Given that there are already several 20mph zones already within Kendal (including those which have recently been introduced), it is assumed that the Town Council already has some knowledge of the process of implementation.

7.1.2 The principle processes include scheme design and specification (including signage and road markings), engagement and consultation, the process of Traffic Regulation Orders (TROs), followed by the implementation of the speed limits and any supporting measures which may be required to encourage compliance.

Phasing options

7.1.3 Clearly work on extension of individual zones could be a first step, but if this was later expanded to a 'most of town' or 'whole-town scheme' there would be some abortive costs. One other transition could be between a 'most of town' and 'whole-town scheme' by relocating signing further out.

Scheme Design

7.1.4 Whilst this assessment has previously provided an initial consideration of scheme design in terms of where 20mph zones can be introduced/expanded, as well as where signage and road markings should be positioned and relocated, it is likely that this would need to be considered in greater detail as proposals move forwards.

7.1.5 In terms of scheme boundaries, the proposed extent of these has been largely based on the interpretation of the recorded speed data, focussing on those roads where speeds are generally below 24 mph and more commonly below 20 mph. Land use and the general characteristics of roads has helped inform this decision- making process.

7.1.6 Research from elsewhere confirms that smaller case studies use obvious urban features to identify scheme boundaries, with these often helping drivers to acknowledge a change in environment as they enter a 20mph area.

7.1.7 Additionally, it is noted that often strategic routes are excluded, as are streets with non-residential frontages or where compliance might be expected to be low. At the same time, sometimes streets which might be considered as less suited to a 20mph limit are included to avoid driver confusion in having isolated 30mph roads in what are otherwise blanket 20mph zones.

Signs and Road Markings

7.1.8 Whilst ultimately the decision on the type and locations of any signs and road markings would be the responsibility of the local highway authority, this assessment has previously

considered the broad requirement for these in accordance with the proposed 20mph area for Kendal, primarily as part of providing an initial cost estimate.

7.1.9 Reviewing the current 20mph zones with Kendal, there is a mixture of signing and lining amongst the different schemes, as previously described in Section 3.

Consultation

7.1.10 In terms of consultation, it's worth noting that the '*20mph Research Study*' undertaken by Atkins, AECOM and UCL, which reviewed a number of case study schemes, found that none of the schemes received substantial objections, with this potentially being attributed to the comprehensive approach to consultation that seemed to have been adopted.

7.1.11 In terms of Kendal, it is understood that a study was undertaken by the Town Council to gather opinions of residents in relation to the potential extension of 20mph speed limits across the town. The study found that the majority of respondents (59%) supported the principle of 20mph.

7.1.12 Therefore, there appears to be an overall positive view towards the implementation, although more detailed community consultation would be required as part of any specific proposals, as described in further detail below.

Traffic Regulation Order (TRO) Process

7.1.13 Section 84 of the Road Traffic Regulation Act 1984 requires that local highway authorities are required to implement a TRO in order to make a new 20mph speed limit legally enforceable.

7.1.14 The TRO must be published in local newspapers and throughout the community, whilst statutory consultees, relevant stakeholders and the public must be consulted. A period of at least 21 days must be allowed for proposals to be given consideration and formal objections to be made, although early community engagement will usually help to minimise objections and delays in this process.

7.1.15 Although objections can lead to lengthy delays, a TRO can be delivered within 6-8 weeks. Although, it should be noted that in the case of Kendal, initial consultation with Cumbria County Council Highways has indicated that an existing high volume and backlog of TRO schemes currently means timescales for implementation are somewhat longer than would normally be expected.

Implementation Timescales

7.1.16 Whilst small isolated schemes (such as those which already exist in Kendal), tend to be implemented in a single phase, larger schemes (such as a town-wide scheme) tend to be phased over a longer time period, with research showing examples of two to four year periods.

7.1.17 There are several benefits to implementation over a longer time. For example, it allows feedback and data to be gathered from early schemes which can help inform subsequent

scheme implementation. However, if there are longer timescales between consultation and implementation it can cause public confusion.

7.1.18 In terms of Kendal, given that there are already a number of existing 20mph zones which have been implemented over recent years, it is likely that there is already an understanding of the public reaction to these schemes, as well as the funding and resources involved. It is expected that this would therefore inform the timescales associated with the implementation of a town-wide scheme, and it should be at the lower end of the above timescales, approximately 2 years.

