

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

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Tactran  
20% Mileage Reduction

16 January 2023



### Achieving a 20% Reduction in Car-km: Options for the Tactran Region

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## 1. Introduction

### 1.1 Context and objectives for this review

The Scottish Government, in its Climate Change Plan, has committed to reduce the number of car-km travelled on Scotland's roads by 20%, in comparison with a 2019 baseline, by 2030. In its "Route map to achieve a 20 per cent reduction in car kilometres by 2030"<sup>1</sup> consultation document, the Government proposed some interventions, to be commenced in the period 2021-2025, that would contribute to the achievement of that target.

It is anticipated, however, that the measures proposed in the route map are unlikely to be sufficient to deliver the scale of reduction in car use that is required. This report, completed for Tactran, investigates a broader range of potential interventions than the route map suggests, and predicts their potential impact on the number of car-km in the region (which comprises Stirling, Perth & Kinross, Angus and Dundee).

Alongside the quantified effects, this report also considers the implementability of each potential intervention, and considers how they might affect different groups of people and/or journey types undertaken in the region. This is commensurate with the Government's aspirations for a Just Transition towards net zero, as well as regional partners' aspirations for a transport system that is inclusive and equitable, as well as environmentally sustainable.

The analysis presented in this report is intended to guide regional partners and others toward identification of the likely preferable mechanisms for delivering the 20% reduction by 2030.

### 1.2 Approach

This report:

- Establishes a baseline of car-km in the region, collating evidence of the total number of car-km and who makes those journeys, where, and for what purposes;
- Considers the differing requirements for, and attitudes to, car use amongst different groups of residents of the region;
- Estimates the potential change in car-km in the region that would occur to 2030 if no specific measures to reduce them were implemented;
- Establishes the range of interventions that are available to Tactran and its partners to reduce car-km, and estimates the proportional reduction in car-km that they would achieve;
- Outlines the likely distributional effects of different options.

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<sup>1</sup> <https://www.transport.gov.scot/publication/a-route-map-to-achieve-a-20-per-cent-reduction-in-car-kilometres-by-2030/>

## 2. Car use in the Tactran region

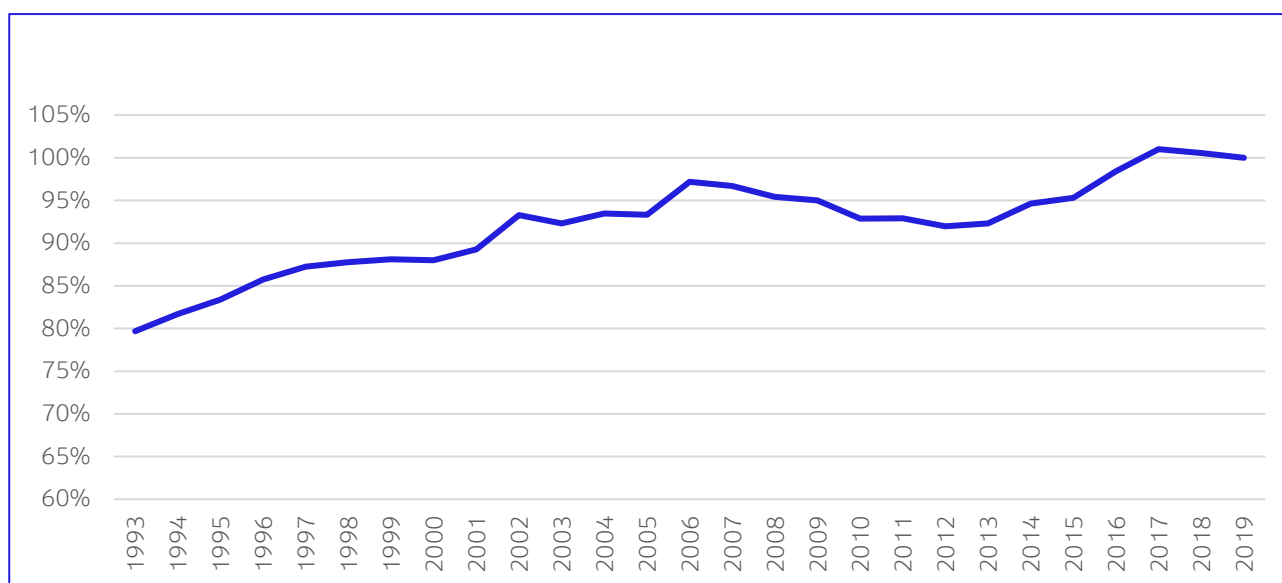
### 2.1 Baseline car use and transport demand

In 2019, around **4,500 million car-km** were driven in the Tactran region<sup>2</sup>, an average of nearly 9,000 car-km for each resident.

#### Historic traffic growth

Traffic levels in the region have increased significantly in recent decades. Department for Transport data<sup>3</sup> for the region, as summarised in Figure 1, suggests that, to achieve a 20% reduction in traffic compared to 2019 levels would be equivalent to typical flows not seen since the early 1990s.

Figure 1. Net car-km, Tactran region, 2019 base



By comparison, the number of public transport journeys has fallen significantly in the same period, with a consistent decline in the most recent decade. Figure 2 shows the proportional change in bus journeys from 1993 and for bus and rail combined from 2000 (pre-2000 data for rail is not available)<sup>4</sup>. Note that all data in Figure 2 is for Scotland, not specifically the Tactran region, and shows passenger journeys, not the number of km travelled. The number of rail journeys has increased significantly (by nearly 50% between 2000 and 2019), but this is more than offset by the fall in bus use.

The data presented does not show the effects of the Covid pandemic in 2020 and beyond. The total number of bus journeys in Scotland in 2020 as a proportion of those in 2019 was 35%<sup>5</sup>.

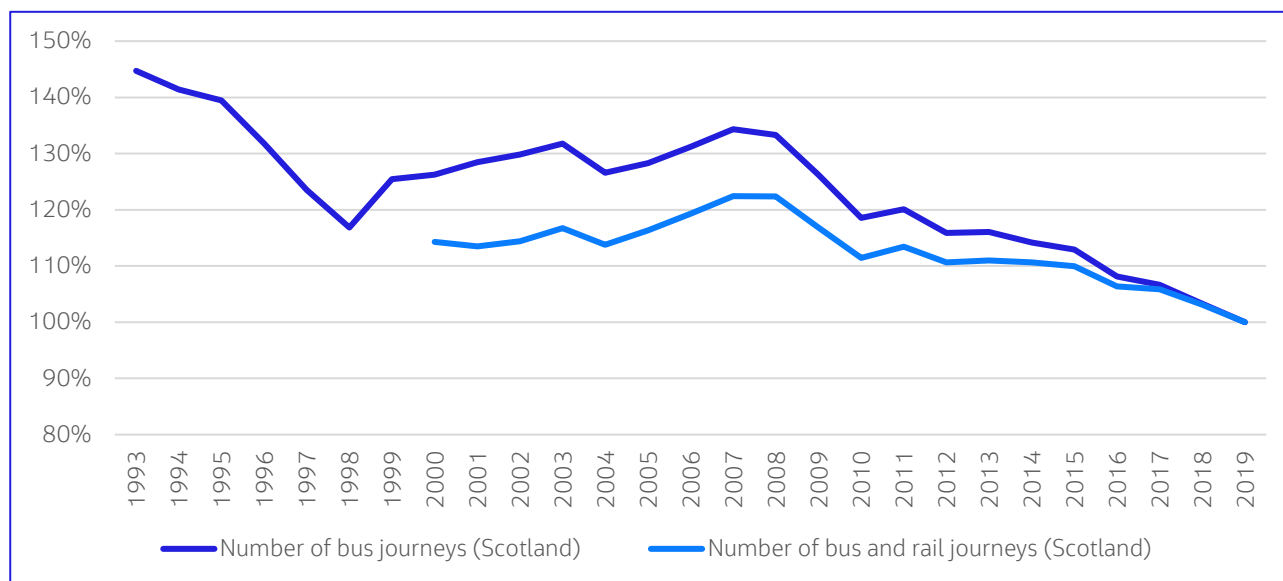
<sup>2</sup> Annex for a route map to achieve a 20 per cent reduction in car kilometres by 2030, Transport Scotland, 2022, Table 17 <https://www.transport.gov.scot/media/50873/technical-annex-a-route-map-to-achieve-a-20-per-cent-reduction-in-car-kms-by-2030.pdf>

<sup>3</sup> <https://www.gov.uk/government/statistics/road-traffic-estimates-in-great-britain-2020>. Table TRA8905a. Note that pre-1993 data is not available

<sup>4</sup> Scottish Transport Statistics, 2021. <https://www.transport.gov.scot/publication/scottish-transport-statistics-2021/>

<sup>5</sup> Scottish Transport Statistics, 2021. Ibid

**Figure 2. Public transport journeys, Scotland, 2019 base**



## Spatial variations in car use

Average car use per person varies significantly across the region, with use generally greater by residents of more rural areas, where average journey distances tend to be greater, and available alternatives fewer (Table 1). Car use per person in the region is around 30% greater than the Scottish average:

**Table 1. Regional car-km per annum**

Council area	Population	Land area (km <sup>2</sup> )	Million car-km (2019) <sup>6</sup>	Car-km per person (2019)
Angus	115,820	2,181	870	7,512
Dundee	148,290	60	663	4,471
Perth & Kinross	151,910	5,286	1,906	12,547
Stirling	94,080	2,186	1,040	11,054
<b>Tactran</b>	<b>510,100</b>	<b>9,713</b>	<b>4,479</b>	<b>8,781</b>
<i>Scotland</i>	<i>5,466,000</i>	<i>77,901</i>	<i>36,747</i>	<i>6,723</i>

The Tay Cities Regional Transport Model (TCRTM) suggests that the proportions of car-km are between the different urban and rural areas of those parts of the region which it covers<sup>7</sup>, using the Scottish Government 6-Fold Urban-Rural Classification<sup>8</sup>, are as shown in Table 2. Figure 3 shows the classification of each part of the region.

<sup>6</sup> Annex for a route map to achieve a 20 per cent reduction in car kilometres by 2030

<sup>7</sup> Most of the Council areas of Dundee, Angus and Perth & Kinross, but with little detail in Stirling

<sup>8</sup> **Class 1 Large Urban Areas:** Settlements of 125,000 people and over (so only Dundee in the Tactran region);

**Class 2 Other Urban Areas:** Settlements of 10,000 to 124,999 people;

**Class 3 Accessible Small Towns:** Settlements of 3,000 to 9,999 people and within a 30-minute drive time of a settlement of 10,000 or more;

**Class 4 Remote Small Towns:** Settlements of 3,000 to 9,999 people, and with a drive time of over 30 minutes to a Settlement of 10,000 or more;

**Class 5 Accessible Rural Areas:** Areas with a population of less than 3,000 people, and within a 30-minute drive time of a Settlement of 10,000 or more;

**Class 6 Remote Rural Areas:** Areas with a population of less than 3,000 people, and with a drive time of over 30 minutes to a Settlement of 10,000 or more

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

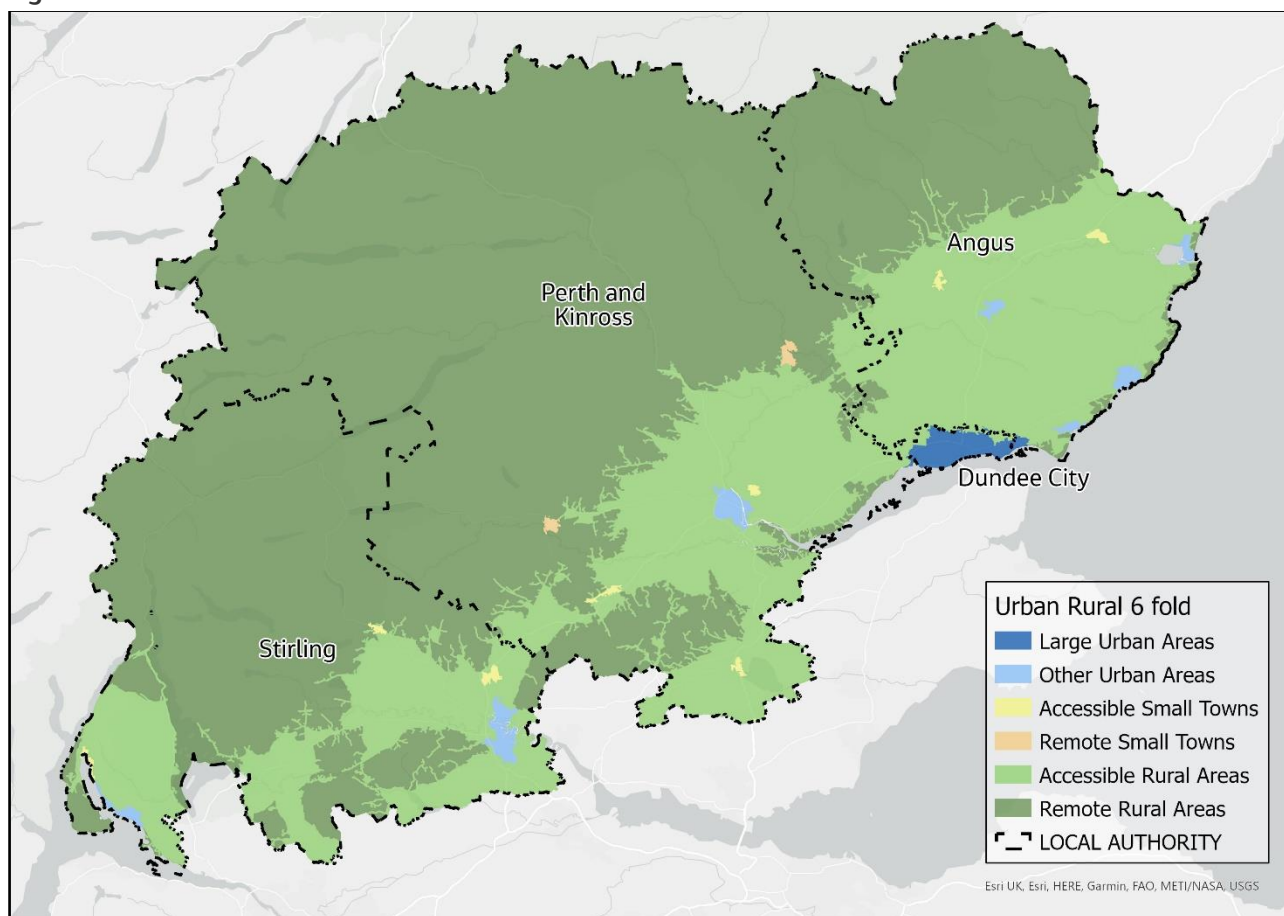
The larger flows are highlighted in Table 2. The data show that regional car-km arise from a broad range of journey types, but that journeys to/from remote small towns and remote rural areas generate less car use than to/from other area types, but that accessible rural areas generate more car-km than any other classification:

**Table 2. Proportion of car-km by urban-rural classification**

To From	Class 1 Large Urban Areas	Class 2 Other Urban Areas	Class 3 Accessi- ble Small Towns	Class 4 Remote Small Towns	Class 5 Accessi- ble Rural Areas	Class 6 Remote Rural Areas	Total
Class 1 Large Urban Areas	4.1%	2.2%	1.7%	0.2%	4.2%	0.4%	12.8%
Class 2 Other Urban Areas	2.3%	9.7%	4.9%	0.3%	9.3%	1.4%	27.9%
Class 3 Accessible Small Towns	0.7%	2.2%	0.9%	0.1%	2%	0.3%	6.2%
Class 4 Remote Small Towns	0.2%	0.3%	0.1%	0.1%	0.5%	0.2%	1.4%
Class 5 Accessible Rural Areas	5.2%	12.7%	5.7%	0.6%	15.7%	3.8%	43.7%
Class 6 Remote Rural Areas	0.4%	1.4%	2.3%	0.3%	2.4%	1.2%	8.0%
Total	12.9%	28.5%	15.6%	1.6%	34.1%	7.3%	100.0%



**Figure 3. Urban-rural classification**



## Car-km by journey length

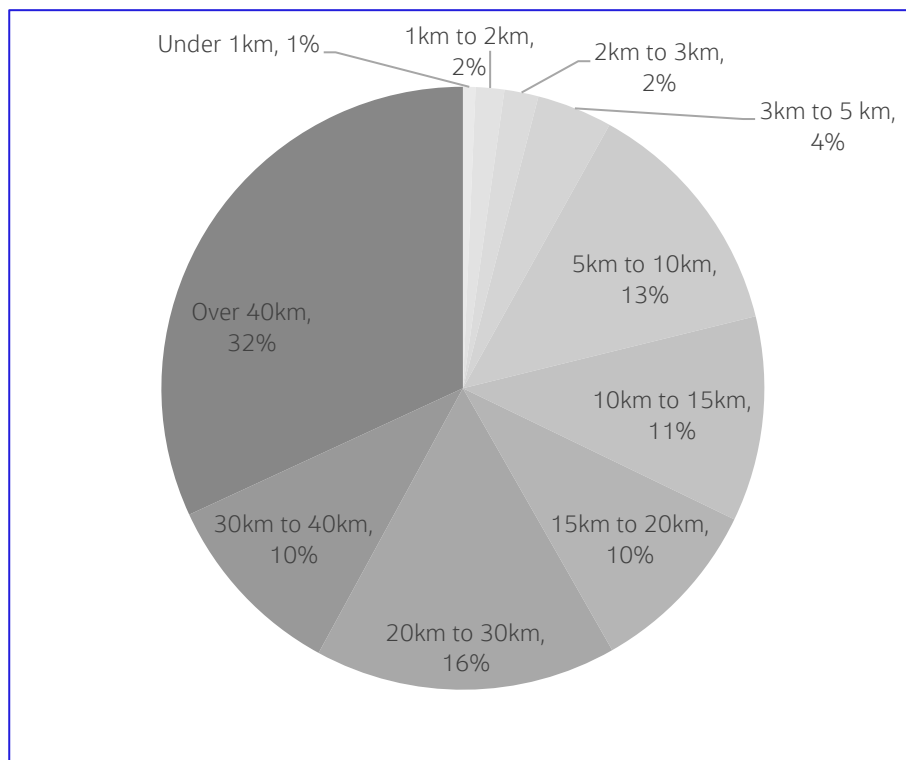
Long journeys comprise a small proportion of all car trips, but a large proportion of car-km. TCRTM estimates that journeys of more than 20km comprise less than a fifth of all journeys made in the region but over half of all the car-km (Table 3 and Figure 4):

**Table 3. Proportion of car journeys and car-km by journey length**

Distance <sup>9</sup>	Proportion of car journeys	Proportion of car-km
Under 1km	11%	1%
1km to 2km	12%	2%
2km to 3km	9%	2%
3km to 5 km	12%	4%
5km to 10km	21%	13%
10km to 15km	11%	11%
15km to 20km	7%	10%
20km to 30km	8%	16%
30km to 40km	4%	10%
Over 40km, including cross-regional journeys	6%	32%

<sup>9</sup> Source: TCRTM

**Figure 4. Proportion of regional car-km by journey length (TCRTM)**



## Cross-regional journeys

The Tactran area includes key parts of Scotland's strategic transport network; virtually all journeys between the Central Belt and the North East and Highlands of Scotland must pass through the region. As such, many car-km in the region may not be for journeys to or from it. This section estimates the number of cross-regional car-km.

Cross-regional car journeys will be on six main routes, which have the following approximate distances within the Tactran region using the direct main-road routes:

**Table 4. Cross-regional route distances**

Cross-regional route	Route distance (km)
A90 Stracathro ↔ A92 Tay Road Bridge	51
A90 Stracathro ↔ M90 Kelty	115
A90 Stracathro ↔ M80 Denny	144
A9 Drumochter ↔ M90 Kelty	120
A9 Drumochter ↔ M80 Denny	139
A82 Tyndrum ↔ M80/M9 Denny/Larbert <sup>10</sup>	88

TCRTM has been used to identify the cross-regional journeys for that part of the region that it models. Select link analyses of the A9 and A90 at the northern extents of the AM peak model (near Drumochter and Stracathro respectively) have been factored to 24-hour traffic flows and suggest the following two-way flows, from which daily and annual car-km totals have been estimated:

<sup>10</sup> The Tyndrum – Inverarnan section of the A82, which is within Stirling, is ignored: although this may carry a significant number of cross-regional cars, its distance (of only 17km) means that the relative contribution to net regional car-km is small

**Table 5. Cross-regional car-km**

Cross-regional route	Number of car trips per day (north- and south-bound combined) <sup>11</sup> (a)	km per journey (b)	Daily car-km (= a x b)	Annual car-km
A90 Stracathro ↔ A92 Tay Road Bridge	1,123	51	57,000	21,000,000
A90 Stracathro ↔ M90 Kelty	2,079	115	239,000	87,000,000
A90 Stracathro ↔ M80 Denny	252	144	36,000	13,000,000
A9 Drumochter ↔ M90 Kelty	1,258	120	151,000	55,000,000
A9 Drumochter ↔ M80 Denny	90	139	13,000	5,000,000
A82 Tyndrum ↔ M80/M9 Denny/Larbert	590 <sup>12</sup>	88	52,000	13,000,000
<b>Cross regional total</b>	<b>5,392</b>	<b>N/A</b>	<b>548,000</b>	<b>200,000,000</b>

Table 5 suggests that there are around 200 million car-km in the Tactran region per annum caused by cross-regional trips. This is 4.5% of the 4,479 million annual car-km (see Table 1) estimated to result from all journeys in the region.

## Distance travelled by mode

Nationally, the proportion of all km travelled by mode, and in comparison with the number of car-km, is as shown in Table 6 and Figure 5. It shows that km travelled by car are very much greater than by other modes: nearly seven times more km travelled by car than public transport, and more than ten times more than by active travel. The data implies that, as journeys by car comprise a substantial majority of km travelled, even substantial proportional growth in use of other modes would have only a modest effect on car use.

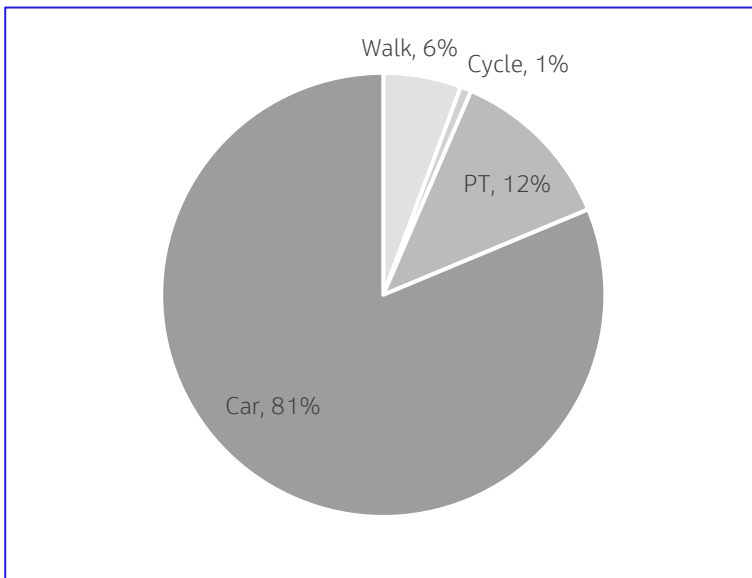
<sup>11</sup> Source: TCRTM, except for Tyndrum – Denny/Larbert corridor (see next footnote)

<sup>12</sup> TCRTM does not include the Tyndrum – Denny/Larbert corridor. To estimate through traffic on this route, DfT two-way traffic count data for all cars, 2019 has been used. This shows net traffic flow (from all origins and destinations) on the A85 between Crianlarich and Lix Toll is 2,200 cars per day (in comparison with 4,900 on the A9 at Drumochter and 19,500 on the A90 at Stracathro). If the same proportion of the trips on that section of the A85 are cross-regional as the proportion at Drumochter (27%), then there are around 590 cross-regional trips on the Tyndrum to Denny/Larbert route per day.

**Table 6. Km travelled by mode**

Mode <sup>13</sup>	Proportion of total km travelled	km travelled in comparison with car
Walk	6%	7%
Cycle	1%	1%
Public transport	12%	15%
Car	81%	N/A

**Figure 5. Proportion of total km travelled by mode**



<sup>13</sup> Extrapolation of data presented in the 20% route map (Annex, Table 6). TCRTM has no representation of active modes, so is not used as the source for this data. Derivation as shown:

Number of journeys by main mode of transport	<2km	2-5km	5-10km	>10km	Net km travelled by mode from this sample	Proportion of total distance travelled by mode
Walking	3,626	545	86	77	7,719	6%
Cycling	100	63	35	22	1,023	1%
Public Transport	238	431	438	497	14,972	12%
Car	2,136	2,280	1,781	3,699	97,454	81%
				<b>Total</b>	<b>121,167</b>	<b>100%</b>
Assumed journey length in this category (km)	1	3.5	7.5	20		

## Journeys and car-km by purpose

Scottish Household Survey data shows that, of all journeys undertaken by residents (not car-km) in the region, the following proportions are for the purposes stated (Table 7).

Commute journeys (even for this pre-pandemic data) were fewer in number than shopping trips (though may be typically longer), and also fewer than the combined number of journeys for leisure purposes (friends or relatives, eating/drinking, sport/entertainment and holiday/daytrip).

**Table 7. Proportion of journeys by purpose**

Journey purpose <sup>14</sup>	Angus	Dundee City	Perth & Kinross	Stirling	Tactran	Scotland
Commute	19%	19%	20%	19%	<b>19%</b>	25%
Business	5%	4%	2%	3%	<b>3%</b>	2%
Education	7%	10%	9%	8%	<b>9%</b>	7%
Shopping	22%	29%	22%	27%	<b>26%</b>	26%
Hospital or health	2%	2%	1%	2%	<b>2%</b>	2%
Personal business	6%	3%	4%	3%	<b>4%</b>	5%
Friends or relatives	14%	11%	11%	9%	<b>11%</b>	11%
Eating/ drinking	5%	4%	6%	3%	<b>4%</b>	3%
Sport/ entertainment	5%	3%	10%	9%	<b>7%</b>	7%
Holiday/ daytrip	2%	1%	1%	1%	<b>1%</b>	1%
Other journey	1%	1%	1%	1%	<b>1%</b>	1%
Escort	3%	2%	2%	2%	<b>2%</b>	2%
Go Home	9%	9%	11%	10%	<b>10%</b>	8%
<i>Total</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>	<i><b>100%</b></i>	<i>100%</i>

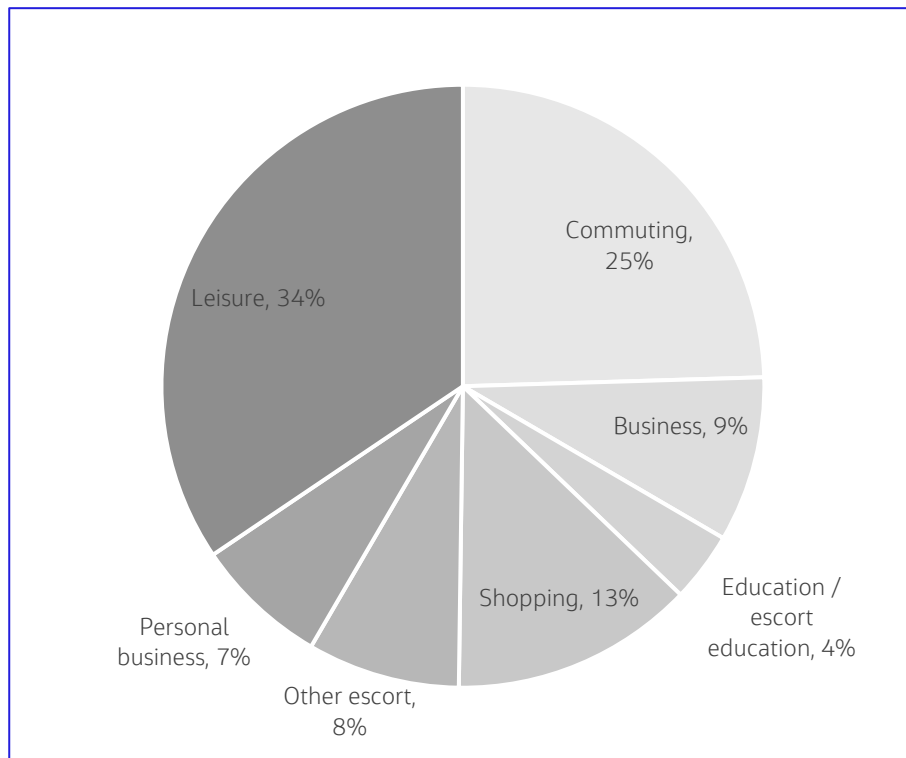
English National Travel Survey data <sup>15</sup> suggests that the proportions of car-km for different purposes are as shown in Figure 6.

'Leisure' (which includes the friends or relatives, eating/drinking, sport/entertainment and holiday/daytrip categories in Table 7) represents the largest proportion of car-km, amounting to over a third more car-km than commuting.

<sup>14</sup> Scottish Household Survey Travel Diary – Main Purpose of Travel: 2019 Note that the 'go for a walk' purpose in the data (which accounts for 10% of all journeys in the region reported by the survey) has been excluded, as these journeys are not considered to be relevant for options to reduce car-km

<sup>15</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1016895/nts0409.ods](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016895/nts0409.ods)

**Figure 6. Proportion of car-km by journey purpose**

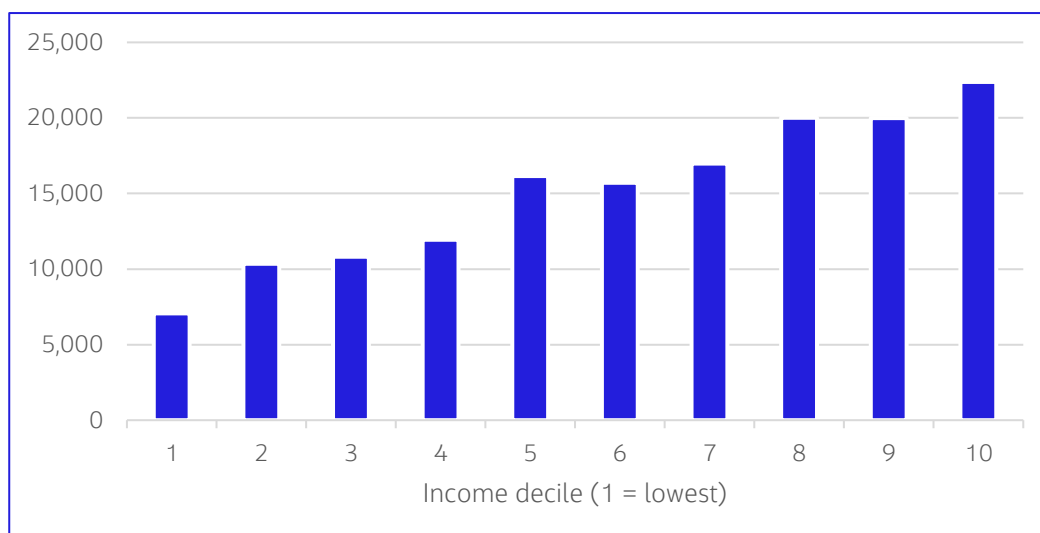


### Socio-demographic variations in car use

Average distance travelled by car by income varies substantially by income (Figure 7)<sup>16</sup>.

People in the highest income band (decile 10) typically travel three times more car-km than those in the lowest, arising from a combination of being more likely to undertake journeys by car, and average journeys being longer.

**Figure 7. Average distance travelled by car (km) by income decile**



<sup>16</sup> Annex for a route map to achieve a 20 per cent reduction in car kilometres by 2030, Transport Scotland, 2022, Table 5  
<https://www.transport.gov.scot/media/50873/technical-annex-a-route-map-to-achieve-a-20-per-cent-reduction-in-car-kms-by-2030.pdf>

Attitudes to car use, and the potential implication of the interventions, also vary widely between different people. Appendix A explores car use and attitudes for different types of people in more detail. It uses the Acorn methodology<sup>17</sup> to classify all the region's households into 17 categories, depending on their socio-demographic characteristics.

Table 8 provides a summary of that information, highlighting people's typical levels of extant car use, their potential propensity to reduce car use, and impacts of not being able to drive as much as currently.

The segmentation approach is intended to be used as a qualitative assessment of how different households in the region could be affected by measures to reduce car use. The development of personas is useful in considering the potential inclusion and equality impacts of introducing different types of options. Using a similar approach to an equalities impact assessment, this insight suggests which types of households are likely to face significant disbenefits; due to a range of factors such as income status, age or household location (at a general level, such as whether urban, suburban or rural).

This is considered helpful for decision-makers to understand the potential consequences of measures on residents' ability to access essential goods, services and opportunities. At an overarching level, segmentation supports the quantitative assessment that measures to reduce car use would disproportionately affect rural households (who typically tend to drive further than urban dwellers), and those individuals from lower income households, for reasons of deprivation or age, who are the most car dependent (who are more likely to be affected by any measure which increases the cost of driving).

Using a segmentation approach also demonstrates the potential challenges with achieving behaviour change towards reduced car use. As an example, the most affluent households in the region (regardless of where they are located) would be largely unaffected by fiscal measures; effectively no financial barriers to transport exist and sustainable travel options are largely seen as irrelevant. This limits the potential range of measures that could deliver change amongst these households. At the opposite end of the income scale, car ownership and travel horizons are low amongst the most deprived households in the region. Whilst there will be many within these households who are car dependent and would be significantly impacted (as noted above), there will be many households for whom measures would have no influence.

**Table 8. Summary of personas and impacts of reduced car use**

Person type (Acorn category)	Extant car use	Propensity to reduce car use	Impacts of reduced car use
<b>A Lavish Lifestyles:</b> <i>Exclusive enclaves; Metropolitan money; Large house luxury</i>	High	Low	Significant reduction in distance travelled, but unlikely to affect overall quality of life
<b>B Executive Wealth:</b> <i>Asset rich families; Wealthy countryside commuters; Financially comfortable families</i>	High	Low	Significant reduction in distance travelled for work and leisure, but still able to access a full range of social needs
<b>C Mature Money:</b> <i>Better-off villagers; Settled suburbia, older people; Retired and empty nesters; Upmarket downsizers</i>	High	Med	Significant reduction in distance travelled for leisure, and still able to access most social needs, although may be more difficult given home location and access to transport alternatives
<b>D City Sophisticates:</b> <i>Townhouse cosmopolitans; Younger professionals in smaller flats; Metropolitan professionals; Socialising young renters</i>	Low	Med	Modest, as able to access most goods and services locally and due to generally better access to a range of transport alternatives, and lower reliance on car.
<b>E Career Climbers:</b> <i>Career driven young families; First time buyers in small, modern homes; Mixed metropolitan areas</i>	Med	Low	Could affect ability to access employment, but limited effect on access to other goods and services, due to generally better access to a range of transport alternatives, and lower reliance on car.

<sup>17</sup> <https://acorn.caci.co.uk/what-is-acorn>

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Person type (Acorn category)	Extant car use	Propensity to reduce car use	Impacts of reduced car use
<b>F Countryside Communities:</b> Farms and cottages; Larger families in rural areas; Owner occupiers in small towns and villages	High	Low	Significant impact on ability to access essential goods and services, with increased risk of social isolation and reliance on others, partly due to fewer transport alternatives.
<b>G Successful Suburbs:</b> Comfortably-off families in modern housing; Larger family homes, multi-ethnic areas; Semi-professional families, owner occupied neighbourhoods	High	Med	Significant reduction in distance travelled for work and leisure, and would have some effect on access a full range of social needs, including employment.
<b>H Steady Neighbourhoods:</b> Suburban semis, conventional attitudes; Owner occupied terraces, average income; Established suburbs, older families	High	Med	Significant reduction in distance travelled for work and leisure, and would have some effect on access a full range of social needs, including employment.
<b>I Comfortable Seniors:</b> Older people, neat and tidy neighbourhoods; Elderly singles in purpose-built accommodation	Med	Med	Significant reduction in distance travelled, and would have some effect on accessing a full range of social needs, with increased risk of social isolation and reliance on others.
<b>J Starting Out:</b> Educated families in terraces, young children; Smaller houses and starter homes	Low	High	Would affect ability to access some essential goods and services, and including employment, training and education, particularly for those reliant on escort journeys.
<b>K Student Life:</b> Student flats and halls of residence; Term-time terraces; Educated young people in flats and tenements	Low	Med	Modest, as able to access most goods and services locally, and with access to good range of transport alternatives.
<b>L Modest Means:</b> Low-cost flats in suburban areas; Semi-skilled workers in traditional neighbourhoods; Fading owner occupied terraces; High occupancy terraces	Med	Med	Significant reduction in distance travelled, and would have some effect on accessing a full range of social needs, including employment, training and education.
<b>M Striving Families:</b> Labouring semi-rural estates; Struggling young families in post-war terraces; Families in right-to-buy estates; Post-war estates, limited means	Low	Low	Significant reduction in ability to access some essential goods and services, particularly employment.
<b>N Poorer Pensioners:</b> Pensioners in social housing, semis and terraces; Elderly people in social rented flats; Low-income older people in smaller semis; Pensioners and singles in social rented flats	Low	Low	Significant reduction in ability to access some essential goods and services, particularly for people with reduced mobility that are most car-dependent; leading to increased risk of social isolation and increased reliance on others.
<b>O Young Hardship:</b> Young families in low-cost private flats; Struggling younger people in mixed tenure; Young people in small, low-cost terraces	Low	Low	Significant reduction in ability to access many essential goods and services, particularly employment, training and education, due to home location and lack of transport alternatives.
<b>P Struggling Estates:</b> Poorer families, many houses, terraced housing; Low-income terraces; Multi-ethnic, purpose-built estates; Deprived and ethnically diverse in flats; Low-income large families in socially rented semis	Low	Low	For those that are most car-dependent, significant reduction in ability to access some essential goods and services, particularly employment and education.



Person type (Acorn category)	Extant car use	Propensity to reduce car use	Impacts of reduced car use
<b>Q Difficult Circumstances:</b> <i>Social rented flats, families and single parents; Singles and young families, some receiving benefits; Deprived areas and high-rise flats</i>	Low	Low	Significant reduction in ability to access some essential goods and services, particularly for people with reduced mobility that are most car-dependent.

## 2.2 Anticipated changes in car use to 2030

In the absence of any intervention, the number of car-km driven in the Tactran region is anticipated to grow by 2030 from the 2019 baseline presented above. This arises from a variety of factors; those for which an anticipated effect on car-km is quantifiable are outlined in Table 9.

**Table 9. Quantified forecasts of changes in car-km to 2030**

Potential influence on net car-km	Potential change in regional car-km by 2030	Notes
Economic growth	+12%	Car use has, historically, been correlated with GDP. 2022 Scottish GDP is approximately equal to that of 2019 <sup>18</sup> . GDP will increase at an estimated 4.3% in 2022, 2.1% in 2023 and 1.6% annually to 2026 <sup>19</sup> , giving net growth of 12% between 2019 and 2030. An elasticity of car demand as a result of GDP of 0.95 is assumed <sup>20</sup> , meaning that net car-km is also anticipated to increase by around 12% in response to economic growth.
Growth in tourist/leisure travel	+4%	The Tay Cities Deal presents an aspiration to grow overnight visitor spend by 3% each year between 2020 and 2024 <sup>21</sup> , or around 13% in total. Applying this proportional growth to all car-km currently made for leisure purposes in the region (which is currently 34% of all car-km, Figure 6) provides an estimate of around a 4% increase in car-km because of this effect.
Population growth and reduced household size	+2%	Regional population growth to 2030 is expected to be around 1% <sup>22</sup> . But the average household size is expected to decline <sup>23</sup> , so the total number of households, which is also an influence on car use, will grow by a greater proportion. A net impact on car use of 2% is therefore estimated.
Reduced desire to drive amongst young people	-1%	In recent years there has been a downward trend in the proportion of young people (and especially young men) gaining driving licences. If this continues, a modest fall in the number of veh-km driven may result.
<b>Total central quantified effect</b>	<b>~12-16%</b>	<b>Making allowance for the likelihood that some of the above effects are correlated, so the net effect may be less than the sum of individual elements</b>

<sup>18</sup> [https://www.fiscalcommission.scot/wp-content/uploads/2021/12/Scotland\\_s-Economic-and-Fiscal-Forecasts-December-2021-Quick-Visual-Guide.pdf](https://www.fiscalcommission.scot/wp-content/uploads/2021/12/Scotland_s-Economic-and-Fiscal-Forecasts-December-2021-Quick-Visual-Guide.pdf)

<sup>19</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1055216/Forecomp\\_February\\_2022.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1055216/Forecomp_February_2022.pdf)

<sup>20</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/395119/road-traffic-demand-elasticities.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/395119/road-traffic-demand-elasticities.pdf)

<sup>21</sup> With compound growth of 3% for each of four years, applied to the estimated 34% of car-km that are for leisure purposes

<sup>22</sup> Data take from 2018-base population projections for Scottish areas <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/sub-national-population-projections/2018-based> and compare 2018 and 2028 forecast growth. Note that almost all of the regional population growth is anticipated in Stirling

<sup>23</sup> <https://www.nrscotland.gov.uk/files/statistics/household-projections/18/household-proj-18-report.pdf>

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Many other factors may influence car use in future years. These include the factors listed in Table 10, for which no change in car-km is forecast, for the reasons stated.

**Table 10. Unquantified influencers of car-km to 2030**

Potential influence on car-km	Rationale for not presenting quantified estimate of effect
Increased home working	Covid recovery is suggesting that, although travel to work remains suppressed, car use has increased for other purposes. The evidence of the relative magnitudes of these effects is not yet clear, hence any net change in car-km as a result of continued high levels of home working is uncertain
Continued growth in online retail	There is no clear evidence that increased use of online retail (or access to other services) reduces net car use, and indeed the large growth in online retail (and online access to other services) in the pre-pandemic decade was also accompanied by growth in car use, so any net change is uncertain
Increased uptake of electric cars	Electric and hybrid cars are anticipated to comprise a significant proportion of the fleet by 2030. As yet, however, there is no robust evidence to suggest that net car-km is likely to change as a result: both positive and negative outcomes have been postulated, and any net change is uncertain
Fuel/electricity price	The marginal cost of running a car is significantly influenced by the cost of petrol/diesel/electricity. Given the substantial recent and on-going volatility in these prices, no robust forecasts of costs in 2030 are made, albeit expectation suggest that fuel prices could be significantly higher than in 2019, and hence this is most likely to have a negative influence on car use
Changing attitudes to car use	It is possible that increased environmental awareness may promote a broader switch away from car use being seen to be socially acceptable, at least amongst some parts of the population. If so, this could have a significant influence on car use. However, the increased availability of electric cars may reduce this effect and, in any event, its likelihood is highly uncertain

The net effect of the influences outlined in Table 10 is to suggest that the quantified estimates presented in Table 9 are an overestimate of regional traffic growth. As a result, we estimate that, without intervention, car-km in the Tactran region would grow in the range of **10-15%** between the 2019 baseline and 2030<sup>24</sup>.

Achieving traffic levels in 2030 that are 20% below those of 2019 therefore requires a reduction of **27-30%** below the without-intervention forecast traffic levels.

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<sup>24</sup> Transport Scotland forecasts suggests that, between 2017 and 2027<sup>24</sup>, traffic levels will increase: In the TAYplan area: by 16%; In the Stirling, Clackmannanshire & Falkirk area: by 15% (<https://www.transport.gov.scot/media/43316/transport-forecasts-2018.pdf>).

We feel it is appropriate for regional forecasts of net car-km growth to be a little lower than these because: (i) the forecasts are based on Transport Model for Scotland, which does not model all car trips and tends to under-represent short journeys; (ii) Car-kms are anticipated to grow at a slower rate than for other vehicle types (notably light goods vehicles).

### 3. Options to reduce car-km

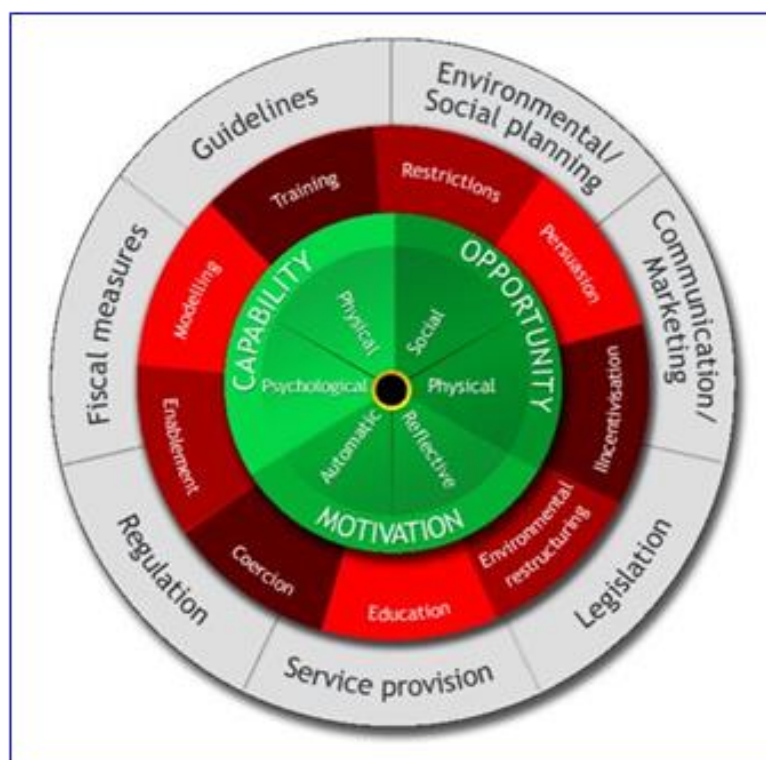
#### 3.1 Derivation of potential options

There are many potential interventions which Tactran, its partners or others could implement which may reduce the number of car-km in the region.

Some of these are listed in the 20% route map, but there is also a variety of other potential measures. A list of these measures is provided below. Table 11 then appraises their potential effects and deliverability.

This includes all the 20% route map measures which evidence suggests could have a material effect on car use in the region. It also lists many other options, the identification of which has been influenced by the Behaviour Change Wheel (Figure 8)<sup>25</sup> which provides a comprehensive categorisation of the types of interventions that are able to influence people's choices.

Figure 8. