



The Society of Chief Officers of Transportation in Scotland and the
Improvement Service

The Value of the Local Roads Network in Scotland

Research Report Summary

November 2019



1. Introduction

- 1.1. In early 2019, the Society of Chief Officers of Transportation in Scotland (SCOTS) and the Improvement Service commissioned independent research into the value of the local road network to the social and to the economic wellbeing of Scotland and its communities.
- 1.2. A research team of experienced consultants with expertise in economic modelling, social value and community engagement completed a combination of primary and secondary desktop research to address this question. The intention was to understand the current arrangements for assessing the value of the network, as well as identifying opportunities to develop and implement a richer approach moving forward. This would allow policy planners, commissioners and service providers to better understand the dynamic impact of decisions on investment (or otherwise) on the asset, network performance and the wellbeing and competitiveness of their communities.
- 1.3. Key research questions included:
 - What do we mean by 'local' roads?
 - What do we mean by the 'value' of local roads?
 - How do local roads networks work as systems and fit with other related systems?
 - Where is the policy alignment between local roads and both local and national outcomes?
 - How important is geography?
 - How do we ensure consistency of approach without diluting the relevance of local circumstances?
- 1.4. This summary sets out the background to the project, the key findings, and the building blocks of a proposed way forward. It also highlights possible next steps in moving from a theoretical framework to a consistently applicable model that allows a better understanding of the absolute and relative value of the local roads network across and within Scotland.
- 1.5. The report was prepared through an assessment of existing academic and policy literature, supplemented through interviews with a breadth of stakeholders with a close interest in the future of local roads in Scotland from policy, management, delivery and user perspectives. Finally, a structured community council survey was completed to ensure an element of community perspective could be fed into the analysis of current issues and opportunities, as well as priorities for the future. Based on that initial input and analysis, a number of existing datasets were considered as the basis for assessments of value.

2. Background

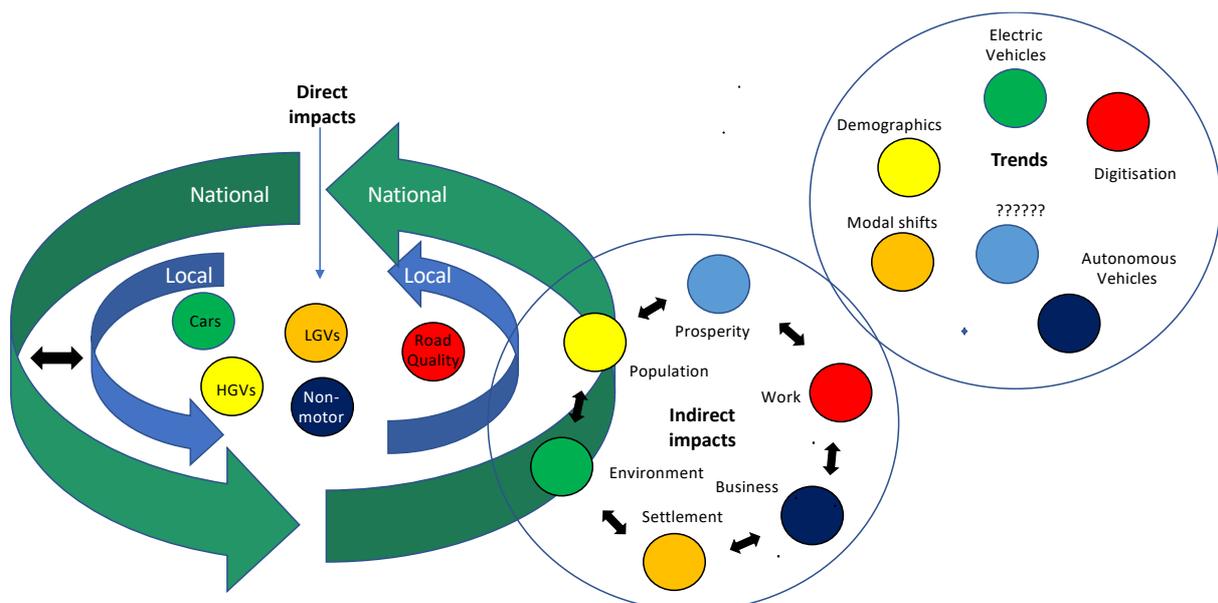
2.1 Infrastructure is widely recognised to be a key driver of success in supporting a breadth of economic, social and environmental objectives. Roads are a fundamental component of any nation's infrastructure. Scotland is no exception to this. Roads are ubiquitous, permeating every aspect of our lives.

2.2 While there is always going to be a basic core function for the roads system - namely to get people or things from A to B - the enabling capacity of the local roads system is heavily influenced by its geographical context. Put simply, expectations of the local roads network differ between cities, small towns, remote rural areas and so on. In urban areas for example, the roads network interacts with a number of other transport mechanisms and other functional activities that form part of a vibrant city centre. In more rural areas, the network also provides access to remote communities and connections between otherwise isolated settlements. In many instances, important utilities, connectivity, and sewerage and drainage infrastructure sit below the surface.

2.3 In order to tackle the question of the value of the local roads network, this project considered local roads as a system which is itself part of a connected group of systems. At the national level, there is one roads network, consisting of interconnected roads sub-systems with a wide range of densities and levels of use. At a regional level, it is then possible to identify the roads networks which function as coherent sub-systems of the Scottish network. This falls within a wider transport system; itself part of a wider system of connectivity. This system of connectivity plays a key role in Scotland's economic, social and environmental wellbeing.

2.4 Local roads are those managed and maintained by local authorities. The term "local roads network" is not always helpful. The absolute separation between "local" and "trunk" roads is primarily administrative and not necessarily reflected in the way roads are used across the country. Local and trunk roads both form part the national network and of regional sub-networks.

Figure 1: Local roads system as part of a wider set of systems



3. Defining and determining ‘value’

3.1 While access, connectivity and safety still rightly dominate much of the discussion on local roads, perspectives on what a local roads network is for seem to be intimately tied up with an attention to “place” as a concept for communities and a policy objective for both national and local government.

For the purposes of this study, an ‘effective’ local roads network was described as one which:

“...enables people and businesses in the area to undertake their daily activities in a manner which does not hinder the ability of communities served by the network to prosper, or lead to undue environmental degradation.”

3.2 It is important to stress the two key parameters in this benchmark. Firstly, that the network does not hinder the ability of people and communities to prosper, and secondly that it does not lead to undue environmental degradation. Essentially, we are recognising that there is an outer limit, which is the “ecological ceiling” and an inner limit, which is the prosperity and wellbeing of people and communities.

3.3 Trying to quantify the “value” of local roads in an absolute sense serves no useful purpose. The local roads network is invaluable, because the country could not operate without it. It is irreplaceable. Therefore, we need to look for a relative measure.

3.4 The research team was interested in measuring change (how value shifts in relative terms) over time, or between scenarios and options to see how that could help to shape policy and strategy. “Value” as a measure of observed change or potential change was thought to help to understand at what point, for example, underinvestment might start to erode the value of the network, or what marginal positive changes in delivered benefits could result from targeted future investment.

3.5 Scotland’s National Performance Framework (“NPF”) is a unique, nationwide articulation of policy aspirations for the country as a whole. It also forms a policy planning framework for a breadth of regional and local bodies, including local authorities as the managers of the local roads networks on the ground. These local priorities are captured in the Local Outcome Improvement Plans (LOIPs) agreed by partners in each local authority area. The research therefore focused its attention on measuring value for local roads in a way that was consistent with the NPF.

Figure 2: Aligning assessment of value with national, regional and local policy priorities



4. Key research findings

- 4.1 The literature review identified nine principal relevant studies, together with road-use data and forward projections for Scottish transport networks. Together, this body of work presents a complex picture, identifying a number of trends which may have transformative effects on the roads network. These include low-emission and automated vehicles, changing age profiles and attitudes to car ownership. While developments are apparent, it is important not to assume that we can accurately predict the nature and impacts of change in terms of roads usage (and the obligations that flow from this) in the medium to long term. At the same time, there are a number of useful studies that point to the need for a greater focus on transport inequalities and the apparent absence of policy that is explicitly aimed at dealing with these in a comprehensive manner.
- 4.2 Through the consultation exercise, a broad consensus was seen about the criticality of local roads infrastructure and the need to frame this in broader socio-economic terms, recognising the systemic nature of the network, as well as a willingness to enter into a debate about the strategic drivers for the network, both now and in the future.
- 4.3 Looking across the literature and consultation, the research found that:
 - 4.3.1 Local roads fulfil a number of functions and purposes (not solely about getting goods and people from A to B), and that this will continue
 - 4.3.2 They don't and won't exist in isolation – they supplement, complement and underpin a breadth of other systems and other system-related outcomes
 - 4.3.3 Value takes a number of forms and varies by geography and by stakeholder group
 - 4.3.4 Absolute value is immeasurable, relative value will vary (and can be modelled)
 - 4.3.5 Local roads make a significant contribution to supporting more vulnerable individuals and communities
 - 4.3.6 There are already modelling processes on which we can build (traffic forecasting, STAG, inclusive growth, etc). The majority of data we need is already captured/collected (and used for other purposes).
- 4.4 What was particularly revealing was how a fresh contextual and analytical perspective on the purpose and function of local roads helped to open up the potential for revalidating the role of local roads in communities and society at large. Of particular interest was the case for decision-making about local roads to be strategic rather than tactical. This could in turn lead to a radical rethink of how investment in all transportation and communication networks is prioritised to deliver a sustainable future for Scotland as part of a place-oriented approach.
- 4.5 Within roads systems themselves, there are choices to be made between the balance of investment in the trunk network and the local network even when the primary objective is to strengthen the trunk network. What makes the Scottish roads network at a national level a true network is the local roads. It follows, therefore, that sustaining investment in local roads is fundamental to preserving an effective integrated network for Scotland. This is particularly the case as volume and climate change impact on the ability of the current network – both trunk and local – to support individual, community, business and tourism needs now and in the future.

5. An emerging model

5.1 Drawing on research and consultation, a framework was developed that incorporates both direct roads data and broader socio-economic components. Understanding this framework and the key inter-dependencies provides a basis for a policy and decision tool for the network across the country.

5.2 The key principles for this model were that it should:

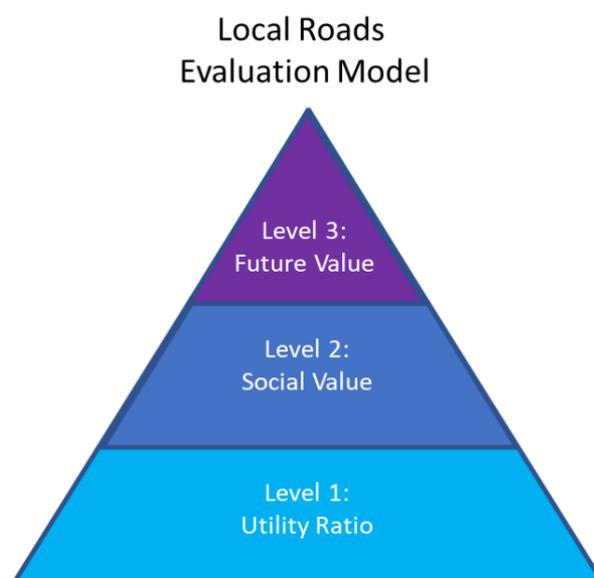
- Reflect the core function and purpose of roads as physical connectors for people, businesses and communities
- Be sensitive to variances in geography and place
- Treat the road as a network (or system) and a network within and connected to other networks
- Align with strategic policy objectives and drivers
- Be responsive to need at a community level (demonstrating both local accountability and responsiveness to local needs)
- Reflect expected future trends and changes in need.

5.3 In addressing these principles, the **Local Roads Evaluation Model** (“LREM”) that has emerged from the research incorporates three “levels” of analysis:

- Level 1 - **Utility Ratio** - which draws on readily available, directly attributable roads and transport data
- Level 2 - **Social Value** - which is also evidence-based but draws on wider *non*-roads specific datasets (relating to a broader set of socio-economic factors – for example, SIMD data)
- Level 3 - **Future Value** - which is essentially predictive and seeks to be responsive to changing policy and future trends.

5.4 One of the challenges in any evidence-based approach is that there is a trade-off between currency and certainty. In other words, there is a risk of a greater time lag in datasets that are regarded as most reliable (e.g. census data), while recent (and therefore potentially more current) data and forecasts carry greater risk of inaccuracy. The LREM combines both, in an effort to create a composite picture that is robust, nuanced and meaningful. Levels 1 and 2 in the LREM are built on historic datasets; Level 3 is predictive and based on articulated needs or aspirations at local and national level. As a result, it provides the ability to test the roads/transport and socio-economic impact of different investment scenarios within and between geographies.

Figure 3: The Local Roads Evaluation Model



5.5 The Utility Ratio¹ is derived from identified spend (“User Spend”) on the network by road users² and essentially acts as a form of input : output multiplier, based on their demonstrable willingness to pay. This is built up from three categories of information:

1. **Personal** use - includes the cost of a car, associated insurance and vehicle maintenance costs, etc. or the cost of travelling by bus
2. **Business** use – freight costs, or the cost of running their own fleet
3. **Social** use - public service providers: emergency services and local authorities who subsidise public transport and provide school buses.

5.6 Analysis of the most recent figures as part of the research indicates that that the current estimated User Spend for local roads in Scotland is **£6.4bn** per annum.

5.7 While this provides an interesting figure in its own right, it becomes more meaningful when set against costs to run the network (“Network Cost”). This consists of the direct spend by public bodies on the network (from direct capital and revenue expenditure on management and maintenance and other impacts on communities which have a cost to resolve) plus the externalised costs that are absorbed by society as a whole rather than paid for by the users. Comparing willingness to pay with levels of spend as part of the project provides a basis for calculating a form of “Utility Ratio”.

5.8 Based on the data available for the research report, the “Utility Ratio” for Scotland’s **local** roads network shows a multiplier effect of 3.46:1. This is a measure of how users value the network relative to its cost. It is a snapshot, based on historic data. One would expect the ratio to be greater than 1:1, but it is likely to vary geographically and over time. As with all cost/benefit ratios, it is important to put this ratio in context and treat this as a relative measure of value rather than an absolute one. Nor should it be used in isolation. However, it provides an essential

¹ The basis for the calculation of External Spend and the Utility Ratio is set out in the annex to this summary

² The importance of the local roads network as a conduit for wider utilities and connectivity connections may be significant. At this stage, no consistently quantifiable data is available that allows granular analysis of impact or costs. This has been excluded from the working model at this stage but can be revisited again as further research is completed and working models are established at a local level.

link with direct roads usage data and a useful point of departure for a broader socio-economic framework for assessing the value of the roads network. What we are principally interested in is how a Utility Ratio can be used as building block in a broader set of tools for measuring change.

- 5.9 However well researched, a ratio should be seen as just one tool in the box. As a general principle, analysis should never be reduced to a single indicator. It should also be borne in mind that a high figure is not automatically good, nor is a low figure automatically bad. A high Utility Ratio could equally denote efficiency (maximum output for lowest cost) or under-investment (storing up problems for later on).
6. The ratio quoted in 5.8 above is a Scotland-wide ratio; it can be adapted regionally and locally. It could be considered for a number of purposes, for instance:
- The position of local authorities against the national ratio
 - How it changes over time (e.g. in response to transport-related and wider trends) at local authority and national level
 - The varying impacts of proposed investment (or disinvestment) in specific areas within local authorities
 - The varying impacts of spending across local authority boundaries (e.g. through City Region plans or regional areas more generally).
- 6.1 The purpose of the second (Level 2) level is to use broader socio-economic datasets to highlight key dependencies at regional, local and sub-local levels. This seeks to adjust the baseline Utility Ratio to arrive at a more broadly defined broader measure of value. Put simply, it moves beyond value in cost terms to look at the wider social and economic impact of the network.
- 6.2 The Level 2 analysis is still data-led but uses broader datasets that require a degree of interpretation as to their applicability. This might include information around economic activity, social need, consumption of other public or charitable services, use of community assets, and environmental quality.
- 6.3 Level 3 will incorporate the “forward-looking” elements derived from policy and community consultation. Essentially, it will consider what impacts changes in policy or investment priorities might have on the Level 2 data, helping predict what changes might arise as a result of different investment scenarios.

Figure 5: Level 2 and Level 3 characteristics

<p>Level 2 Characteristics:</p> <p>For application at regional, local and sub-local levels. Data-led like Level 1 but using broader datasets. Key elements:</p> <ul style="list-style-type: none"> • Redundancy – the level of criticality inherent in the network. • Social need – inequality and deprivation assessment • Community capital - access to key community assets (third sector, voluntary organisations, social enterprises) • Business innovation – growth potential in local economy • Natural capital – quality of the natural environment 	<p>Level 3 Characteristics:</p> <p>Allows policy-makers to factor in the consequences of policy implementation, e.g. behavioural change strategies:</p> <ul style="list-style-type: none"> • Consultative – communities and other stakeholders can influence the assessment • Policy led - with National Performance Framework as starting point
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- 6.4 The research team looked for readily accessible and intelligible data as a starting point for the Utility Ratio (mainly Scottish Transport Statistics, Scottish Annual Business Statistics and data from the National Records of Scotland). They also explored a breadth of socio-economic and

behavioural data that could be used in building the social and future value elements of the model. Much of this data may already be submitted by local authorities in annual returns. Further work is needed to go through the datasets and work out usability and interdependencies, and to what extent these can be localised, as well as what other datasets may be appropriate³.

6.5 Together, Levels 2 and 3 allow authorities to map “hotspots” and areas of need within regional and local authority areas (potentially is support of re-prioritisation or re-allocation of budgets). They can also support more informed planning assessments and contribute to more sustainable procurement decisions.

6.6 A National Performance Framework (NPF) alignment tool was developed in support of the research. This assessed how effective local roads could potentially impact on the breadth of outcomes in the NPF, as well as providing a basis for applying different weights to the importance of these impacts in different geographies. Local authorities have signed up to the NPF and used the commitments to inform their own priorities at a local level. With this in mind, the tool could form part of the Level 3 toolkit. High-scoring networks or projects at Level 3 would be those which were able to demonstrate alignment with a significant number of National Performance Outcomes (and in turn with the local policy objectives which support their realisation).

³ This is being tested in a small supplementary exercise being completed in parallel with the finalisation of the wider research report. The team will also explore alignment with the current Scottish Transport Appraisal Guidance (STAG) approach.

7. Conclusion

- 7.1 The research found that there is a strong case for adopting a wider approach to valuing the roads network. Local roads are strategically significant for the social, economic and environmental wellbeing, not only of local communities, but Scotland as a whole, and that this needs to be reflected in long term policy and planning for the sector.
- 7.2 The scope of this work has specifically covered the *local* roads network and the proposals are framed accordingly. A key principle of the approach is that local roads are evaluated on a systemic basis. As a result, they should be seen not only as part of the overall roads network with trunk roads, but also part of wider transportation and connectivity networks.
- 7.3 A new evaluation model will help policy-makers and practitioners to embed the wider social, economic and environmental impacts of local (and trunk) roads in their decision-making and therefore make more informed decisions about the impact of investment (or disinvestment) going forward.
- 7.4 The new framework is data-led and evidence-focused but also recognises and allows for structured consultative input, so that key stakeholders – from policy-makers to custodians of the network to user groups to communities – can make qualitative judgements against a robust and transparent decision-making framework.
- 7.5 We see a number of potential benefits both to local and central government:
- The inclusion of economic and social value as core investment considerations, supplementing the traditional focus on safety, roads network performance and asset condition
 - The ability to base this model on the approaches and data sources already used to inform service delivery within the wider public sector
 - Alignment with overarching Government strategy on inclusive growth and other outcomes through the NPF (that in itself informs Local Outcome Improvement Plans), the National Transport Strategy and future strategic developments
 - The ability to weight the criteria in the model to fit the specific circumstances of local authorities across the geographic spectrum (or to do the same to assess relative values between communities/areas within each local authority).
 - The development of dynamic tool for use across local government (with building blocks that can be weighted to reflect different priorities and allow authorities to supplement and periodically update core data as required). This could be supported by SCOTS, the Improvement Service or through another hosting organisation
 - A comprehensive and consistent framework that allows policy-makers and roads practitioners capturing the value of local roads moving forward.

8. Next steps

- 8.1 A key question to be addressed is the practical application and usability of this model. At this stage the model is largely conceptual, based largely on secondary research, with a small amount of primary data collected through the consultation work.
- 8.2 The research team is completing a short supplementary exercise examining the applicability of local and national data sets and additional guidance (e.g. STAG) in a specific area context. The principal purpose of this is to test the hypothesis that multiple local and national datasets can be combined to create an evidence-led evaluation model for local roads.
- 8.3 Assuming the conclusion of this supplementary exercise is positive, the intention is to undertake a more extensive pilot research programme. This would involve more extensive applied research, testing the emerging conceptual model “on the ground” in a broadly representative sample of areas (with a view to a wider roll-out). The research pilot would explore applicability of the hypothetical model across different geographical types, the importance of interdependencies between and within the trunk and local roads systems and the influence of cities and other population centres on the way that the wider regions in which they are located are connected. The research pilot would also explore the governance, community engagement and implementation strategies needed to make the model workable in practice.
- 8.4 The key objectives of this pilot stage would be to:
 - Test and refine the theoretical model through applied research to ensure that it works for roads and wider transport planning and management across all of Scotland’s 32 local authority areas
 - Establish potential for a standardised approach with accompanying guidance to ensure consistency and comparability
 - Demonstrate how the model works to embed local roads in wider strategic considerations of prosperity and wellbeing.
 - Work out how to create effective feedback loops to enable evidence gathered to shape the evolution of the evaluation toolkit.
 - Consider the potential for digital technology to enhance data capture, consistency of application and analytical insight.

Annex: Analysis of User Spend and Utility Ratio Calculations

“User Spend” is built up from data showing what different groups of users in society pay to use the local roads network. This is taken as a proxy for willingness to pay in the emerging model. It has the benefit of being evidence-based, but it has the disbenefit of being blind to external factors and constraints that affect free choice or unintended or unforeseen consequences of road use (or lack of it). This is why it is only the first layer of the model.

This User Spend figure excludes the costs and impact of utilities (gas, electricity and water) and connectivity connections embedded in or under the local roads network. There is currently limited widely accessible data to support a coherent articulation of value associated with this activity. This position may evolve over time, with the model offering scope to add in such considerations in the future.

Our estimate of the User Spend is built up from three sectoral components: Business Use, Personal Use, and Social Use. For Business Use, we estimated the share attributable to transportation in the wider economy, focusing on sectors where transportation was likely to be a material cost component (excluding, for instance, sectors such as financial services).

We then estimated a percentage attributable to transportation in these sectors. For this report we assumed that 10% would be a reasonable. Further research or consultation (for example with road freight user groups) could make this assumption more robust moving forward. Drawing on Scottish Annual Business Statistics 2016 gave us the following summary:

GVA of sectors significantly dependent on transport	Employees	Turnover (£m)	GVA (£m)
Forestry and logging	3,100	490.8	144.6
Fishing and aquaculture	4,500	984.8	361.4
Mining, quarrying and support services	22500	4488.1	1923.8
Manufacturing	178,800	33,826	12,710
Construction	32,400	17,424.30	7112.5
Wholesale, retail and repairs	353,100	60,498.40	11,935.40
Accommodation and food services	174,700	6,696.10	3,804.50
Total indirect effects	769,100	124,409	37,992
Estimated road transport component	10%	10%	10%
Total indirect impact	76,910	12,441	3,799
Share of non-trunk roads	42,953	6,948	2,122
Business user spend of non-trunk roads			2,121,786,608

Table 1: Business Use element of User Spend

The share of non-trunk roads is based on the split in miles travelled between trunk and non-trunk roads from the Scottish Transport Statistics 2018 is as follows:

Million kilometres driven in Scotland in 2017	48,000
% driven on trunk roads	39%
% driven on non-trunk roads	61%
Million kilometres driven on trunk roads	18,720
Million kilometres driven on non-trunk roads	29,280

Table 2: Split between trunk and non-trunk mileage

Our estimate of the Personal Use component is based on data from the Scottish Transport Statistics 2018 about average weekly household expenditure on transport and vehicles, excluding rail, tube and “other travel and transport” (i.e. road only)⁴. The average household spend is shown in the table below. This is split between trunk and non-trunk on the same basis as the business expenditure.

Average weekly expenditure per household vehicles and personal transport	£52.20
Estimated number of households	£2,460,000
Annual spend on vehicles and personal transport	£6,677,424,000

Table 3: Personal Use element of User Spend

The final element of the User Spend is called (for want of a better term) the “Social Element” – in other words the elements that are spent on behalf of individual users by public sector bodies. We identified emergency services and the cost of concessionary fares as being the main components. The latter are drawn from the Scottish Transport Statistics and the former estimated on the basis of publicly available information (such as the report and accounts of the “blue light” services). There may be other elements of “social” costs that have not been identified (waste collection, for instance), but overall this element is likely to be relatively small compared with personal and business spend. The spend we identified under this heading is summarised in the table below.

Social use	
Concessionary fares	£7,142,000
Emergency services	
Police	£8,923,129
Fire & Rescue	£2,617,833
Ambulance	£11,624,000
Total social use	£30,306,962

Table 4: Social Use element of User Spend

All of these elements combine to make up the User Spend as follows. Business and personal are assumed to follow the same split of trunk / non-trunk. Social use is assumed to be predominantly non-trunk.

User Spend estimate	Overall	Local roads
Business	£ 3,799,220,000	£2,121,786,608
Personal	£6,677,424,000	£4,205,832,210
Social	£30,306,962	£30,306,962
Total user spend	£10,506,950,962	£6,357,925,780

Table 5: User Spend estimate

Calculating the Utility Ratio

We can then examine how this User Spend compares with the costs of supporting the local network – in other words, the costs that other “actors” sustain in order to keep the network running. This provides a Utility Ratio, using the User Spend as the numerator and the externalised costs as the denominator.

⁴ See Scottish Transport Statistics p179, Table 10.8

One very significant actor is the local authority sector, which funds the ongoing maintenance and infrastructure costs of the network. However, there are also other externalised costs sustained by third parties, such as the cost to the environment of the CO₂ emissions generated and the particulates emitted (which result, for instance, in costs to the health sector as well as to individuals and the planet). External costs can thus be broken down into two parts:

- Costs to local authorities of maintenance and investment
- Other costs that are absorbed by communities and more widely by society, such as the cost of road accidents, emissions (CO₂ and air pollutants) and noise⁵.

Drawing on Scottish Transport Statistics 2018, we estimated this broader definition of aggregate local roads network costs as follows:

Costs of the local roads network	
Capital expenditure	£326,483,000
Maintenance expenditure (net)	£305,433,000
<i>Sub-total: local authority expenditure</i>	<i>£631,916,000</i>
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Road accidents on local roads	£617,930,000
Emissions & noise costs - cars & LGVs	£500,188,679
Emissions & noise costs - HGVs	£86,127,484
<i>Sub-total: externalised costs</i>	<i>£1,204,246,163</i>
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Total direct and externalised costs	1,836,162,163

Table 6: Externalised costs of the Local Roads Network

“User Spend” is intended to be a measure of value for the local roads network, using what users of the network collectively spend in order to be able to make use of it. From this, we derived a “Utility Ratio” from this Utility Value by dividing it by the accumulated cost or expenditure required to sustain the network, including, but not limited to local authority expenditure. This ratio shows that what users are prepared to spend to use the local network is significantly greater than what is spent on making it available. In this sense, the network is beneficial in net terms.

Based on the data available for this report, we calculated a User Spend of **£6.4bn** for Scotland’s local roads network and a “Utility Ratio” for Scotland of **3.46 to 1**. This can be taken as a form of input : output multiplier or a proxy for the economic value of the local roads network. It is a Scotland-wide ratio but can be adapted regionally and locally, using the relevant data.

Based on the Scottish Transport data, it should be possible to recalculate this ratio for all local authority areas in Scotland. At sub-local authority (e.g. ward) level, where there is known sub-local data for this level, this could be used to modify the User Spend further.

However, as with all cost/benefit ratios, it is important to put this ratio in context and treat this as a relative rather than an absolute measure of value; nor should it be used in isolation. What we are interested in is how this can be used as a component of a broader set of tools for measuring change.

⁵ There may be other cost headings that should be included. While Scottish Transport statistics have data for the cost of road accidents, they do not seek to provide a cost for emissions and noise. At this stage we have used unit costs provided by a Swedish study: “Transportsektorns samhällsekonomiska kostnader Rapport 2019:4” and converted from SEK to £. This area would require further research at a later stage.