Supporting Measures

7.1.19 Evidence from case studies elsewhere in the UK shows that there are often a range of measures which Local Authorities adopt to encourage compliance with 20mph limits.

7.1.20 Research undertaken by Toy, S (2012) on schemes previously implemented, classifies supporting measures according to:

- Education – explaining the importance of 20mph speed limits;
- Enlightenment – developing a broad vision for 20mph;
- Engagement – listening to local concerns;
- Encouragement – visual reminders for keeping to the limit; and
- Enforcement – warnings, sanctions, and penalties for breaking the limit

Scheme Delivery

7.1.21 Whilst the delivery of schemes is nearly always led by the highway authority, there are normally several key delivery partners with different roles. Councillors have the responsibility for giving approval to Council officers to proceed, as well as promoting schemes and supporting consultation exercises.

7.1.22 The local police force will have an input in terms of agreeing the inclusion of roads, attending meeting and consultations, as well as in terms of enforcement and education, whilst partnership with health organisations will benefit in terms of promoting the active travel benefits of the scheme.

Funding

7.1.23 Whilst most schemes are funded from Local Transport Funds and Sustainable Transport Funds, there are examples of schemes which have had substantial contributions from the health sector, in view of the active travel and health benefits which can be derived from 20mph schemes. This includes examples of funding from a Local Authority's Public Health Department as well as a Primary Care Trust. Schemes have also been known to be part funded using planning obligations from local developers.

8. Summary and Conclusions

8.1.1 This report has been prepared by Markides Associates to consider the costs associated with implementing 20mph speed limits throughout Kendal on behalf of Kendal Town Council. Whilst considering the costs of implementing 20mph speed limits on the town's roads, the study has also considered the timescales and practicalities associated with implementing such a scheme.

8.1.2 Following a review of the current policy and guidance in relation to the implementation of 20mph speed limits, a review of the current situation in Kendal has been provided, with this encompassing a review of existing speed limits and land uses on and adjacent to different parts of the road network. The review has confirmed that some existing roads within Kendal already have 20mph mandatory speed limits, including several large residential areas. Outside of these areas, the majority of Kendal's road network currently has a 30mph speed limit.

8.1.3 As part of the review of the current situation, an analysis of existing recorded speeds on different parts of the local road network has been undertaken based on OS Mastermap speed data.

8.1.4 The main points to note from this analysis are:

- The existing 20mph zones of Rinkfield, Kirkbarrow, Hallgarth, Queens Road, Castle Estate and Stricklandgate have recorded average speeds which are predominantly below 20mph;
- The existing '20's Plenty' area near Aikrigg has recorded average speeds which are predominantly below 20mph;
- Outside of these areas, recorded average speeds in other residential areas are predominantly below 20mph; and
- Close to the town centre, the recorded average speeds on the arterial routes are predominantly below 20mph, generally being below 24 mph some way out from the town centre

8.1.5 On the basis that the roads identified above are considered appropriate for the implementation of 20mph speed limits, the study has gone to consider that there is justification to implement a 'majority of town' 20mph limit which includes both residential areas and the town's arterial roads in close proximity to the town centre. An alternative option has been considered, which excludes the arterial routes and expands existing residential 20mph zones to incorporate most other residential parts of the town. Cumbria County Council have expressed some caution bout 20mph zones on the arterial routes. As requested by KTC, initial consideration has been given to additional traffic calming measures associated with a town-wide option.

8.1.6 The costs implications of these options have subsequently been considered in addition to the wider considerations of implementing 20mph speed limits on the wider road network of Kendal.

FIGURES

Figure 1.1 Study Area
Figure 4.1 Existing Speed Limits on Kendal's Roads
Figure 4.2 Land Uses within Kendal Parish Boundary
Figure 4.3 Collisions involving Cyclist Casualties, 2015-2019
Figure 4.4 Collisions involving Pedestrian Casualties, 2015-2019
Figure 4.5 All Collisions, 2015-2019
Figure 4.6 OS Mastermap Average Speed Data
Figure 4.7 OS Mastermap Average Speed Data – Above and below 24mph threshold
Figure 5.1 Proposed Majority of Town 20mph Speed Limit
Figure 5.2 Proposed 20mph Residential Zone Expansion
Figure 5.1 Proposed Majority of Town 20mph Speed Limit Sign Locations
Figure 5.2 Proposed Expanded Residential 20mph Limit Sign Locations

APPENDIX A – COST ANALYSIS

Kendal 20mph Study

Cost Analysis - Full Town with elements of traffic calming

Unit cost	Terminal sign	£400	needs signage on front and reverse sides for entry and exit, assume requires 1 post
	Repeater sign	£240	
	Illumination	£945	only required on trunk and principal roads
	High Friction colour Surfacing with 20mph roundel	£3,000	
	Sign removal	£100	
	TRO	£5,000	assumed to be 1 for a town-wide scheme
	Roundel	£100	
	Vehicle speed activated signs	£10,000	
	Vehicles speed activated traffic lights	£150,000	

New Signage

No.	Principal Roads (black circles)	Terminal Sign	Illumination	Cost
1	A685 Appleby Road	2	1	**£1,745**
2	Sedbergh Road	2	1	**£1,745**
3	A684 Singleton Park Road	2	1	**£1,745**
4	B8254 Oxenholme Road	2	0	**£800**
5	A65 Burton Road	2	1	**£1,745**
6	Oxenholme Lane	2	0	**£800**
7	Natland Road	2	0	**£800**
8	A6 Milnthorpe Road	2	1	**£1,745**
9	Brigsteer Road	2	0	**£800**
10	Underbarrow Road	2	0	**£800**
11	A5284 Windermere Road	2	1	**£1,745**
12	Burneside Road	2	0	**£800**
13	Giltwaiterrigg Lane	2	0	**£800**
14	A6 Shap Road	2	1	**£1,745**
15	Mealbank Road	2	0	**£800**
	Total			**£18,615**

				Option	
				VA Signs	VA Lights
		£80,915	**£630,915**	**Design Fee**	£12,137.25	£94,637.25
				Contingency	£12,137.25	£94,637.25
				GRAND TOTAL	**£105,189.50**	**£820,189.50**

Option assume HFS with roundel needed

15	£	3,000	£ 45,000

Traffic Calming

No.	Principal Roads (black circles)	VA Sign	VA Lights	Cost	Cost
1	A685 Appleby Road			**£0**	**£0**
2	Sedbergh Road			**£0**	**£0**
3	A684 Singleton Park Road	1	1	**£10,000**	**£150,000**
4	B8254 Oxenholme Road	1	1	**£10,000**	**£150,000**
5	A65 Burton Road			**£0**	**£0**
6	Oxenholme Lane			**£0**	**£0**
7	Natland Road			**£0**	**£0**
8	A6 Milnthorpe Road			**£0**	**£0**
9	Brigsteer Road			**£0**	**£0**
10	Underbarrow Road			**£0**	**£0**
11	A5284 Windermere Road	2	1	**£20,000**	**£150,000**
12	Burneside Road	1	1	**£10,000**	**£150,000**
13	Giltwaiterrigg Lane			**£0**	**£0**
14	A6 Shap Road			**£0**	**£0**
15	Mealbank Road			**£0**	**£0**
	Total			**£50,000**	**£600,000**

Sign Removal (assumed to be existing 20mph zone terminal signs only - repeater signs can be left in place, except for '20's Plenty signs

Zone	Location	No.	Cost
Castle Estate	Castle Road	4	**£400**
	Castle Dr./Gr.	8	**£800**
Aikrigg/Valley Dr. (20's Plenty)	Valley Drive	2	**£200**
area - all repeater signs will	Hayclose Road	2	**£200**
need to be removed/replaced as	Esthwaite Ave.	1	**£100**
they are green '20's Plenty' signs	Internal	16	**£1,600**
Rinkfield	Eastern end	4	**£400**
	Western end	4	**£400**
Kirkbarrow	Vicarage Dr. (e)	4	**£400**
	Glebe Road	4	**£400**
	Westwood Ave.	2	**£200**
	Vicarage Dr. (w)	4	**£400**
	Barne Holme	4	**£400**
Kendal Fellside	High Tenterfell	4	**£400**
	Queen's Road	3	**£300**
Hallgarth	Sparrowmire Ln.	4	**£400**
Town Centre	Stricklandgate	3	**£300**
Total			**£7,300**

TRO	1	**£5,000**

Cost Analysis - Majority of Town Option including sections of arterial routes and residential areas which fall outside the main town cordon.

Unit cost	Terminal sign	£400	needs signage on front and reverse sides for entry and exit, assume requires 1 post
	Repeater sign	£240	
	Illumination	£945	only required on trunk and principal roads
	High Friction colour Surfacing with 20mph roundel	£3,000	
	Sign removal	£100	
	TRO	£5,000	assumed to be 1 for a majority of town scheme
	Roundel	£100	

	New Signage			**£33,570**
No.	**Principal Roads (black circles)**	**Terminal Sign**	**Illumination**	**Cost**
1	A685 Appleby Road	2	1	**£1,745**
2	A684 Sedbergh Road	2	1	**£1,745**
3	Park Side Road	2	0	**£800**
4	B8254 Oxenholme Road	2	0	**£800**
5	A65 Burton Road	2	1	**£1,745**
6	Natland Road	2	0	**£800**
7	A6 Milnthorpe Road	2	1	**£1,745**
8	Brigsteer Road	2	0	**£800**
9	Underbarrow Road	2	0	**£800**
10	A5284 Windermere Road	2	1	**£1,745**
11	Burneside Road	2	0	**£800**
12	A6 Shap Road	2	1	**£1,745**
	Total			**£15,270**
No.	**Residential Roads outside of principal cordon (blue circles)**			
1	Sedbergh Drive	1	0	**£400**
2	Oak Tree Road	1	0	**£400**
3	Castle Green Close	1	0	**£400**
4	Hayclose Road	1	0	**£400**
5	Strawberry Fields	1	0	**£400**
6	Kent Park Avenue	1	0	**£400**
7	Lumley Road	1	0	**£400**
8	Stonecross Road	1	0	**£400**
9	Underwood	1	0	**£400**
10	Green Hill	1	0	**£400**
11	Fairfield Lane	1	0	**£400**
12	Underley Road	1	0	**£400**
13	Briarrigg	1	0	**£400**
14	Kentrigg	1	0	**£400**
15	Kentrigg Walk	1	0	**£400**
	Total			**£6,000**

Sign Removal (assumed to be existing 20mph zone terminal signs only - repeater signs can be left in place, except for '20's Plenty signs

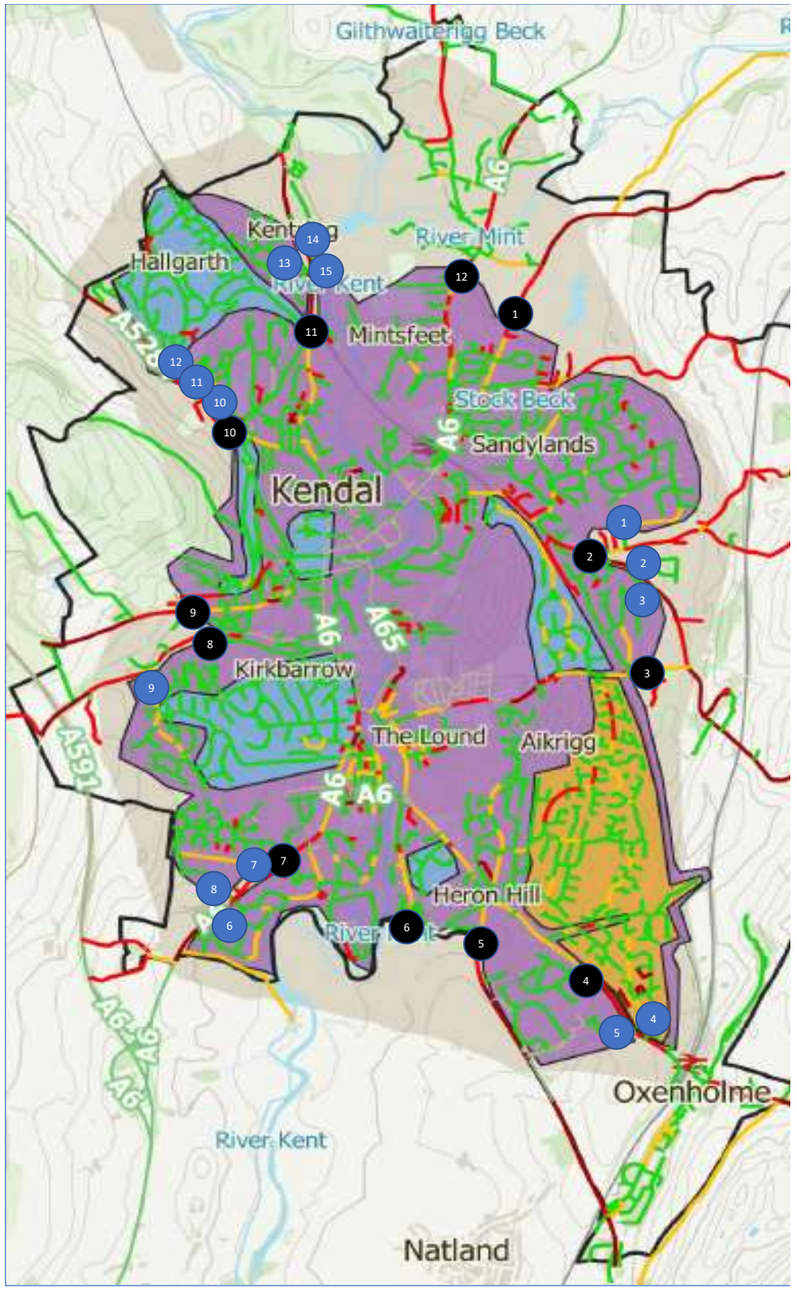
Zone	**Location**	**No.**	**Cost**
Castle Estate	Castle Road	4	**£400**
	Castle Dr./Gr.	8	**£800**
Aikrigg/Valley Dr. (20's Plenty)	Valley Drive	2	**£200**
area - all repeater signs will	Hayclose Road	2	**£200**
need to be removed/replaced as	Esthwaite Ave.	1	**£100**
they are green '20's Plenty' signs	Internal	16	**£1,600**
Rinkfield	Eastern end	4	**£400**
	Western end	4	**£400**
Kirkbarrow	Vicarage Dr. (e)	4	**£400**
	Glebe Road	4	**£400**
	Westwood Ave.	2	**£200**
	Vicarage Dr. (w)	4	**£400**
	Barne Holme	4	**£400**
Kendal Fellside	High Tenterfell	4	**£400**
	Queen's Road	3	**£300**
Hallgarth	Sparrowmire Ln.	4	**£400**
Town Centre	Stricklandgate	3	**£300**
Total			**£7,300**

TRO	1		**£5,000**

Design Fee	£5,035.50
Contingency	£5,035.50
GRAND TOTAL	**£43,641.00**

Option assume HFS with roundel needed

12	£	3,000	£	36,000



Cost Analysis - Alternative Option, the addition of more residential zones (shown purple)

Unit cost	Terminal sign	£400	signage on front and reverse sides for entry and exit, requires 1 post
	Repeater sign	£250	
	Illumination	£945	only requierd on trunk and principal roads
	High Friction Surfacing	£3,000	
	Sign removal	£100	not relevant, with the addition of more residential zones
	TRO	£5,000	assumed to be 1 for each zone

	New Signage		**£69,000**
No.	**Residential Roads**	**Terminal Sign**	**Cost**
1	Spital Park	2	**£800**
2	Fowl Ing Lane	2	**£800**
3	Sandylands Road (w)	2	**£800**
4	Sandylands Road (s)	2	**£800**
5	Sedbergh Drive	2	**£800**
6	Oak Tree Road	2	**£800**
7	Rusland Park	2	**£800**
8	Castle Green Close	2	**£800**
9	Larch Grove	2	**£800**
10	Valley Drive	2	**£800**
11	Hayclose Road	2	**£800**
12	Kendal Parks Road	2	**£800**
13	Strawberry Fields	2	**£800**
14	Whinlatter Drive	2	**£800**
15	Murley Moss Lane	2	**£800**
16	Heron Hill	2	**£800**
17	Heron Hill (one way)	2	**£800**
18	Archers Meadow	2	**£800**
19	Wattsfield Road	2	**£800**
20	Bellingham Road	2	**£800**
21	Kent Park Avenue	2	**£800**
22	Stonecross Road	2	**£800**
23	Collin Road	2	**£800**
24	Underwood	2	**£800**
25	Underley Road	2	**£800**
26	Fairfield Lane	2	**£800**
27	Green Hill	2	**£800**
28	Green Road	2	**£800**
29	Horncop Lane	2	**£800**
30	Briarrigg	2	**£800**
	Total		**£24,000**
	Sign Removal (not required, although '20's Plenty' signs in Aikrigg/Valley Drive area will need replacing)		
	Total		**£0**
	TRO	9	**£45,000**

Design Fee	£10,350.00
Contingency	£10,350.00
GRAND TOTAL	**£89,700.00**