Midlothian Roads Hierarchy Review

Midlothian Council

7 December 2021

DRAFT

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Quality information

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1. Introduction

1.1 Background

Scotland's National Transport Strategy (NTS2) published in February 2020 sets out a vision of our transport system for the next 20 years to address the key challenges we face. With a number of overarching strategies and delivery plans being produced to support this at a national level, including the Road Safety Framework (2021), Midlothian Council have appointed AECOM to undertake a review of their existing road network hierarchy and whether this is still appropriate and in keeping with the recent national publications, with a particular focus on road safety.

Midlothian Council officers monitor all road accidents which occur in the local authority boundary as well as specific complaints from members of the public and community Councils. Various datasets have been extracted for analysis within this report, including an assessment of: Severity, speed, lighting conditions, weather conditions, and classification of road. This has helped to establish a baseline for the local authority area and has allowed site specific assessments to be undertaken of major settlements within the local authority boundary.

The following Figure details the study area being considered.

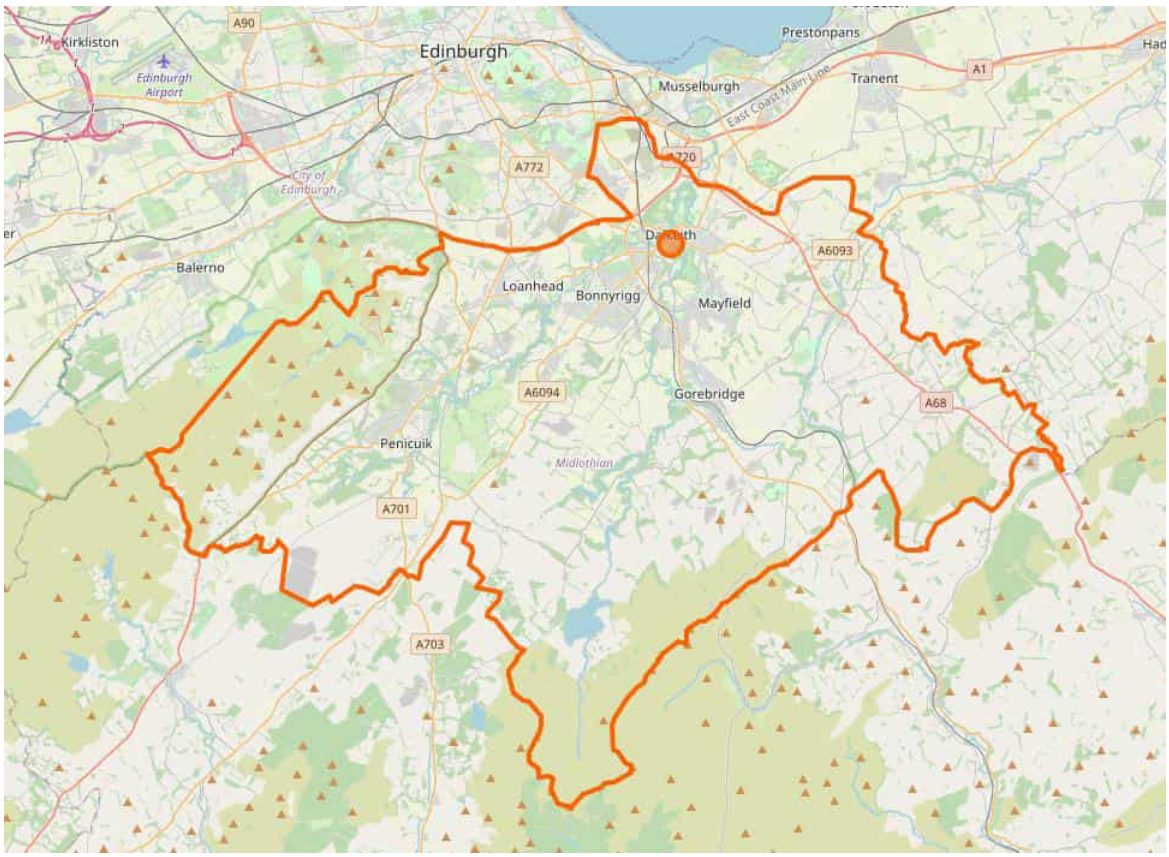


Figure 1: Roads Hierarchy Review study area

1.2 Aims and Structure of Report

This report will review both the National Transport Strategy and the Road Safety Framework, along with the emerging strategies and policies from neighbouring local authority areas to help inform this study by highlighting the key findings. A Review of accidents will then be undertaken across the local authority area with a view to setting the baseline of safety and environment for residents and communities. A review will then be undertaken of the types of measures that can be introduced to reduce the number of collisions occurring and their severity. This will include an examination of 20mph Limits and 20mph Zones.

The remainder of this report is structured as follows:

- Section 2 – National & Local Policy Review
- Section 3 – Review of Midlothian Accident Data
- Section 4 – Measures to improve Road Safety
- Section 5 – Speed Reduction
- Section 6 – Potential 20mph Limits and 20mph Zones
- Section 7 – Summary

2. National & Local Policy Review

2.1 Introduction

As the world moves forward national and local policies need to adapt to the changes in society and the priorities which arise. In recent years we have seen unprecedented changes with a global pandemic and climate emergency. These have tested countries resilience from national leaders down to local communities and demonstrated some of the challenges and priorities which are likely to exist.

National Transport Strategy 2 was published in 2020 and since that time a number of supporting strategies and delivery plans to accompany the document have been produced. This Chapter seeks to provide a summary of these documents along with a review of emerging policies from neighbouring local authorities. This will help to establish what the likely priorities will be for Midlothian Council, and help to form a cohesive strategy which can then be implemented.

2.2 National Transport Strategy (NTS2)

The NTS2 recognises the different needs of Scotland's cities, towns, remote and rural areas. It considers the reasons for travel and how these trips are undertaken. The strategy does not present specific initiatives, interventions, or projects, but it does set out the strategic framework for which future investment decisions will be made.

The vision of the strategy for the next 20 years is to, "have a sustainable, inclusive, safe and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors".

The vision is underpinned by the adjacent four priorities, each with three associated outcomes. It can be seen that in order to achieve the aims of the strategy, road safety and accessible transport will play a large part. The four priorities are covered in further detail below.

2.2.1 Reduce Inequalities

Everyone in Scotland will share in the benefits of a modern and accessible transport system. Transport plays an important part in delivering the fully inclusive society we want. While we tackle inequalities, our actions will simultaneously reduce poverty, in particular child poverty. Our transport system:

- *Will provide fair access to services we need: we have a duty to reduce inequalities and advance equality of opportunity and outcome, including the protected characteristics of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex and sexual orientation. We will ensure that our disadvantaged communities and individuals have fair access to the transport services they need. The transport system will enable everyone to access a wide range of services and to realise their human rights.*
- *Will be easy to use for all: people have different needs and capabilities. Our transport system will recognise these and work to ensure that everyone can use the system with as few barriers as possible.*
- *Will be affordable for all: people have different incomes and our transport system will not exclude people from mobility by making it unaffordable. We will target actions to deliver the Strategy towards those needing most help, including those living in poverty.*

2.2.2 Climate Action

People will be able to make travel choices that minimise the long-term impacts on our climate and the wellbeing of future generations. We face a global climate emergency. Scotland must transition to a net-zero emissions economy for the benefit of our environment, our people and our future prosperity. Our transport system:

- *Will help deliver our net-zero target: the Climate Change Act passed by the Scottish Parliament includes an increased ambition to reduce greenhouse gas emissions to 75% of 1990 levels by 2030, 90% by 2040 (i.e. the period covered by this Strategy) and net-zero emissions by 2045. Transport is currently the largest contributor to Scottish emissions and this will be tackled through a range of actions including an ambition to phase out the need for new petrol and diesel cars and vans by 2032, changing people's travel behaviour and managing demand.*
- *Will adapt to the effects of climate change: in Scotland we are already experiencing the impacts of climate change and we will adapt our transport system to remain resilient and reduce the harmful effects on future generations.*
- *Will enable greener, cleaner choices: over the next 20 years, Scotland will see a continued transformation in transport where sustainable travel options are people's first choice if they need to travel. We will design our transport system so that walking, cycling and public and shared transport take precedence ahead of private car use.*

2.2.3 Economic Growth

Scotland will have a transport system that will help deliver sustainable and inclusive economic growth enabling the whole country to flourish. Transport plays a key role in delivering Scotland's Economic Strategy's four priority areas of investment, innovation, inclusive growth and internationalisation. It enables firms to have efficient access to suppliers and customers. It allows people fair and affordable access to reach the jobs where they can be most productive and boost both business growth and household incomes through improving access to employment. Our transport system:

- *Will get people and goods where they need to get to: network and services will be integrated effectively with spatial and land use planning and economic development, and adapt to changing requirements of our citizens, businesses and visitors.*
- *Will be reliable, efficient and high quality: everyone needs to be confident about how long a journey will take, and that it will be a simple and comfortable experience. We will be able to plan our lives, to get to work on time, access education and training, and to deliver goods efficiently and keep businesses running smoothly.*
- *Will use beneficial innovation: will pioneer and use new products, services and technologies developed from high quality research to improve our transport system. We will secure opportunities and investment for innovation and growth of testing platforms and supply chains to help Scotland be at the forefront of world leading developments in sustainable mobility.*

2.2.4 Health & Wellbeing

Scotland's transport system will be safe and enable a healthy, active and fit nation. Our transport system needs to be safe and secure and give users trust and confidence that they will reach their destinations without threat. It should also allow people to make active travel choices to improve their health and physical and mental wellbeing and seek to reduce health inequalities. It should support our Public Health Priorities. Our transport system:

- *Will be safe and secure for all: the prevention and reduction of incidents on the transport system will continue to be a priority.*
- *Will enable us to make healthy travel choices: active modes will be a preferred method of travel and have a significant positive effect on individual health and wellbeing, both by making people more active and by improving air quality. This will reduce the social and economic impact of public health problems such as mental health, obesity, type-2 diabetes, and respiratory and cardio-vascular diseases.*
- *Will help make our communities great places to live: cleaner, greener and sustainable places and networks will encourage walking, wheeling and cycling. This will deliver more social interaction, support local businesses and services and create vibrant communities.*

2.3 Scotland's Road Safety Framework to 2030

Road Safety systems involve those who design and are responsible for the road network as well as those who use them. They are responsible for reducing road casualties, particularly serious and fatal incidents, and all road users have a role to play in achieving this by using roads safely and complying with the rules. The Framework defines road safety as, "*any policy, project, plan, programme or strategy which aims to reduce the number and severity of road traffic casualties or reduces road danger with better education or through the design, building, operation or use of the road system*".

To achieve this vision the framework identifies five outcomes (Safe Road Use, Safe Roads & Roadsides, Safe Speeds, Safe Vehicles and Post-crash Response) which describe the road safety environment it aims to deliver. These outcomes align with the five pillars of the Safe System show below.

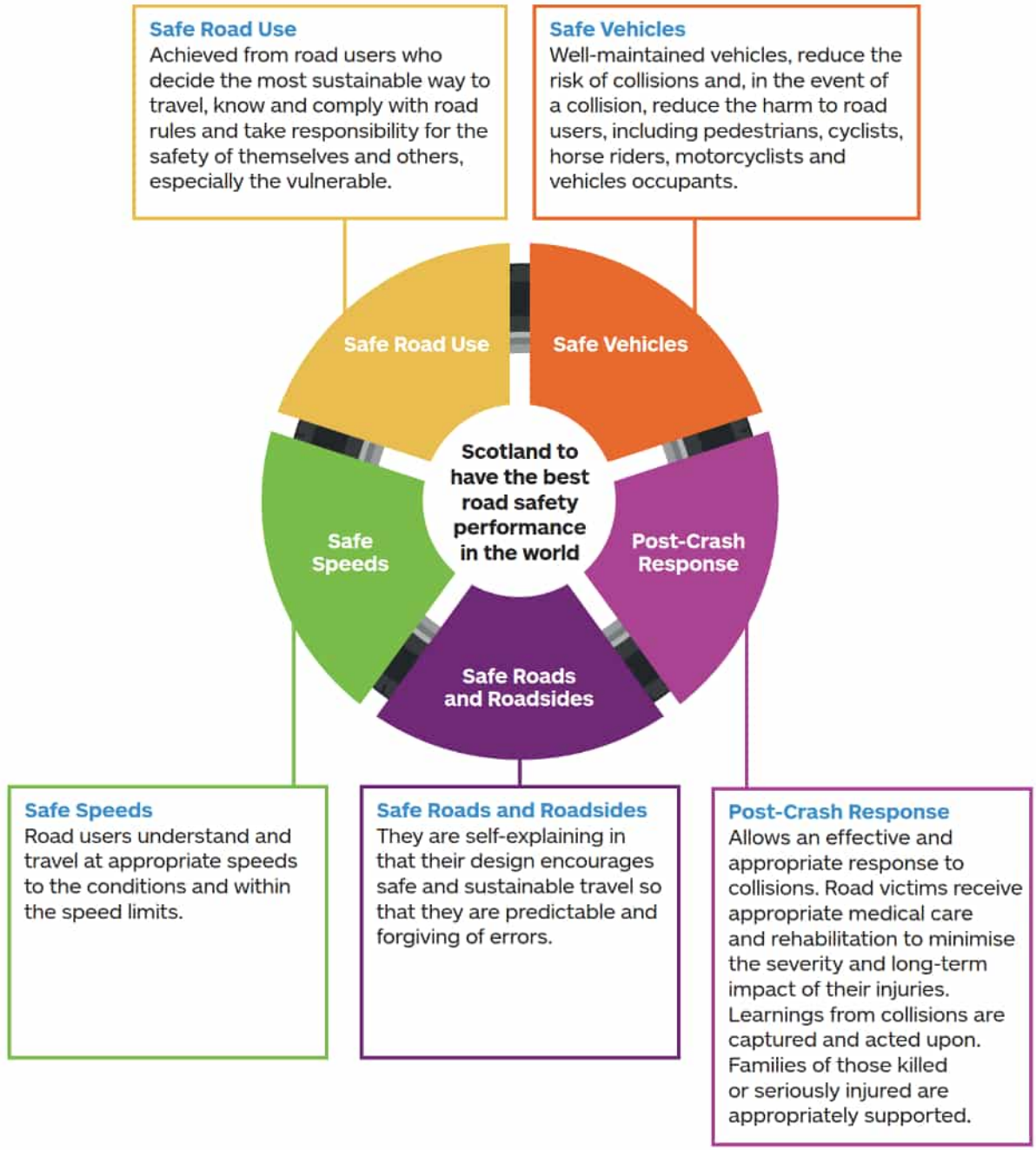


Figure 2: Extract of Five Outcomes identified in Scotland Road Safety Framework 2030

2.3.1.1 Safe Roads and Roadsides

In a Safe System, roads and roadsides are designed to reduce the risk of collision, and to mitigate the severity of injury should a collision occur. A combination of the design and maintenance supported by the implementation of a range of strategies to ensure that roads and roadsides can be as safe as possible can reduce casualties on our roads. One way in which this can be achieved is to both segregate different kinds of road users and the traffic moving in different directions or at different speeds. If this is not possible, promoting positive behaviours and safer sharing of spaces, as well as the appropriate use of speed limits and signage, can also be a much more affordable and sustainable way to protect the most vulnerable road users.

2.3.1.2 Safe Speeds

Speed limits in a Safe System are based on aiding crash-avoidance and reducing the speed at which impacts occur. This ensures the body's limit for physical trauma is not reached or exceeded. The Safe System aims to establish appropriate speed limits according to the features of the road, the function it serves, and the physical tolerance of those who use it. The key factors that should be taken into account in any decisions on local speed limits are:

- history of collisions
- road geometry and engineering
- road function
- composition of road users (including existing and potential levels of vulnerable road users)
- existing traffic speeds
- road environment

2.3.1.3 National Targets

The following targets have been set within the Road Safet Framework 2030.

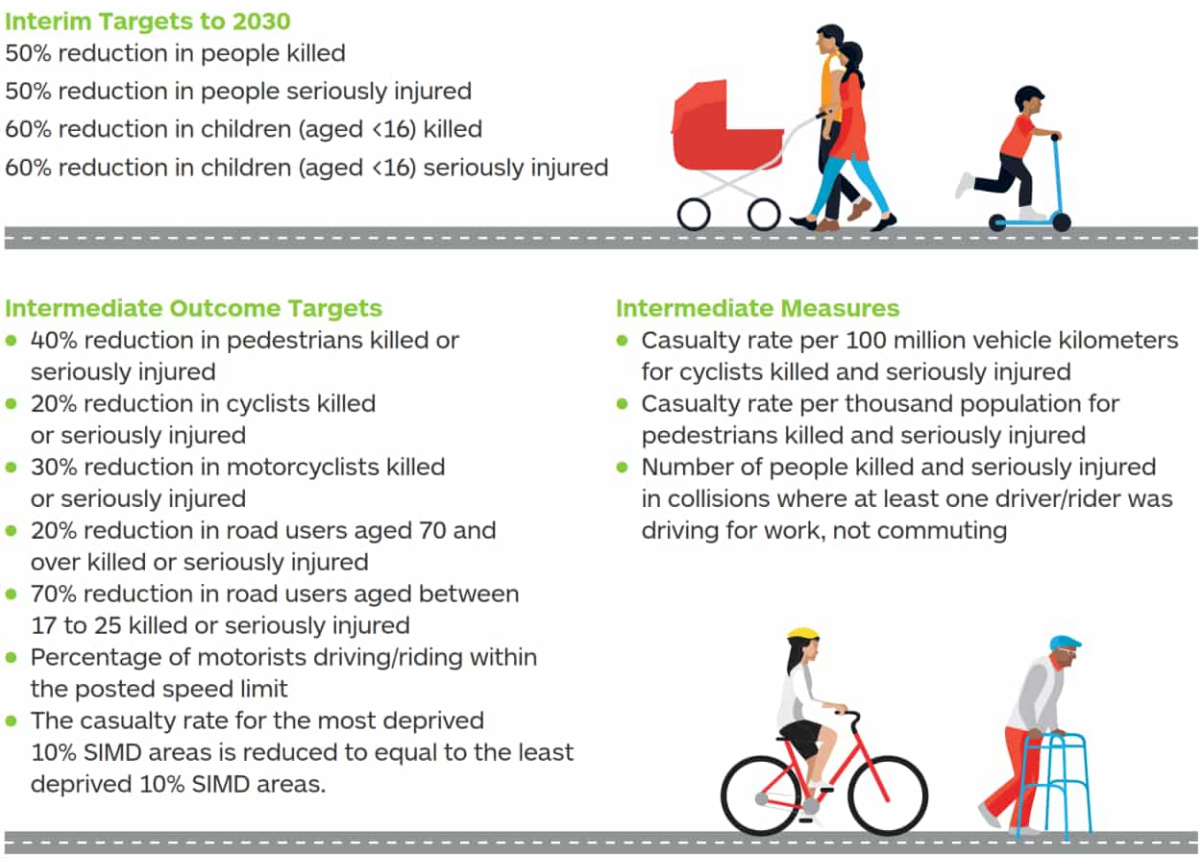


Figure 3: National Targets extracted from Road Safety Framework 2030

2.4 Neighbouring Local Authority Policies

The following section will examine the existing policies of neighbouring local authorities and those which are in the process of being brought forward. It is important to understand this as there needs to be a level of consistency in approach as residents and visitors can become confused with the differing roads types and the measures controlling them. For the purpose of this study a review has been undertaken of both East Lothian Council and The City of Edinburgh Council which are discussed below.

2.4.1 East Lothian Council (ELC)

East Lothian Council's Single Outcome Agreement 2013-2023 outlines their road safety commitment in Outcome 7 which states, "East Lothian is an even safer place – There are fewer collisions, casualties and deaths on our road". There is acknowledgement that this will not be an easy task as the Council faces significant challenges, including the Council's financial position, growing population, and increased demand for services.

The Council identifies 20mph Speed Restrictions as a major mechanism for achieving Outcome 7. The ELC speed policy was updated in 2018 to reflect the publication of "The Good Practice Guide on 20 mph Speed Restrictions" by Transport Scotland (January 2015) and the Traffic Signs Regulations and General Directions (TSRGD) (2016). In addition, it recognises speed limit as only one of many speed management measures along with engineering, enforcement and education.

Main policy objectives are for ELC to set speed limits on the local road network in a way that supports the local transport system that promotes economic growth, is safe for all road users and improves the quality of life. The policy is seen as a tool for setting up an effective speed management part of which are speed limits. Speed limits should be evidence-led, self-explaining, indicate, but also align, with people's assessment of appropriate and safe speed. They should encourage self-compliance. The underlying aim is to achieve a 'safe' distribution of speeds that reflects the function of the road and the impact on the local communities.

The following three items are assessed before a potential speed change – is 'movement' or 'access and place' the prevailing function; casualty numbers; the need to increase active travel journeys. Some of the underlying policy principles are:

- Alternative speed management options will always be considered before a new speed limit is introduced;
- Mean (average) speeds will be used to determine local speed limits;
- The minimum length of a speed limit will generally not be less than 600m (allowable minimum of 400m);
- Speed limits will not be used to attempt to solve the problem of isolated hazards, for example a single road junction or reduced forward visibility on a bend;
- A balance has to be struck between the needs of the community and the needs of motorists.

Enforcement
Police Scotland is the agency responsible for the enforcement of speed limits on roads in the Council area although 20mph speed limits and zones should be designed and introduced to be self-enforcing; and changes should not be reliant on Police enforcement.

Urban roads
The national speed limit in most urban areas is 30mph. A 40mph limit may be used where appropriate and, in exceptional circumstances, a 50mph limit may be considered. The three speeds are roughly split between town centres, suburban roads/on outskirts and dual carriageways/higher quality roads, respectively.

Rural roads
The national speed limit on the rural road network is 60mph on single carriageway roads and 70mph on dual carriageways. Road network is divided into upper (A and B Class) and lower tier (Class C and Unclassified) roads depending on function. National speed limits are normally applicable except where accident rates exceed the thresholds (for upper and lower tiers roads) specified in Circular 1/2006. Then lower speed limits will be considered. The accident rate is a trigger for intervention.

Village Speed Limits
In order to implement the 30mph speed limit in villages, a definition for 'village' has been produced (i.e. criteria). Buffer zones (40mph) are also considered for various development scenarios (e.g. lower density, outlying houses, buildings such as schools or churches, etc. Class C and unclassified roads are by virtue of the presence of street lighting. Beyond that, Traffic Regulation orders are required.

ELC have considered the following 20mph speed restrictions:

- 20mph speed limit zones
- Mandatory 20mph speed limits
- Variable/Part Time 20 mph Limits
- Advisory 20 mph limits
- 20 mph limits – TSRGD requirements

The main three types of data required for a speed limit assessment are:

- Traffic flow data – Annual Average Daily Flow (AADF);
- Traffic speed data – based on typical mean journey speeds along individual sections;
- Accident data – typically for a 5-year period (minimum 3-year).

2.4.2 City of Edinburgh Council

City of Edinburgh Council have stated that they are committed to providing a safe and modern road network for the 21st century, as set out in its Road Safety Plan for Edinburgh to 2020. This document is however, over a decade old and work is currently underway to develop a new Plan to cover the period to 2030. The new Plan is intended to be developed within the context of Scotland's Road Safety Framework to 2030.

The Council's Road Safety team is responsible for delivering a programme of road safety infrastructure improvements, which can be categorised into four major workstreams:

- Reducing road traffic collisions;
- Reducing excessive traffic speeds;
- Improving walking, wheeling and cycling journeys to school; and
- Improving pedestrian crossing facilities.

In addition to the above, a citywide 20mph network was approved for Edinburgh in January 2015; and the scheme was implemented by March 2018. The main goals of the scheme were to reduce the risk and severity of collisions, encourage people to walk and cycle and create more pleasant streets and neighbourhoods. The approved network extends 20mph speed limits to the city centre, main shopping streets and residential areas while retaining a network of roads at 30mph and 40mph in the city suburbs.

Due to the overall positive response and requests from across the city following the roll-out, further streets are in the process of being added to the network. Evidence and justification for the roll-out include a successful 2012 pilot and the positive findings of the monitoring programme that was established. The following image is an extract from the City of Edinburgh Council website, with the dark green and blue showing existing and proposed 20mph streets respectively. It can be seen that the proposed coverage will be extensive.

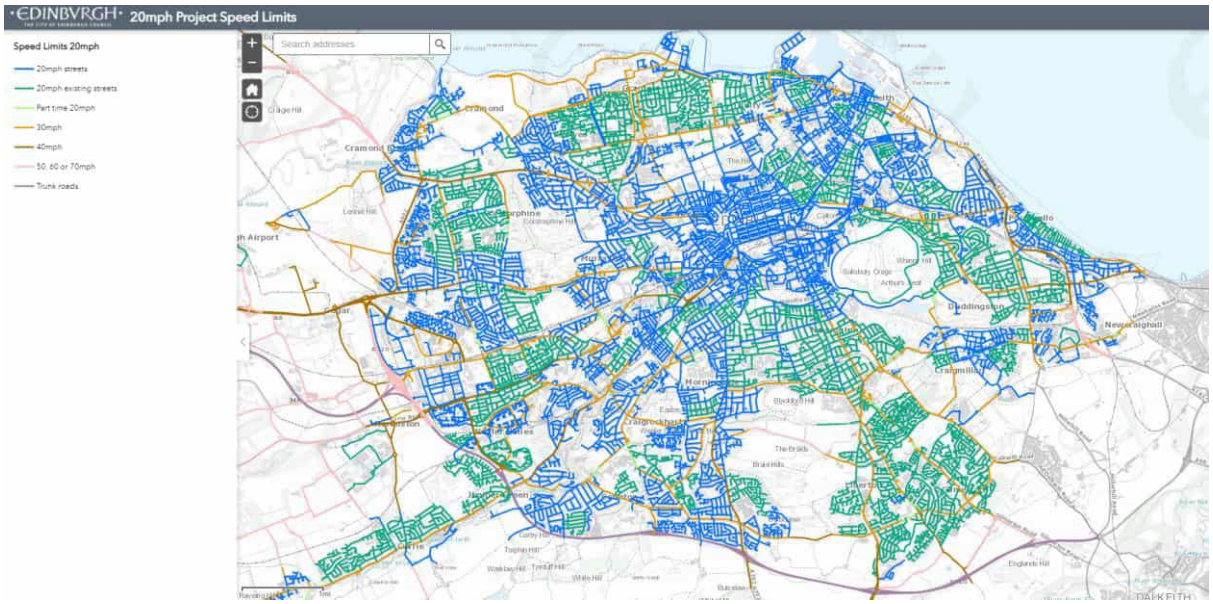


Figure 4: City of Edinburgh Council 20mph map extract

3. Review of Midlothian Accident data

3.1 Introduction

Midlothian Council gather and collate accident data for the local authority area and the following Chapter undertakes a review of this to assess whether there are any apparent causal factors. Accident locations have been assessed in terms of vehicle speeds, lighting conditions, weather conditions, and type of road carriageway or junction. Appendix A shows the mapping exercise which has been undertaken to track the location, speed, and severity of the accidents occurring.

3.2 Midlothian Road Network

Midlothian's public road network comprises of the following classifications and length, 2016/17 (kilometres)

	Trunk	Local Authority				Total
	A Roads	A Road	B Road	C Road	Unclassified	
Midlothian	39	93	100	101	389	721

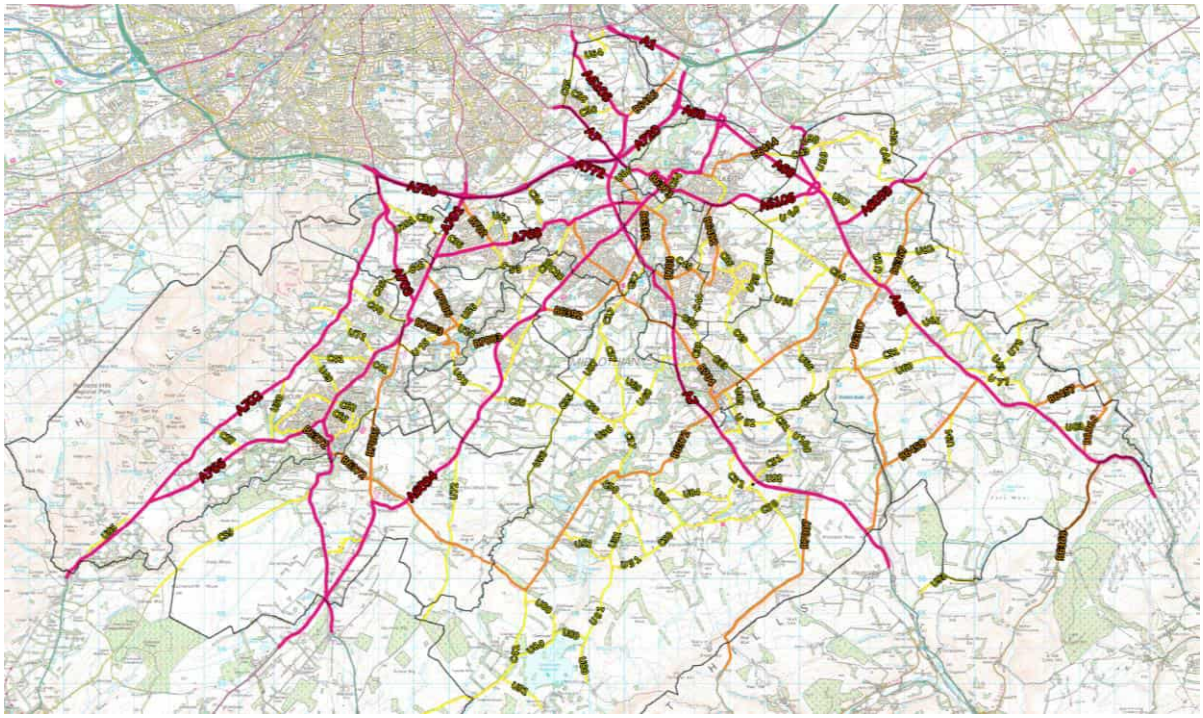


Figure 5: Midlothian Roads Hierarchy classifications

3.3 Midlothian Accident Statistics

The following graphs show the total number of vehicles involved in collisions resulting in respective types of injury, namely Slight, Serious, and Fatal, recorded over a 5-year period to the year 2021.

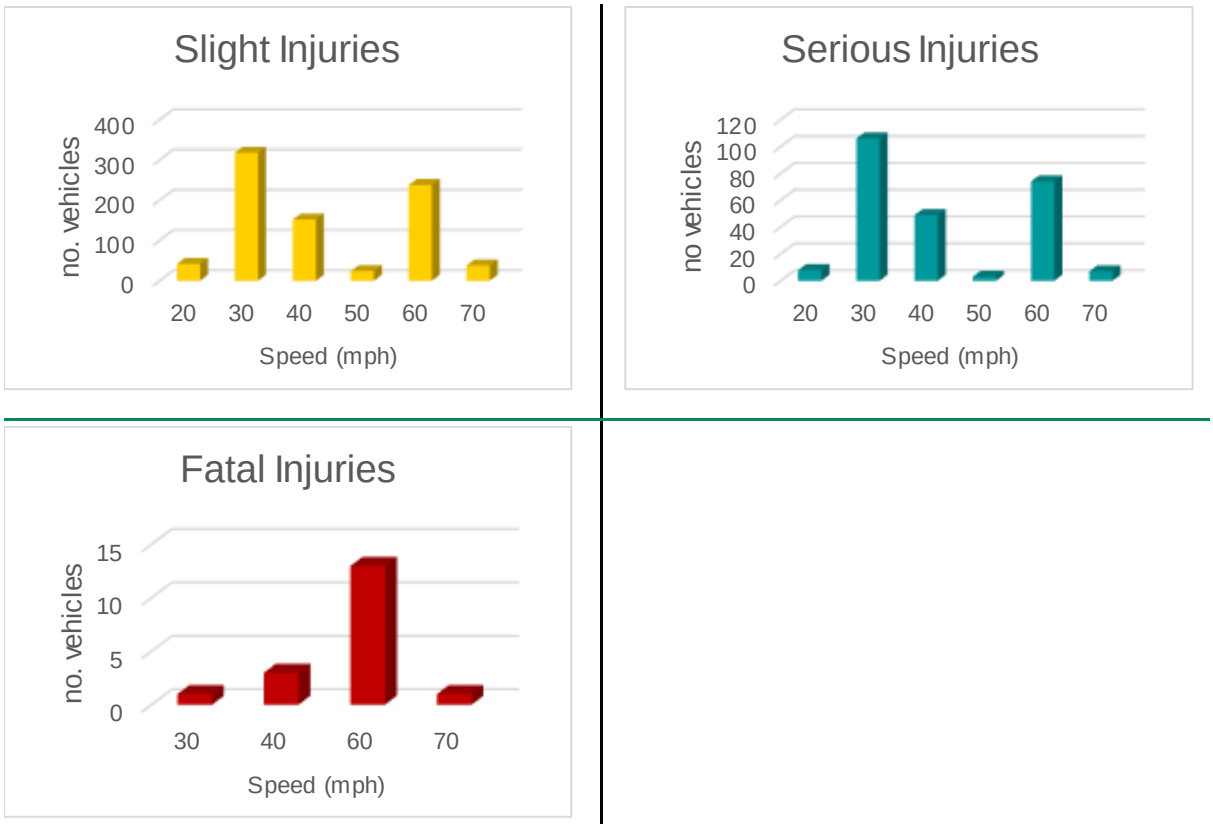


Figure 6: Total number of vehicle collisions occurring in previous 5-year period to 2021

It can be seen that the majority of Slight and Serious injuries occur in the 30mph bracket. The number of fatal accidents is however much higher in the 60mph bracket, demonstrating the link between higher speeds resulting in much higher chances of serious or fatal accidents, which is discussed in further detail within Chapter 5. The following graphs further break down the Casualties by Speed, Type of Road, Weather Conditions, and Lighting Conditions, all which could be considered as potential contributory factors.

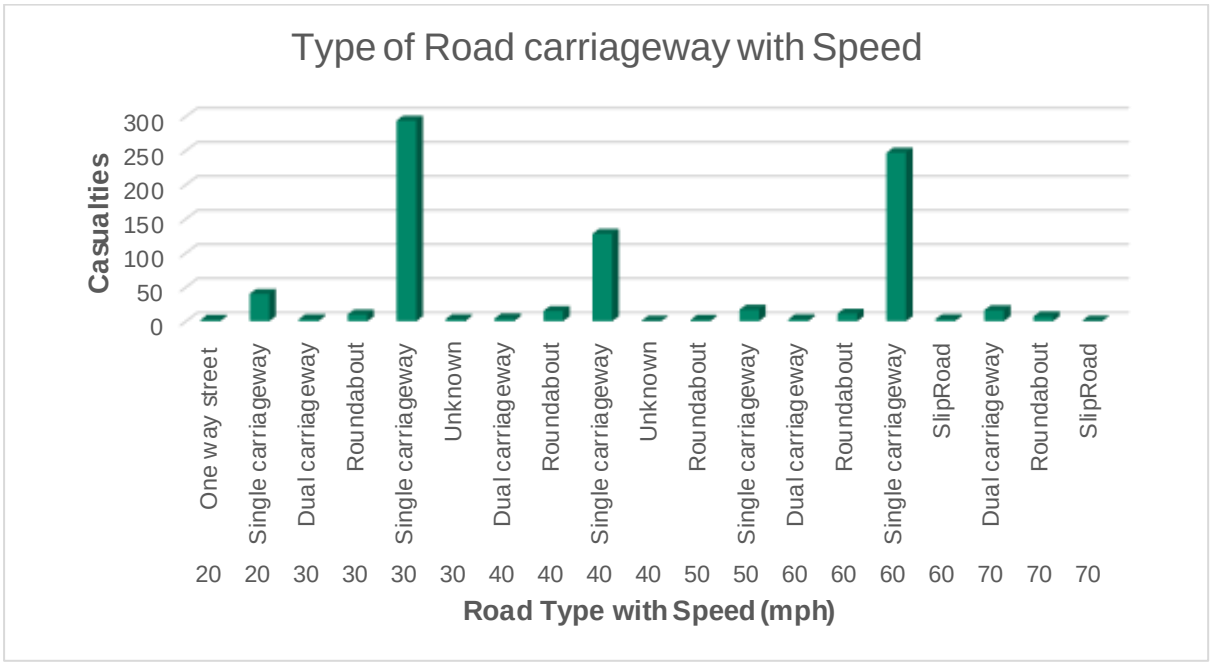


Figure 7: Total Casualties split by Road Speed and Road Type

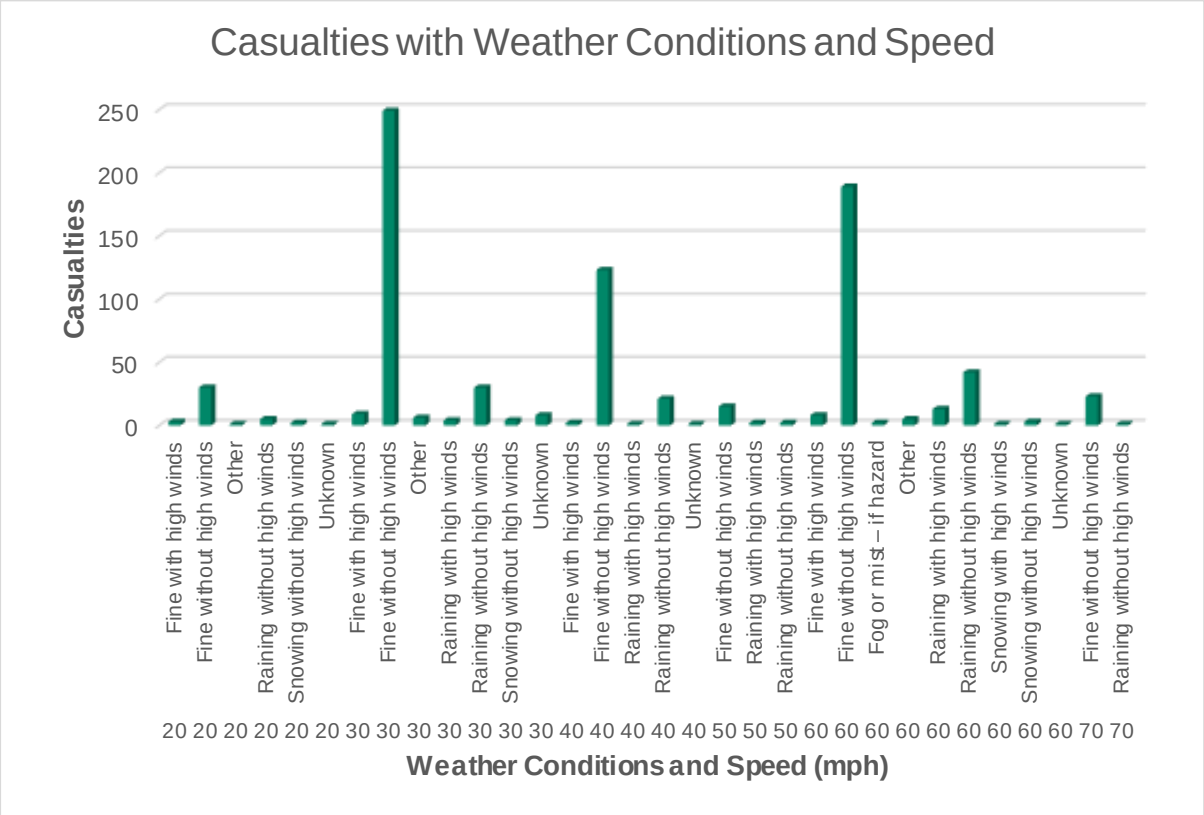


Figure 8: Total casualties split by road speed and weather conditions

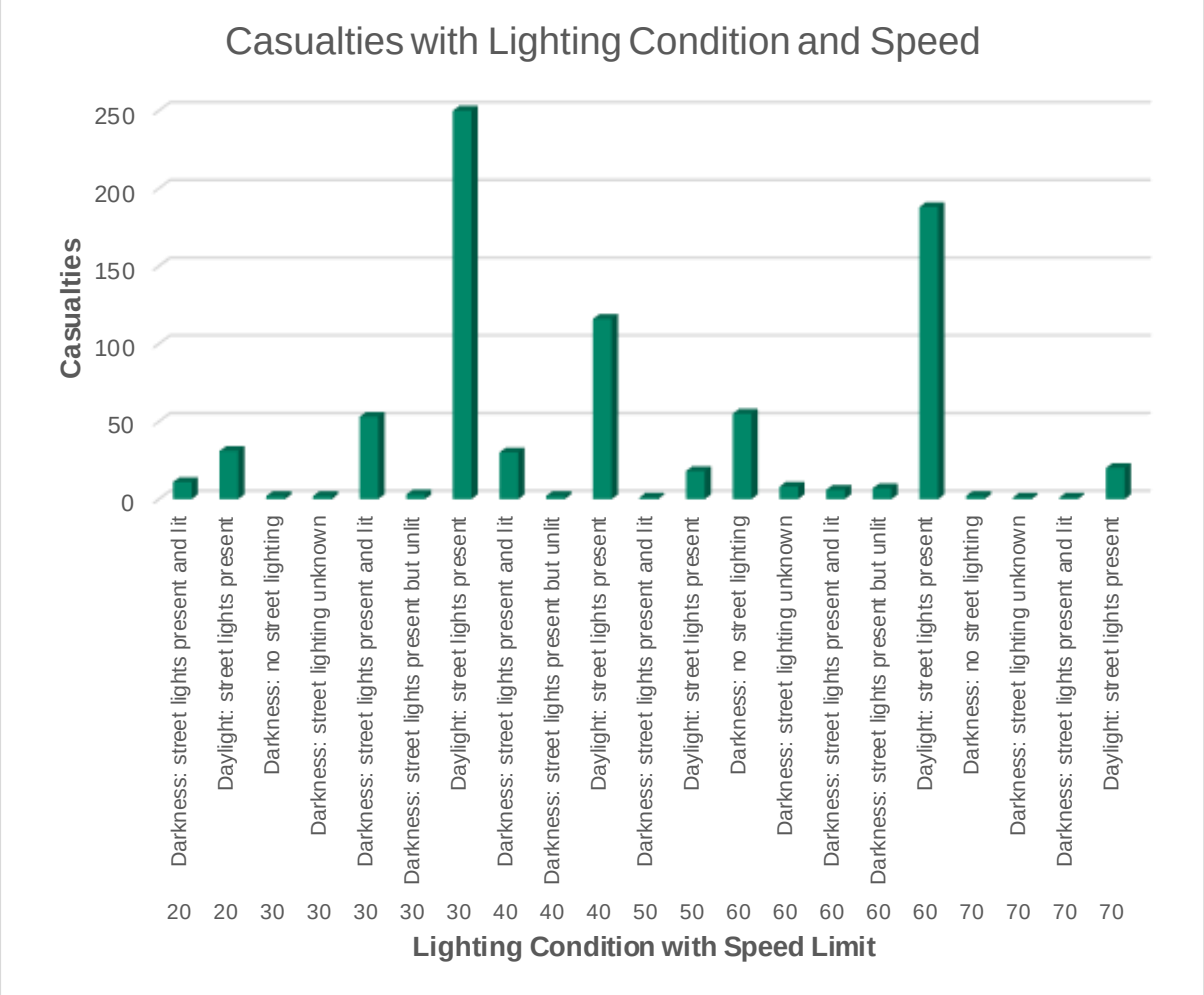


Figure 9: Total casualties split by road speed and lighting conditions

It can be seen in Figures 7, 8, and 9 that the potential contributory factors of Road Type, Weather Conditions, and Lighting Conditions, do not offer any obvious reasons for the overall accidents occurring in the local authority area. The majority of accidents occur on single carriageway roads where weather and lighting conditions were good at the time of the accidents.

It is considered that this type of analysis would be more beneficial when examining smaller cordoned areas as there could indeed be some site specific reasons for incidents occurring which are not apparent when considering global statistics for the local authority area.

3.4 Midlothian Settlements Review

To give some context to the global accident statistics discussed in the previous section, a review of individual settlements within Midlothian has been undertaken. This is to try and better understand whether the accidents are occurring at a uniform rate across the local authority area or whether there are specific settlements which are experiencing higher than average rates. The map below details ten settlements within Midlothian where further analysis has been undertaken.

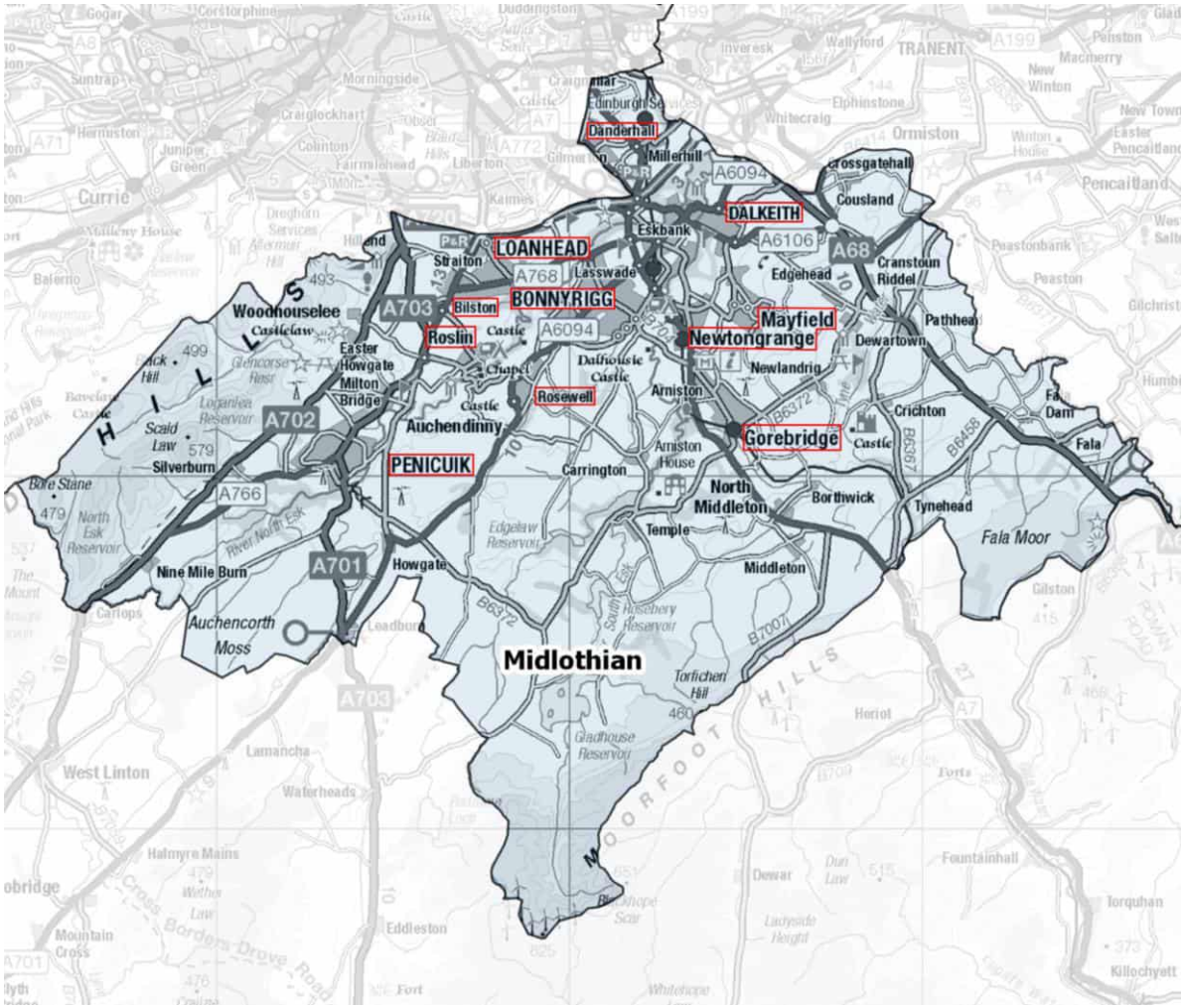


Figure 10: Ten settlements considered for further analysis

The total number of casualties (Slight, Serious, Fatal) have been plotted against each settlement and is show in the graph overleaf which breaks the accidents down by the types of road/ junction on which they occurred and the speed of the road.

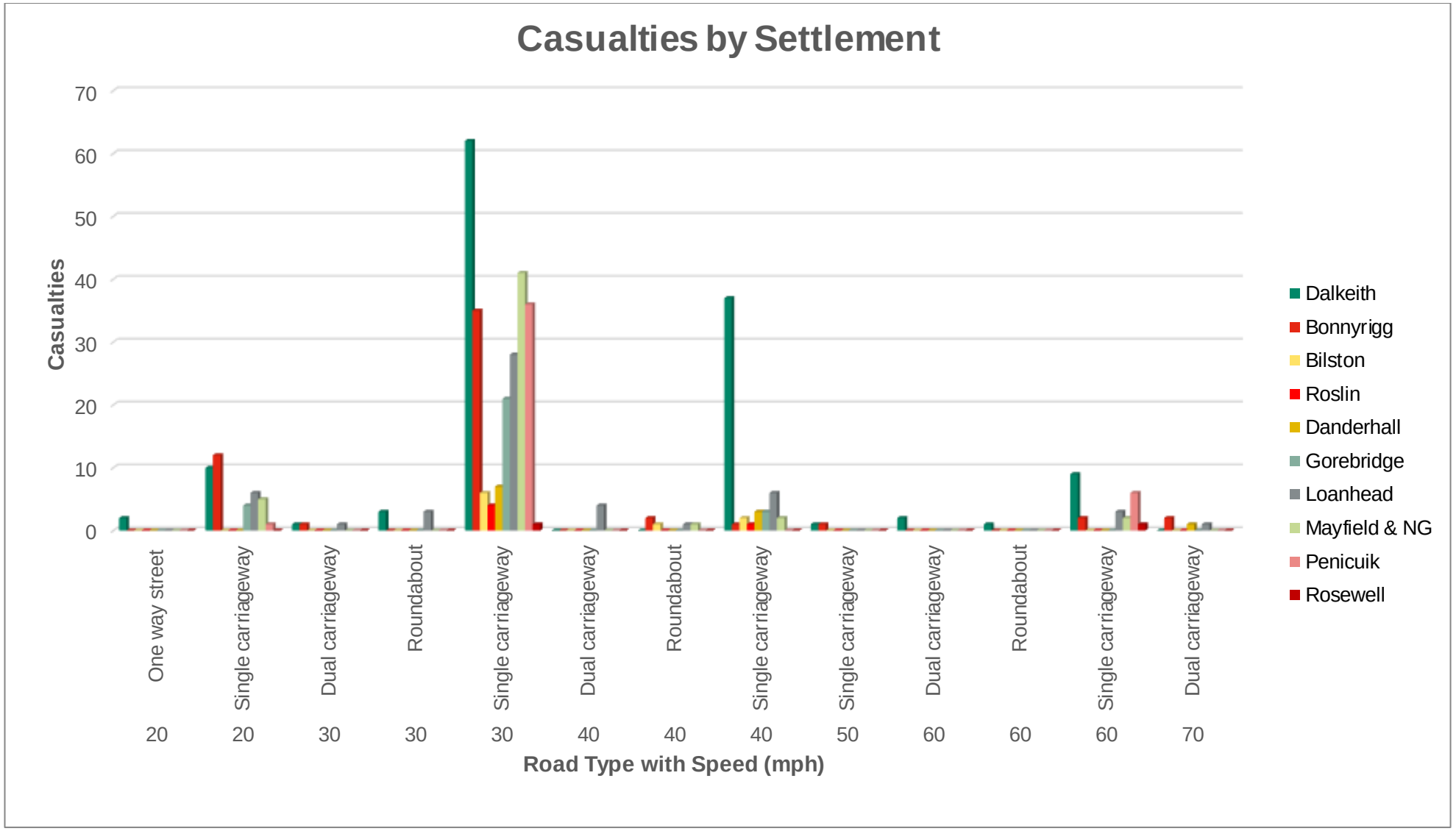


Figure 11: Casualties by Settlement and Speed/ Road Type

Some settlements have a high volume of accidents in comparison to others, which could be due to higher populations and higher volumes of traffic traversing through the settlements. Some will also have a higher number of daily walking and cycling trips to local amenities and all of these movements have the potential for accidents where conflict points occur. To better understand the rate at accidents are occurring in each settlement, the total number of accidents were converted into a per capita population, based on 2018 population predictions shown below.

Settlement	Population (2018 Estimated)
Dalkeith	12,000
Bonnyrigg	15,677
Bilston	1,330
Roslin	1,670
Danderhall	2,810
Gorebridge	7,160
Loanhead	6,440
Mayfield & Newtongrange	13,570
Penicuik	16,120
Rosewell	1,680

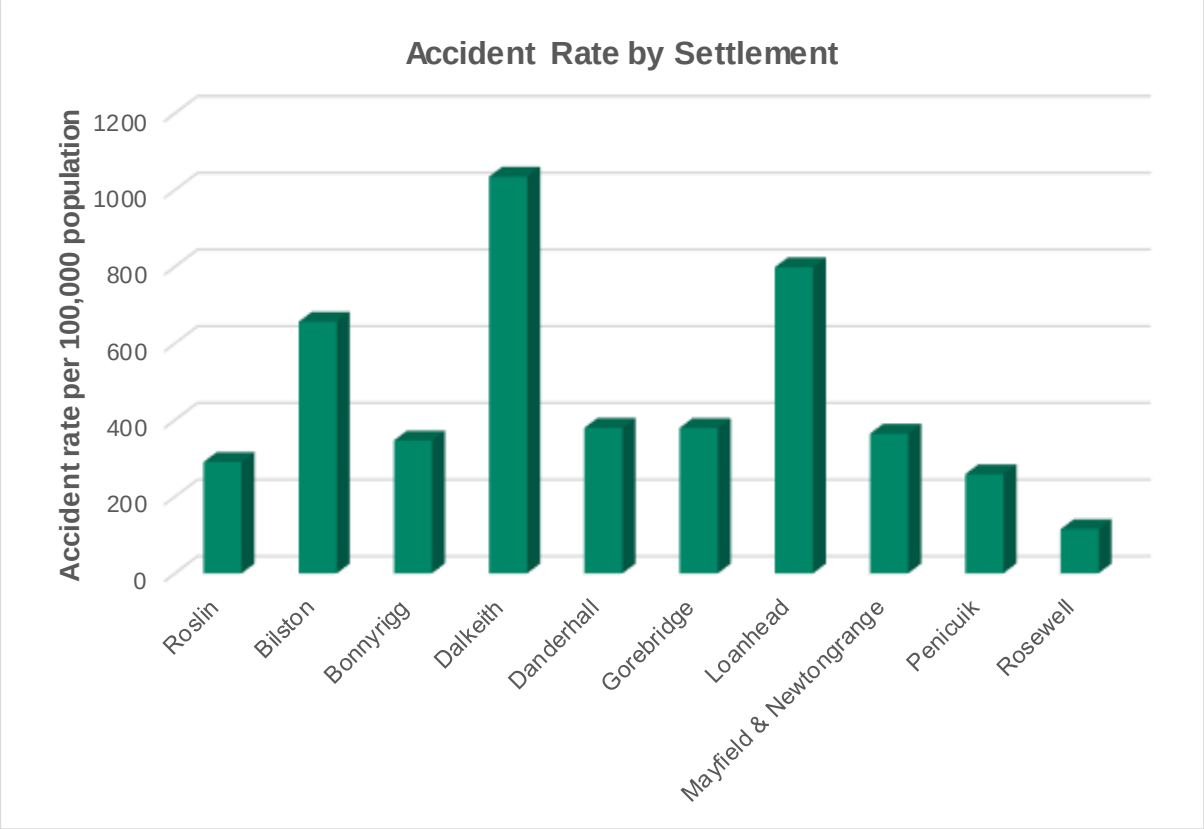


Figure 12: Accident rate per Settlement

It can be seen that when considering the accidents on a per capita basis, the various settlements within Midlothian become more uniform, however Dalkeith does retain the highest number of casualties in total and as a ratio per population.

4. Measures to improve Road Safety

4.1 Introduction

Whilst traffic regulation, enforcement and signage can offer speed reduction benefits it is unlikely these measures in isolation would offer the same level of reduction as those in combination with physical interventions, which generally offer better speed reduction results for problem locations. Measures that also tend to be requested by members of the public include speed cameras, however the Safety Camera Scotland Partnership (SCSP) who are responsible for these will only consider them when all other engineering measures have failed. The typical traffic calming type measures which would be used to lower speeds are discussed within this Chapter.

4.2 Traffic Calming

There are many different forms of traffic calming measures although generally they can be categorised into the following three groups;

1. **Vertical Measures** – These traffic calming measures generally require a vehicle to overcome a physical object that is designed to influence the speed of the vehicle. The most common types of vertical traffic calming are speed humps, speed tables and speed cushions but there are other devices such as raised junctions and rumble strips that can also be used.

2. **Horizontal Measures** – Horizontal calming measures aim to reduce a vehicles speed by forcing a lateral movement or forcing vehicles to give way to each other. These measures can include chicanes, pinch-points and mini-roundabouts.

3. **Traffic Regulation, Signage and Enforcement** – A range of other traffic management measures can be utilised to slow traffic speeds, either by regulatory deterrents (speed limits and safety cameras) or softer psychological measures (signage, vehicle activated signs, road markings and coloured/ textured surfacing).

4.2.1 Traffic Calming Measures and their Relative Performance (*Department of Transport)*

Type	Impact on Speed ***Most Impact *Least Impact	Impact on Traffic Flows ***Most Impact *Least Impact	Impact on Injury Accidents ***Most Impact *Least Impact
Raised Junction	***	***	***
Road Hump	**	***	***
Rumble Strip	*	*	**
Local Narrowing	**	**	**
Chicane	**	*	**
Mini Roundabout	**	*	**
Speed Cameras	**	*	**
Speed Table/Raised Crossing	**	***	***

			
Example Raised Junction	Example Road Hump	Example Rumble Strip	Example Local Narrowing
			
Example Chicane	Example Mini Roundabout	Example Speed Camera	Example Speed Table/Raised Crossing

Vertical measures such as raised junctions and speed cushions generally have the largest impact on vehicle speeds, conversely however they also have the largest detrimental effect on traffic flows. Horizontal measures such as pinch points, gateways and chicanes have varying levels of impact on reducing vehicle speed depending on the design. It is noted that Speed Cameras have an impact on traffic speeds, albeit not as significantly as some vertical measures with least impact on existing traffic flows and emergency vehicles.

4.2.2 Pedestrian Crossing and Traffic Management

In addition to Traffic Calming, traffic signals can be provided at junctions and designated pedestrian crossings which not only reduce traffic speeds but also enhance pedestrian crossing and safety. A range of traffic crossing techniques are available.

Type/Notes	Example Photograph
Priority Crossing – A priority crossing is a point designed for pedestrians to cross, these usually include dropped kerbs and paving for visually impaired pedestrians. At these crossings, vehicles have right of way and pedestrians should cross during safe gaps in traffic. These crossings whilst improving pedestrian crossings facilities will have minimum impacts on vehicle speeds. These facilities can be provided at raised junctions which aid speed reduction	
Zebra Crossing - Characterised by black and white stripes on the road, parallel to the flow of the traffic. The crossing is marked with flashing amber globes on black and white posts on each side of the road. Pedestrians have a right of way when they step onto the crossing. Zebra crossings promote priority for pedestrians and can also help reduce traffic speeds. These facilities can be located on raised carriageway areas, further aiding speed calming.	

Push Button / Signalised Crossing – A traditional push button / signalised crossing where a pedestrian is invited to cross when a green signal is showing. This improves pedestrian safety when crossing and helps calm traffic speeds.	
Signalised Junction with Pedestrian Crossings – Both traffic and pedestrians are controlled by traffic lights. These facilities managed flow and minimise vehicular conflict and promote pedestrian crossing. Signals can help calm traffic speeds. On busy roads these facilities help manage traffic flow more efficiently. However, on quieter roads they are likely to introduce delays to both traffic and pedestrians.	

In addition to the measures listed above, changes to the road environment can also contribute to a reduction in vehicle speeds. Measures, such as, tightening of corner radii, installing traffic signals, reduction of carriageway widths, gateway features and public realm improvements can all be used to reduce the speed of drivers. Guidance on traffic calming measures is provided by the Department of Transport in Local Transport Note 1/07. *Table 1.1* of this document provides a summary of the performance of a range of calming measures. This table is reproduced below.

Type of measure	Chapter or Section in LTN	Impact on traffic speeds * * * = largest reduction	Impact on traffic flows * * * = largest reduction	Impact on injury accidents * * * = largest reduction	Delays to emergency services * * * = shortest delay	Relative public acceptability * * * = most acceptable	Impact on vehicle emissions * * * =smallest increase		
							CO	NOx	PM
Road hump									
Round-top	4.2	* * *	* * *	* * *	*	* * *	* *	* *	* *
Flat-top	4.2	* * *	* * *	* * *	*	* * *	*	*	*
Raised junction	4.2	* * *	* * *	* * *	*	* * *	*	*	* *
Sinusoidal	4.2	* * *	* * *	* * *	*	* * *	-	-	-
'H' hump	4.2	* *	* * *	* * *	* *	* * *	-	-	-
'S' hump	4.2	* *	* * *	* * *	* *	* * *	-	-	-
Thump	4.2	* *	* * *	* *	*	* *	-	-	-
Cushion	4.2	* *	* * *	* * *	* *	* *	* *	* *	* *
Rumble device									
Area	5.1	*	*	* *	* * *	* *	-	-	-
Strip	5.1	*	*	* *	* * *	*	-	-	-
Narrowing									
Island	6.3	*	*	*	* * *	-	-	-	-
Pinch point/build-out	6.3	* to * * *	* to * *	* to * *	* * *	*	* *	* * *	* * *
Chicane									
Single lane	6.4	* * *	* *	* *	* *	*	*	* * *	*
Two-way	6.4	* *	*	* *	* *	* *	-	-	-
Gateway	7	* *	*	* *	* * *	* *	-	-	-
Mini-roundabout	8	* *	*	* *	* * *	*	* * *	* *	* *
Vehicle activated device									
Vehicle activated signs	9.1	* *	*	* *	* * *	-	-	-	
Speed cameras	9.2	* *	*	* *	* * *	* * *	-	-	
Road markings, traffic signs and furniture									
Roundels	10.2	*	*	*	* * *	* * *	-	-	
Coloured surfacing	10.2	*	*	*	* * *	-	-	-	

Figure 13: DoT Summary of Measures and Performance

4.2.3 Safety Cameras

The Safety Camera Scotland Partnership has a set criterion that needs to be met before a safety camera is likely to be considered. In summary the criteria are;

- Number of Collisions: The number of points required before a site can be considered is 9 per kilometre with 7 points attributed to a fatal collision, serious 4.5 points and slight 1 point. The weightings are doubled when a collision involves a pedestrian;
- Vehicle Speeds: The 85th percentile speed during free-flowing conditions must equal or exceed 35mph; and
- Engineering measures should be evaluated and exhausted before a speed camera is considered.

Safety cameras would therefore need to be considered on a case by case basis, however the strict criteria above is likely to severely restrict the implantation of cameras to all but the sites with extreme accident records and recorded excess speeds.

4.3 Alternative Speed Restriction Measures

While the traffic calming measures above including safety cameras can have site specific benefits, it can be difficult to implement these on a wider network due to various reasons, including:

- Parking and Driveway Access restricting available highway land;
- HGV and Bus Operations resulting in wear and tear to traffic calming measures, or noise pollution;
- Street Lighting or lack of street lighting making it unsafe to implement some measures;
- Drainage and potential for ponding or expensive design solutions to overcome;
- Surfacing/ Tie-ins with solutions dependent upon existing conditions and elements such as upstand heights; and
- Public Utilities can result in expensive design solutions.

When considering a wider area the above issues may prove prohibitive and therefore alternative measures may need to be considered such as speed restrictions as these would not be subject to the same limitations outlined above. This is discussed in Chapter 5 in further detail.

5. Speed Reduction

5.1 Introduction

Higher inappropriate speeds contribute to around 11% of all injury collisions reported to the police, 15% of crashes resulting in a serious injury, and 24% of collisions that result in a death. This includes excessive speeds when the speed limit is broken. It also includes speeds which remain within the speed limit, however the conditions dictate that these are inappropriate at the time, for example: in poor weather, poor visibility, or high pedestrian activity.

Motorists who travel at higher inappropriate speeds are more likely to crash and their higher speed means that the crash will cause more severe injuries to themselves and/or to other road users. Inappropriate speed also magnifies other driver errors such as driving too close or driving when tired or distracted, multiplying the chances of these types of driving causing an accident

5.2 20mph Background

The Department of Transport issued Circular 'Roads 4/90' in 1990 which set out guidelines for the introduction of 20mph speed limits. At that time, Councils had to apply for consent from the Secretary of State to introduce a 20mph zone. The strategy was based on research and experience of implementation in other countries. Case studies demonstrated that lower speed limits when combined with traffic calming measures to ensure that vehicles maintained low speeds through the zone, could have amplified benefits over just traffic calming alone. Road safety publicity messages were used to highlight 20mph speeds as crucial to reducing the risks of injury and death in collisions.

In 1999, the law was changed by the Road Traffic Regulation Act (Amendment) Order 1999, which gave Highways Authorities more flexibility so they no longer had to apply for permission to introduce a zone. The updated legislation made two distinct types of 20mph speed limit possible:

- 20mph limits, which consist of just a speed limit change to 20mph which is indicated by the speed limit (and repeater) signs, and
- 20mph zones, which were designed to be "self-enforcing" due to the traffic calming measures that were introduced along with the change in the speed limit.

It suggested that 20mph limits were appropriate for roads where average speeds were already low (below 24mph) or along with traffic calming measures.

5.3 Scottish Guidelines

In January 2015 the Scottish Government published 'Good Practice Guide on 20mph Speed Restrictions' (updated 2016). The document provides clarity on the options available to local authorities in setting 20 mph speed restrictions. Whilst encouraging consistency across the country, local authorities have options to introduce them near schools, in residential areas and in other areas of towns and cities where there is a significant volume of pedestrian or cyclist activity. It aims to encourage local authorities to set 20 mph speed restrictions where appropriate.

Local authorities have a number of options when considering introducing a 20 mph speed restriction, including:

- 20 mph speed limit zones
- 20 mph limits
- Variable and part-time 20 mph limit

The information in the Good Practice Guide is not intended to override any of the provisions contained in the relevant road traffic legislation. The guidance is not be used in isolation, but rather, read in conjunction with the more comprehensive advice set out in the relevant legislation and guidance, including the Traffic Signs Regulations and General Directions 2016 (SI2016/362), DfT Circular 01/16 on the 2016 TSRGD, the Traffic Signs Manual and related Traffic Advisory Leaflets.

The Guide is intended for use by Scottish Local Authorities and replaces all previous guidance on 20 mph issued by the Scottish Executive including SODD Circular 13/1999; 2001 SEDD Circular No.6/2001; ETLLD Circular No. 1 /2004 (relating to schools) and Section 5.1 of ETLLD Circular No.1/2006

5.4 Higher Speeds

Higher speeds results in drivers having less time to identify and react to what is happening around them, and it takes longer for the vehicles to stop. Where speeding occurs, it can result in near misses becoming crashes. While the public may consider 30mph to be a lower speed road, around two-thirds of crashes in which people are killed or injured occur on roads with a speed limit of 30 mph or less. In good conditions, the difference in stopping distance between 30 mph and 35 mph is an extra 21 feet which is more than 2 car lengths. As discussed in Section 5.4.2, almost half of drivers will speed on a 30mph road.

According to the Royal Society for the Prevention of Accidents, if average speeds reduced by 1 mph, the accident rate would fall by approximately 5%. This varies slightly according to road type, so that a 1 mph reduction in average speed would reduce accident frequency by about:

- 6% on urban main roads and residential roads with low average speeds
- 4% on medium speed urban roads and lower speed rural main roads
- 3% on the higher speed urban roads and rural single carriageway main roads.

If an individual drives more than 10 - 15% above the average speed of the traffic around them, they are much more likely to be involved in an accident. Drivers who speed are more likely to be involved in collisions. They are also more likely to commit other driving violations, such as red-light running and driving too close.

5.4.1 Higher Speeds Cause More Serious Injuries

The risk of injury in any collision is influenced by a number factors including: Vehicle Speed, Occupant protection systems such as seat belts or air bags, the nature of the other vehicle(s) or object(s) struck, and the medical care received by those involved. The Royal Society for the Prevention of Accidents have also undertaken research on motorist speeds and have found that car drivers are much more likely to be injured in collisions at higher speeds. On average, in frontal impacts, belted drivers have a 17% risk of being fatally injured in impacts at 40 mph and a 60% risk at 50 mph. When cars are hit from the side, drivers are at a much greater risk: in a collision at 40 mph, the risk of a belted driver being killed is 85%.

The risk of a pedestrian who is hit by a car being killed increases slowly until impact speeds of around 30 mph. Above this speed, the risk increases rapidly as demonstrated in the table below which included research from the UK and Germany. Elderly pedestrians have a much greater risk of suffering fatal injuries than other age groups.

Country	Date	Risk of fatal injury at 30mph	Increased risk of fatal injury between 30mph and 40mph
UK	1970s	9%	5.5 times more likely
Germany	1999-2007	7%	3.5 times more likely
UK	2000-2009	7%	4.5 times more likely

5.4.2 Who Speeds?

- On 20mph roads, 81% of car drivers exceed the speed limit and 44% exceed 25mph.
- On 30 mph roads in built-up areas, 53% of car drivers exceed 30 mph and 19% exceed 35 mph.
- On single carriageway 60 mph roads in non-built-up areas, 8% of drivers speed but only 3% go over 70 mph.
- On motorways in non-built-up areas with 70 mph limits, almost half (46%) of car drivers exceed the speed limit, with 11% going faster than 80 mph.

Research suggests there are three types of drivers:

- Compliant drivers who usually observe speed limits (52% of drivers)
- Moderate speeders who occasionally exceed speed limits (33% of drivers)
- Excessive speeders who routinely exceed speed limits (14% of drivers)

However, even the moderate speeders exceed 30 mph limits regularly. Excessive speeders normally ignore the 30 mph limit, and often by a wide margin

5.4.3 Driver Attitudes and Behaviours

The RITS Drivers Attitudes and Behaviours Tracking Study has been running since 2010 and includes a sample of drivers across Scotland each year. The study was set up to provide a consistent monitor of driver attitudes and behaviours across Scotland in order to evaluate the impact of various road safety campaigns run by the Scottish Government and Road Safety Scotland. A continuous monitor of attitudes and behaviours allows the Scottish Government and its partners to assess longer terms trends and a selection of relevant graphical information relevant to this report have been extracted and reproduced below.

5.4.3.1 Speeding Behaviours

Drivers were asked a series of questions regarding speeding behaviours at varying speeds and situations and the following graph shows the results stretching from the initial year 2010 to the latest survey undertaken in 2020.

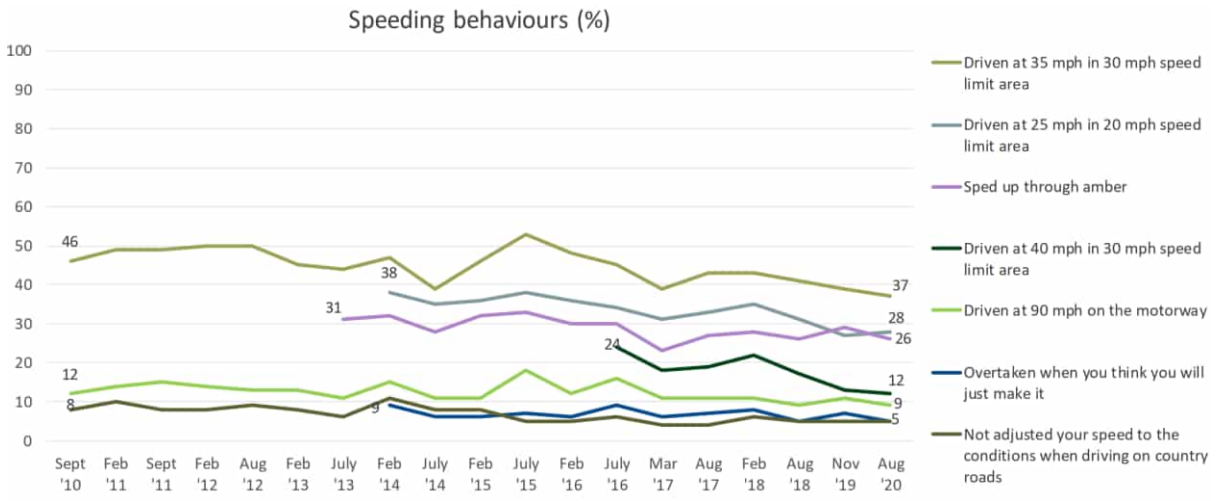


Figure 14: Speeding Behaviours

It can be seen that the results reinforce those obtained by The Royal Society for the Prevention of Accidents, whereby a large proportion of drivers will speed by up to 5mph in both 30mph and 20mph areas.

5.4.3.2 Built-up area Speed Behaviour

Drivers were then asked about their speed behaviour with regards to more built-up areas which could contain pedestrians and people on pedal bikes, with the following results recorded.

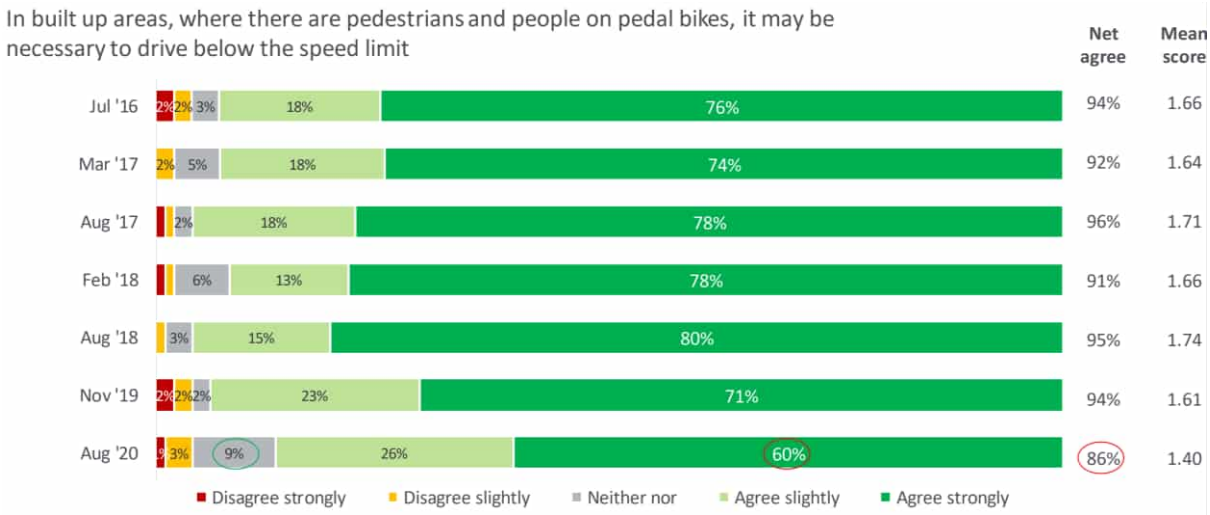


Figure 15: Built-up area Speed Behaviour

It can be seen that there was a marked decrease in those drivers who strongly agree with the statement that it may be necessary to drive below the speed limit in such areas. Indeed the net number of respondents agreeing was the lowest since the question was introduced in 2016 which would make it less conducive to encouraging walking and cycling in urban areas.

5.4.3.3 20mph Speed Limit Behaviour

Drivers were then asked about their speed behaviour with regards to 20mphs speed limits, with the following results recorded.

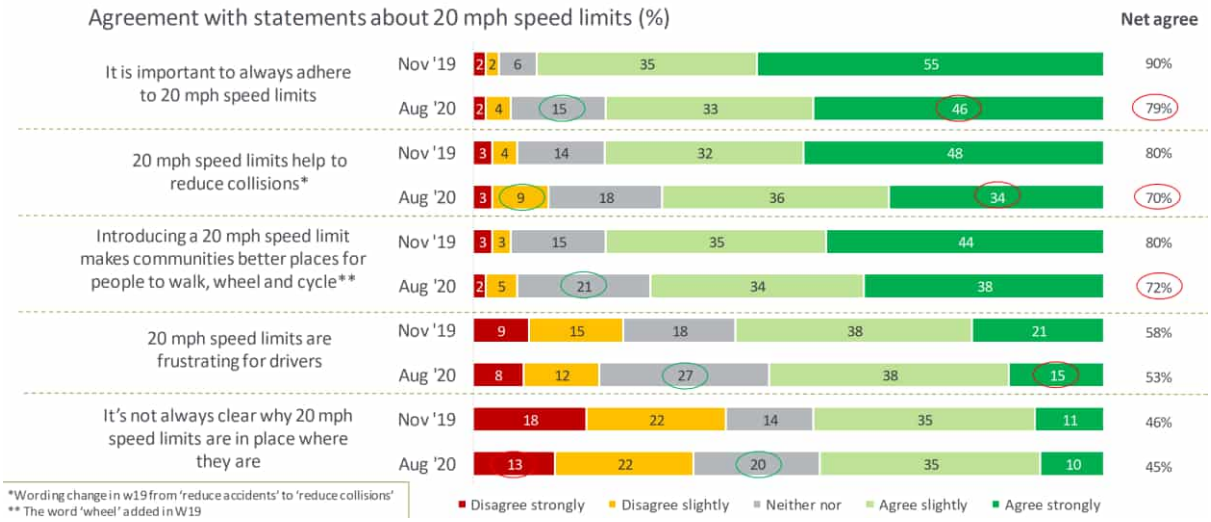


Figure 16: 20mph Speed Limit Behaviour

It can be seen that attitudes towards 20 mph speed limits are generally positive. Over half of drivers did however indicate that the speed limits are frustrating and almost half agree that it's not always clear why they are imposed. This would be important to Councils and officers considering 20mph limits, with public communication and reasons for being implemented being a key factor to the success.

5.5 Reducing Speed related Accidents

Speed related accidents can have a number of contributory factors and reducing the number of accidents and their severity can be achieved in a number of ways including:

- Driver Education
- Driver Training
- The Driving Test/ Post-Test
- Highway Design & Engineering
- 20 mph Zones and 20 mph Limits
- Vehicle Engineering/ Intelligent Speed Adaptation
- Vehicle Speed Warning/ Braking Technology
- Employers

From the above list, the main tools within a local authorities' ability to influence and reduce the number and severity of accidents would be Highway Design & Engineering along with 20mph zones and 20mph limits. As previously discussed in Chapter 4, it is likely that 20mph zones and 20mph limits would need to be supported by some highway design and engineering works.

Speed management is central to road safety. A number of local authorities in the UK have already introduced speed management strategies that have been successful in reducing casualties and average speeds. The measures that are most effective in reducing vehicle speeds which then results in reduced road death and injury are area-wide traffic calming schemes and 20 mph zones. Recent schemes which would be relevant, along with the outcomes and how these could translate to Midlothian Council, are discussed in Chapter 6.

6. Potential 20mph Limits and 20mph Zones

6.1 Introduction

The previous two Chapters have discussed the measures which can be introduced to improve road safety, including speed reduction. It is evident that despite 20mph and 30mph speed limits, a considerable proportion of drivers in the UK continue to speed, with many admitting they travel up to 5mph over the stated speed limits. Added to this, the risk of fatalities greatly increases with speeds greater than 30mph, it is clear that speed reduction in urban areas is key to improving road safety. This has been examined in further detail by a number of Universities working in conjunction with Local Authorities. The following Chapter will discuss some of the recent studies which have been undertaken, along with what this could mean for settlements within Midlothian should similar measures and results be achieved.

6.2 Edinburgh University 20mph Study in Edinburgh

Edinburgh University have been working with The City of Edinburgh Council to monitor a number of trial areas where 20mph speed limits were introduced. A report published in October 2019 indicated the key outcomes following the implementation of 20mph speed limits in the City of Edinburgh.

The study team were based at the University of Edinburgh and several other Universities around the UK. An evaluation of the public health impact of the 20mph speed limit policies in Edinburgh and Belfast was undertaken as part of the study. The published report provided an overview of changes in vehicle speed and volume and road traffic collision rates resulting in personal injury before and after the implementation of the 20mph speed limits. With this recent data from a neighbouring local authority, where driver characteristics will be similar, it is considered that the results will offer an excellent comparator for Midlothian.

6.2.1 The findings of the Edinburgh University Study are outlined below:

6.2.1.1 Vehicle speed and volume

The speed and volume data used in the analysis covered sixty-six 20mph streets. These streets were 30mph before the speed limit implementation and changed to 20mph afterwards.

- *There has been a statistically significant reduction in average vehicle speed of -1.34mph for all 66 streets combined.*
- *The largest reduction in average vehicle speed was -2.41mph and was observed in Rural West Edinburgh.*
- *A comparatively higher reduction in average speed, -2.03mph, was observed in streets where the average speed before the speed limits was greater than or equal to 24mph.*
- *The frequency of average speed observations which were less than or equal to 20mph was greater after the speed limit implementation.*
- *There was a reduction post speed limit introduction in the number of drivers exceeding 20mph at speeds over 20mph (10%), 24mph (25%) and 30mph (41%).*

6.2.1.2 Road traffic related collisions

- *Within the entire city of Edinburgh boundary, a reduction in collision rates has been observed on roads (with either 20mph and 30mph speed limits) after the speed limit implementation with a decrease of 371 collisions per year. Similarly, a reduction has been observed for collision rates in the following categories:*

Summary of Findings

Was there a change in speed of traffic in Edinburgh after the 20mph speed limit implementation?

Yes. The results in this report point to a statistically significant reduction in average vehicle speed, with the highest reduction observed for zone 1b, Rural West Edinburgh of -2.41mph. Additionally, we note a relatively larger reduction in average speeds on streets with higher speeds before the speed limit implementation.

Was there a change in volume of traffic in Edinburgh after the 20mph speed limit implementation?

No. There was no evidence of a change in the average volume of traffic after the 20mph speed limit implementation.

Was there any displacement of traffic from 20mph streets to 30mph streets?

No evidence of this. In terms of whether there was any displacement of traffic from 20mph streets to 30mph streets, the results for South Central/East provided an indication that there was none. Comparisons for the other implementation zones were not done due to lack of data on 30mph streets.

Was there a change in the rate of road traffic collisions (overall and by level of severity) in Edinburgh after the 20mph speed limit implementation?

Yes. This was observed for the city wide analysis. Preliminary models indicated that the decrease in road traffic collisions resulting in personal injury across the City of Edinburgh council boundary after the speed limit implementation.

6.3 University of West of England Analysis of Bristol's 20mph rollout

In July 2012, Bristol City Council voted to introduce 20mph speed limits throughout the city. This followed the completion of successful pilot schemes in South and East Bristol. The 20mph speed limit was introduced in six phases. The first area implemented on 20th January 2014 covers Central Bristol and borders the two pilot areas. The process of introducing 20mph limits across the city was completed in September 2015.

The roll-out of the 20mph speed limits in Bristol was about more than reducing road traffic casualties, although this was one of the aims. The roll-out sought to improve health and well-being across the city, taking a holistic perspective as to how slower traffic speeds might impact on people's lives. The research undertaken by the University of West of England is understood to be one of the biggest of its kind and again will provide a good backdrop and comparator for Midlothian.

6.3.1 Research Methods

The research took a holistic, public health approach to evaluation, using a variety of data sources to examine: changes in vehicle speeds; road traffic casualties; levels of walking and cycling; public perceptions and attitudes; and reported levels of health and wellbeing across the communities in Bristol before and after the introduction of 20mph speed limits across Bristol.

Summary of Findings

Speed

- On average, according to Automatic Traffic Count (ATC) speed data (with over 36 million vehicle observations analysed) there was a statistically significant 2.7mph decrease in vehicle speeds on roads where the 20mph speed limit was introduced, when controlling for other factors that might affect speed (areas, calendar year, time of day, season, type of road, and day of week). In the areas that stayed 30mph, there was a statistically significant negligible reduction in speed (0.04 mph)
- The largest reduction in speed was on 20mph A and B roads.
- Average speeds on 20mph roads were found to be below 24 mph in every area except for the Outer North and South areas of Bristol. On 30mph roads, average speeds are below 30mph in every area.
- Average speeds declined by a greater amount in the summer months and on weekends, where traffic volume (and congestion) is lowest.
- 94% of roads surveyed saw a reduction in average speeds. Average speed decreased on 100 roads out of 106.
- The greater reduction in speeds seen here when compared with previous studies may be due to the methodological differences in the approach taken in the Study, including analysis of individual vehicle speeds rather than daily average speeds, and inclusion of both residential and larger roads which may have a greater scope for speed reductions.

Casualties

- Annual rates of fatal, serious, and slight injuries following the introduction of the 20mph speed limits are lower than the respective pre-20mph limit rate, thus showing a reduction in the number of injuries. The estimated total number of injuries avoided across the city each year is 4.53 fatal, 11.3 serious, and 159.3 slight injuries.

- The estimated annual saving following the decrease in casualties is £15,256,309, based on Department for Transport formula for calculating the cost of road traffic casualties.
- The decrease in casualties has also benefitted some vulnerable groups. It is estimated that:
  - Two child lives will be saved every three years; 3 older adult lives will be saved every two years; and 3 pedestrian deaths will be avoided every year.
  - More than 4 child serious injuries will be avoided in just over three years; 4 older adult lives will be saved in three years; and 2 pedestrian severe injuries will be avoided every year.
  - The number of avoided slight child injuries per year is 7.68; 25.77 older adult slight injuries will be avoided each year; and 24.54 pedestrian slight injuries will be avoided each year.

Wider public health effects

- Clear majority support remains in Bristol for 20mph speed limits, with 62% supporting such limits on residential roads and 72% on busy streets.
- However, there is cynicism in Bristol about lack of enforcement of 20mph limits, a lack of compliance from "other drivers" and an increased readiness to report that it is sometimes okay to drive above the posted speed limit on residential roads.
- The number of people who walk or cycle to work in Bristol has increased between 2010 and 2015.
- More children in Bristol now walk or cycle to school following the introduction of the 20mph speed limits.

6.4 Napier University 20mph limits in the Scottish Borders

Reduced speed limits were initially introduced to over 90 settlements across the Borders area in October 2020 as part of the Spaces for People programme. Run in conjunction with Transport Scotland and Sustrans, the project's aim has been to encourage more active travel including walking and cycling throughout the COVID-19 pandemic. These 20mph limits were recently approved at committee as permanent measures and will be retained in order to continue to encourage a safer environment and promote walking and cycling as the primary modes of transport within the Local Authority area.

6.4.1 Evaluation

The trial has been run with input from experts from Edinburgh Napier University, who carried out an independent evaluation from 125 survey sites over 97 settlements. They found vehicle speeds have reduced in almost all settlements, in some instances by 6mph, with an average reduction closer to 3mph. As well as valuable feedback from 8,000 members of the public the Council sought the views of community councils to the trial and have worked with Police Scotland and Transport Scotland on recommendations.

Taking into account feedback and data, 20mph will be the default limit across towns and villages. However some settlements will have 30mph or 40mph buffer zones in place where suitable. These tend to be areas with no homes near the road or long stretches where it is felt driving at 20mph is difficult to justify and particularly challenging. It should be noted that amendments were made throughout the pilot scheme taking on board public feedback, which has included trialling buffer zones in a number of locations.

Summary of Findings

Speed

- There has been significant speed reductions after the introduction of the 20mph speed limit
- There has been a shift from mean speeds from 25mph to 22mph
- Speed reductions seem to be maintained over time (8 month period)
- Where speeds were higher pre-trial, these sites have seen the biggest reductions

Public Feedback

- Polarised response with some residents keen to retain the 20mph speed limits, while others were less so. Generally, there was an acceptance that outside schools and residential areas should have a form of 20mph speed limit in place.

6.5 Midlothian Council Potential 20mph Limits & 20mph Zones

As has been shown in the previous two Chapters, road safety and speed reduction are interlinked and it is likely that both would need to be considered in tandem to successfully implement an environment such as a 20mph zone which can be relatively self-enforcing, as Police Scotland have limited resources for continual monitoring given the vast road network they need to cover.

It is however apparent that the Scottish Government and the National Transport Strategy, with supporting documents such as the Road Safety Framework, are moving in a direction which is intended to be sustainable, inclusive, safe, healthier, and fairer. In terms of our road network and hierarchy, walking and cycling are the most sustainable modes of transport, however they are often overlooked in road and junction design, with most of our settlements having historic layouts which were designed primarily to facilitate private car travel. It can often be difficult to retrofit engineering solutions and many will retain required departures from standard as it is cost prohibitive to achieve fully compliant layouts.

Traffic calming measures including 20mph limits and 20mph zones are however a cost effective measure which have demonstrable results as shown in the three University case studies in this Chapter. Speed reductions of between 1.34mph and 3mph were achieved in Scottish Local Authority areas without significant heavy engineering works.

While this report has focused upon the road safety aspects of traffic calming and speed reducing measures, clearly making an environment which is more conducive to walking and cycling and encouraging people to be more active in their daily trips will have wider reaching benefits. Roads where people are more comfortable in using them, where accidents occur less, but more importantly when accidents occur they are not serious or life threatening, can only be of benefit to local communities and continue a trend of increasing trips by walking and cycling.

6.5.1 Midlothian Settlements Accident Rates

Should Midlothian Council wish to pursue a transport strategy where 20mph limits and 20mph zones are introduced across the local authority area then it is important to understand the type of benefits which could be anticipated.

In this Chapter three University studies have been examined which all experienced similar results from close to a 1% speed reduction on some roads, up to a higher end 6% speed reduction on other roads. When considering the average obtained in each of the three studies, Edinburgh achieved a 1.34% speed reduction, Bristol achieved a 2.7% reduction, and Scottish Borders achieved a 3% reduction.

The lower 1.34% speed reduction and higher average 3% speed reduction have been taken and applied to the base results obtained in Chapter 3 to determine the overall effect on accident rates per settlement. It should be borne in mind that most of the settlements contained a mixture of roads, including a significant number of accidents occurring in the 40mph speed range. Only 30s changing to potential 20mphs in settlements have been considered, with the results shown overleaf.

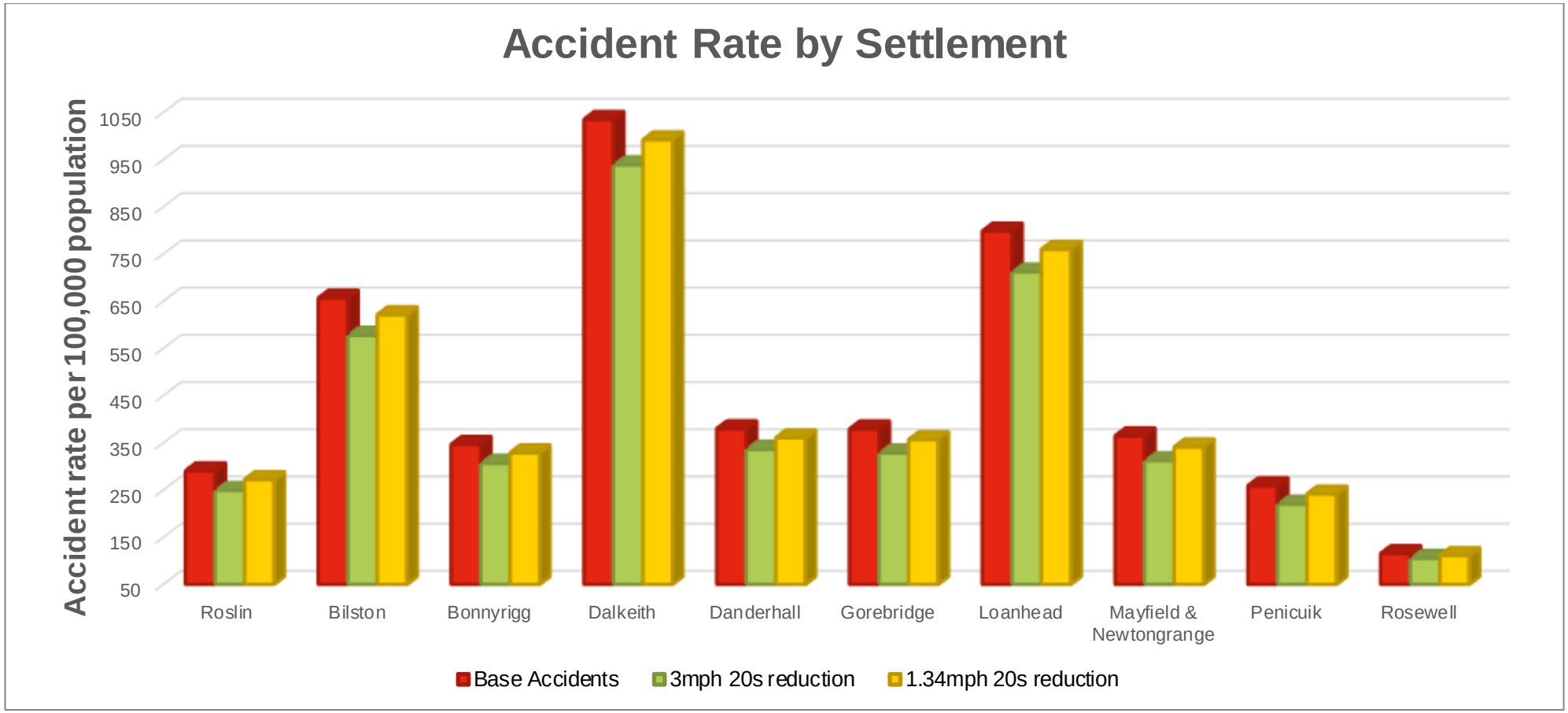


Figure 17: Accident rate by Settlement with 20mph Speed Scenarios

6.5.2 20mph Speed Reduction Summary Results

As the majority of accidents currently occur in the urban settlements with 30mph roads, a significant change in overall accident rates could be anticipated in some settlements with the introduction of 20mph limits and 20mph zones. With a predicted 1.34% and 3% speed reduction respectively, settlements could anticipate the following overall accident reduction rates:

Settlement	Collision Reduction Percentage (1.34mph speed reduction)	Collision Reduction Percentage (3mph speed reduction)
Roslin	6.4%	14.4%
Bilston	5.4%	12.0%
Bonnyrig	5.2%	11.6%
Dalkeith	4.1%	9.3%
Danderhall	5.1%	11.5%
Gorebridge	6.0%	13.5%
Loanhead	4.9%	10.9%
Mayfield & Newtonbrige	6.5%	14.5%
Penicuik	6.7%	15.1%
Rosewell	4.0%	9.0%

The above predictions are estimates based upon similar results occurring in Midlothian that have been experienced elsewhere. It would be recommended that trial areas be examined before a wider rollout as has been done in other local authority areas. This would then allow specific data to be collected on those settlements as well as a more detailed examination on any accident clusters and characteristics of various roads to ensure they are suitable and could be self-enforcing post implementation.

7. Summary and Conclusion

7.1 Introduction

The National Transport Strategy sets out the vision for Scotland over the next 20 years which is to, “have a sustainable, inclusive, safe and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors”. The following elements help to underpin this and are fundamental to achieving the vision:

- Reduce Inequalities
- Climate Action
- Economic Growth
- Health & Wellbeing

The supporting Road Safety Framework 2030 identifies five outcomes: Safe Road Use, Safe Roads & Roadsides, Safe Speeds, Safe Vehicles and Post-crash Response. Particularly pertinent to Local Authorities are Safe Roads/ Roadsides and Safe Speeds, as measures can be introduced to have an influence on both of these, i.e. physical traffic calming measures, and reduced speed limits/ zones to alert people to the characteristic of the road carriageway and how they should be driving appropriately. Creating a safer lower speed environment can contribute to achieving the National Transport Strategy vision and the four underpinning principles.

7.2 Safe Roads and Roadsides

Roads and roadsides can be designed to reduce the risk of collision and to mitigate the severity of injury should a collision occur. A combination of the design and maintenance supported by the implementation of a range of strategies can ensure that roads and roadsides are as safe as possible. One way in which this can be achieved is to both segregate different kinds of road users and the traffic moving in different directions or at different speeds. If this is not possible, promoting positive behaviours and safer sharing of spaces, as well as the appropriate use of speed limits and signage can be a much more affordable and sustainable way to protect the most vulnerable road users.

7.3 Safe Speeds

Speed limits contribute to avoiding collisions and reducing the speed at which impacts occur when they do happen. This in turn reduces the severity of the collision and can reduce severe and fatal accidents. Appropriate speed limits should be determined by the road characteristic, the function it serves, and the features of the road e.g. the physical speed at which vehicles can traverse bends, dips, or sections with poor road visibility. The key factors that should be taken into account in any decisions on local speed limits are:

- history of collisions
- road geometry and engineering
- road function
- composition of road users (including existing and potential levels of vulnerable road users)
- existing traffic speeds
- road environment

7.4 Midlothian Accident Statistics

The majority of Slight and Serious injuries occur in the 30mph bracket in Midlothian. The number of fatal accidents is however much higher in the 60mph bracket, demonstrating the link between higher speeds resulting in much higher chances of serious or fatal accidents. Potential contributory factors of Road Type, Weather Conditions, and Lighting Conditions have been examined and do not offer any obvious reasons for the overall accidents occurring in the local authority area. The majority of accidents occur on single carriageway roads where weather and lighting conditions were good at the time of the accidents.

7.5 Accident Reduction Measures

Traffic calming has traditionally been the main method used by local authorities to control problem areas and accident hotspots. There are many different forms of traffic calming measures although generally they can be categorised into the following three groups;

1. **Vertical Measures** – These traffic calming measures generally require a vehicle to overcome a physical object that is designed to influence the speed of the vehicle. The most common types of vertical traffic calming are speed humps, speed tables and speed cushions but there are other devices such as raised junctions and rumble strips that can also be used.

2. **Horizontal Measures** – Horizontal calming measures aim to reduce a vehicles speed by forcing a lateral movement or forcing vehicles to give way to each other. These measures can include chicanes, pinch-points and mini-roundabouts.

3. **Traffic Regulation, Signage and Enforcement** – A range of other traffic management measures can be utilised to slow traffic speeds, either by regulatory deterrents (speed limits and safety cameras) or softer psychological measures (signage, vehicle activated signs, road markings and coloured/ textured surfacing).

The range of measures which can be introduced above all have their individual benefits but they also come with associated initial capital budget costs and then ongoing maintenance costs. Often these can be prohibitive to rolling out the measures on a network wide basis, instead targeting available budgets on areas which have a demonstrable accident history record.

7.6 Speed Reduction

Scottish Government and the National Transport Strategy, with supporting documents such as the Road Safety Framework, are moving in a direction which is intended to be sustainable, inclusive, safe, healthier, and fairer. In terms of our road network and hierarchy, walking and cycling are the most sustainable modes of transport, however they are often overlooked in road and junction design, with most of our settlements having historic layouts which were designed primarily to facilitate private car travel. It can often be difficult to retrofit engineering solutions and many will retain required departures from standard as it is cost prohibitive to achieve fully compliant layouts and the ongoing maintenance burden.

20mph limits and 20mph zones are however a cost effective measure which have demonstrable results as shown in the three University case studies. Speed reductions of between 1.34mph and 3mph were achieved in Scottish Local Authority areas without significant heavy engineering works and could offer a solution to villages and towns within Midlothian.

7.7 20mph Limits and 20mph Zones

Road safety and speed reduction are interlinked and it is likely that both would need to be considered in tandem to successfully implement an environment such as a 20mph zone which can be relatively self-enforcing, as Police Scotland have limited resources for continual monitoring given the vast road network they need to cover.

While this report has focused upon the road safety aspects of traffic calming and speed reducing measures, clearly making an environment which is more conducive to walking and cycling and encouraging people to be more active in their daily trips will have wider reaching benefits. Roads where people are more comfortable in using them, where accidents occur less, but more importantly when accidents occur they are less serious and not life threatening. This can only be of benefit to local communities and continue a trend of increasing trips by more sustainable walking and cycling modes.

7.8 Midlothian Settlements Accident Rates

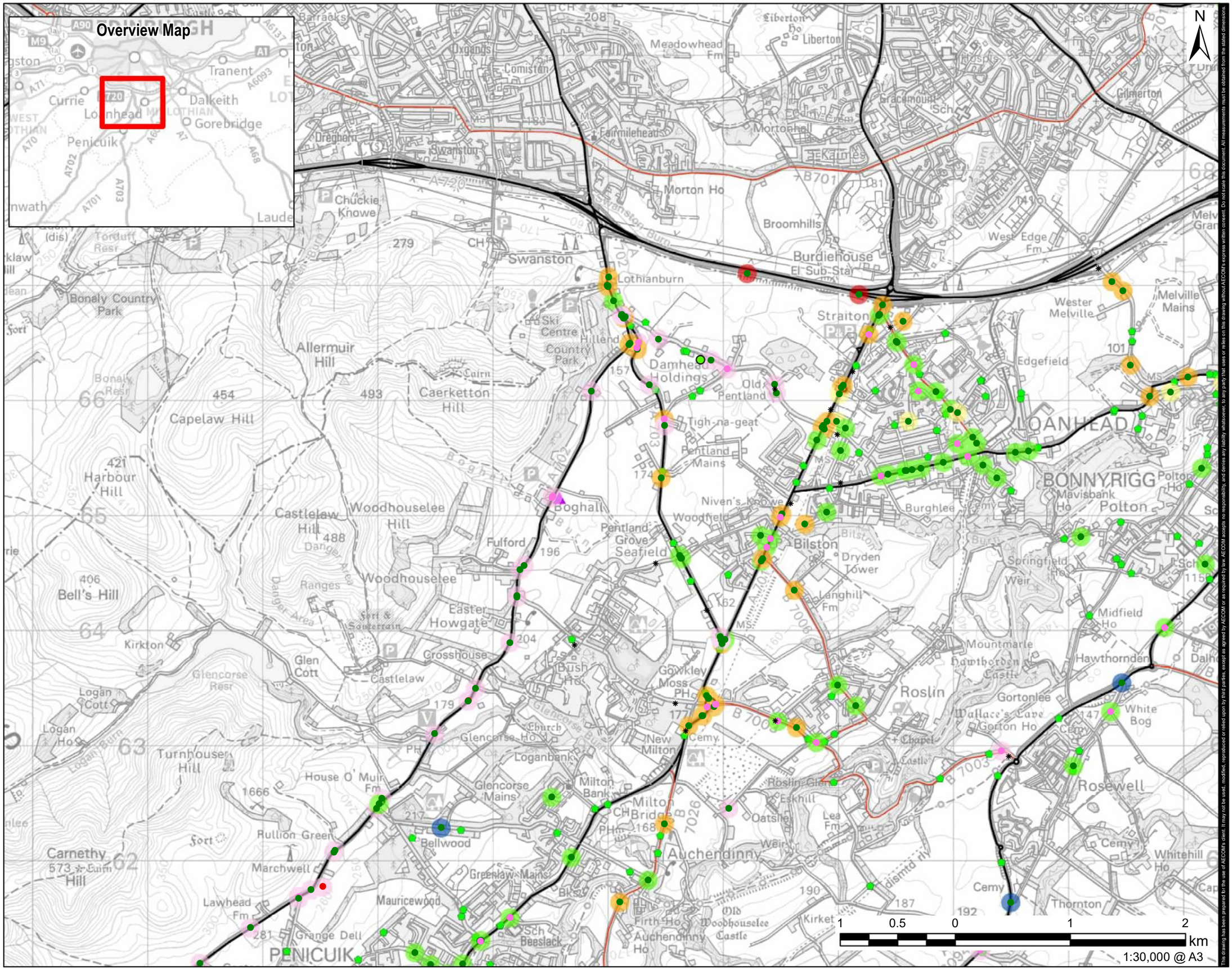
Should Midlothian Council wish to pursue a transport strategy where 20mph limits and 20mph zones are introduced across the local authority area then it is important to understand the type of benefits which could be anticipated.

Three University studies have been examined which all experienced similar results from close to a 1% speed reduction on some roads, up to a higher end 6% speed reduction on other roads. When considering the average obtained in each of the three studies, Edinburgh achieved a 1.34% speed reduction, Bristol achieved a 2.7% reduction, and Scottish Borders achieved a 3% reduction.

The lower 1.34% speed reduction and higher average 3% speed reduction have been taken and applied to the baseline Midlothian results obtained over the previous 5-year period to determine the overall effect on accident rates per settlement. It should be borne in mind that most of the settlements contained a mixture of roads, including a significant number of accidents occurring in the 40mph speed range. Only 30s changing to potential 20mphs in settlements have been considered.

The results vary by settlement but are potentially very positive, having a lower end 4% reduction but ranging up towards 15% in multiple Towns and Villages should higher speed reductions be achieved.

Appendix A - Accident Location Mapping



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PROJECT
ROADS HIERARCHY AND ROAD SAFETY REVIEW

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LEGEND
- A Roads
- B Road
- Other Roads
- Traffic Counters Site
- Radar Sites

Speed Limit Zones
- 20
- 30
- 40
- 50
- 60
- 70

Accident Severity
- 1 - Fatal
- 2 - Serious
- 3 - Slight
- High casualties ≥ 5

NOTES

ISSUE PURPOSE
DRAFT

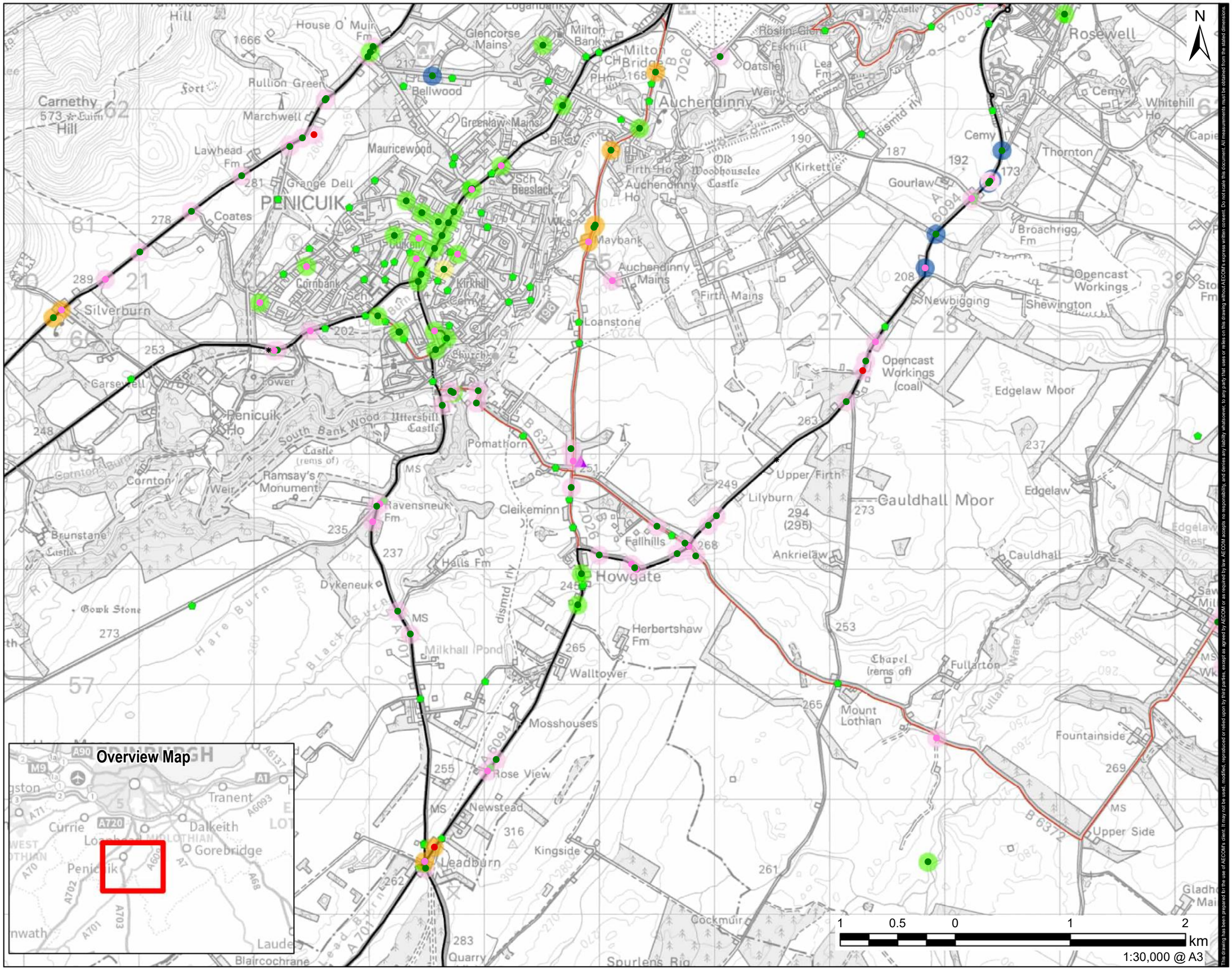
PROJECT NUMBER
60668229

SHEET TITLE
Roads Hierarchy Review

SHEET NUMBER
Figure 2A

Revision: Rev No. Drawn: AM Checked: NS Approved: DM Date: 25/11/2021

Filename: F:\General\GIS\01 - Jobs\#2021\211123_Roads_Hierarchy_and_Safety_Review\02_Maps\Templates\Roads Hierarchy Review.mxd



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NOTES

ISSUE PURPOSE
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Roads Hierarchy Review

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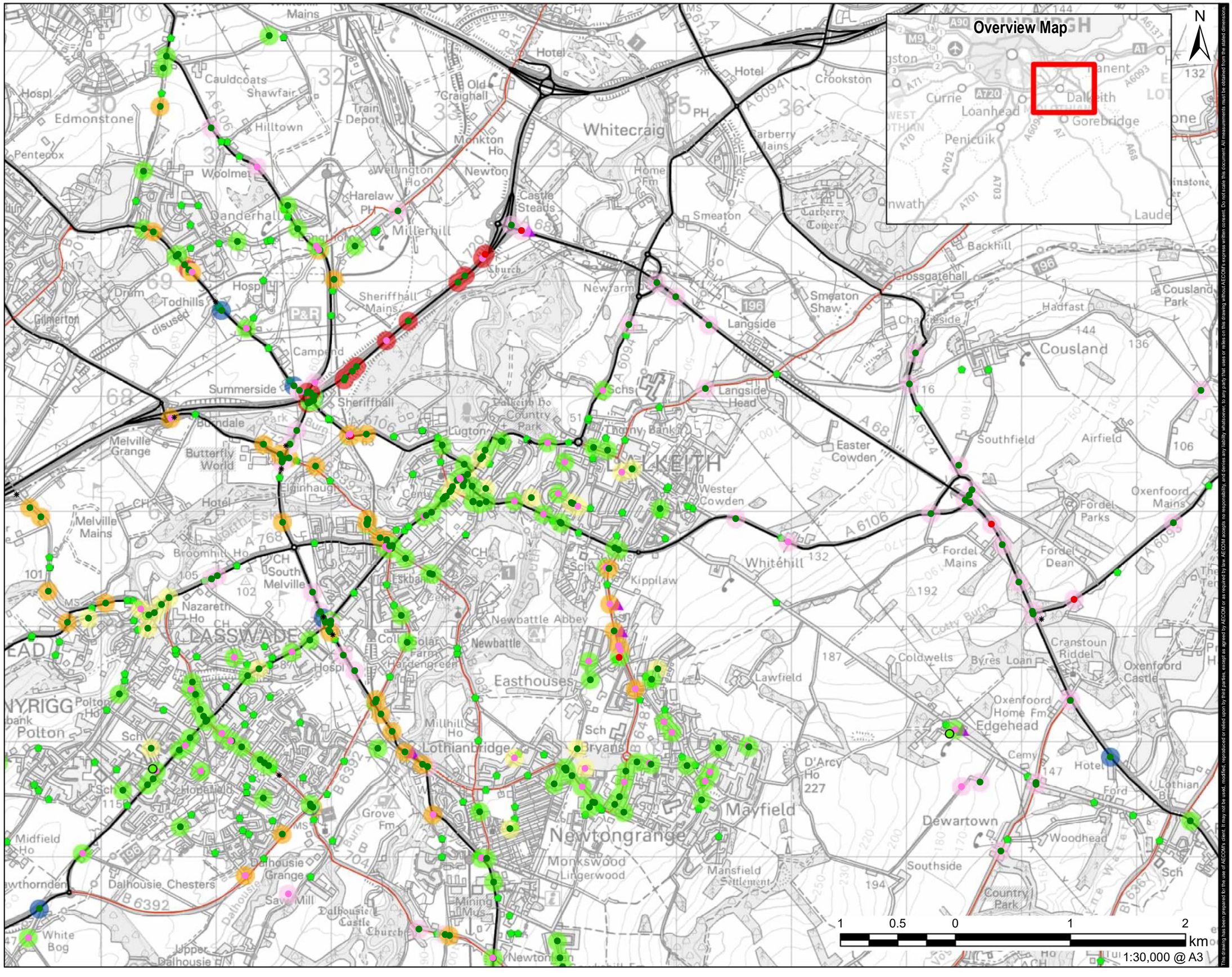
Figure 2B



Revision: Rev No. Drawn: AM Checked: NS Approved: DM Date: 25/11/2021

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NOTES

ISSUE PURPOSE
DRAFT

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60668229

SHEET TITLE
Roads Hierarchy Review

SHEET NUMBER
Figure 2C

Revision: Rev No. Drawn: AM Checked: NS Approved: DM Date: 25/11/2021

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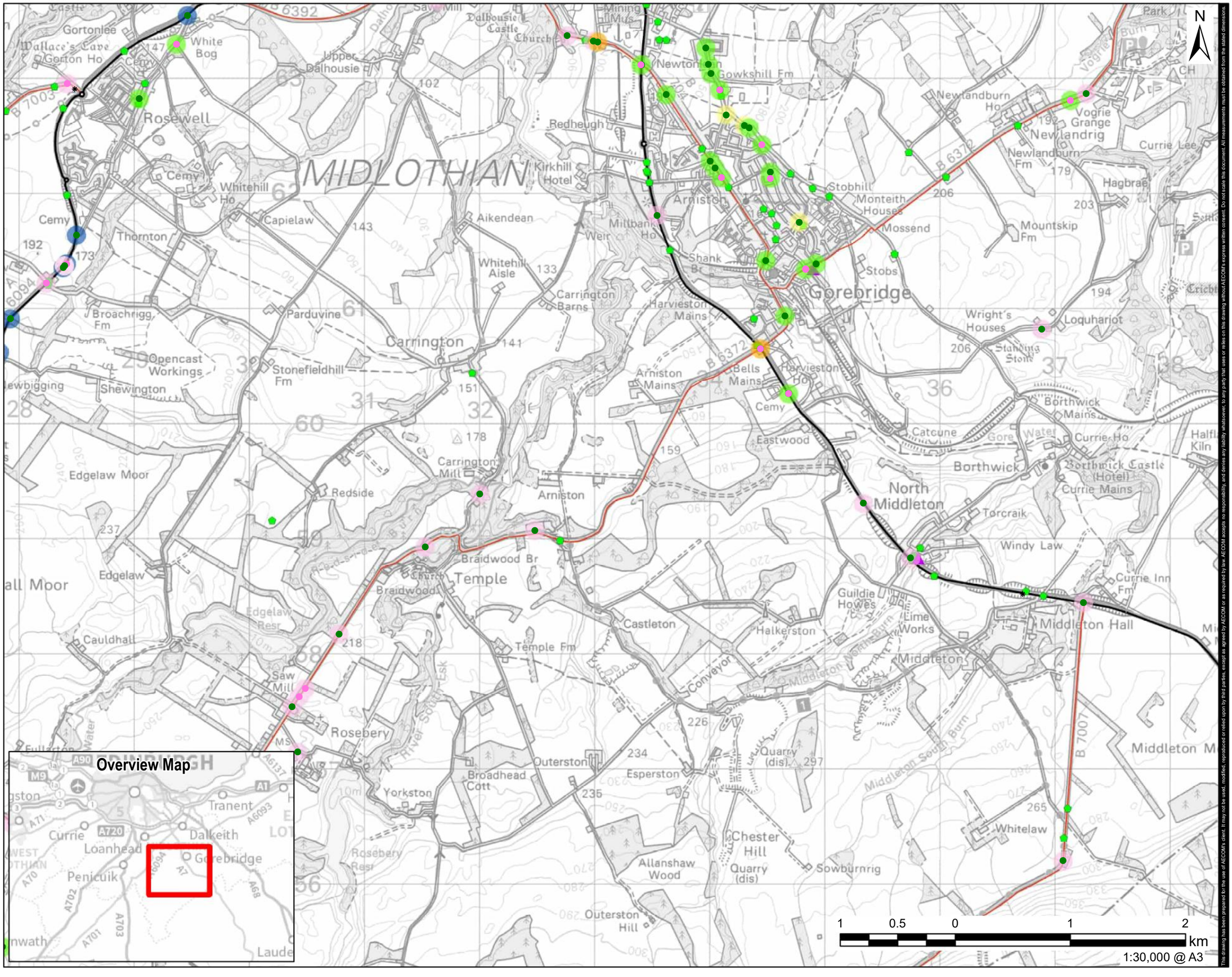

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LEGEND
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Accident Severity
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NOTES

ISSUE PURPOSE
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PROJECT NUMBER
60668229

SHEET TITLE
Roads Hierarchy Review

SHEET NUMBER
Figure 2D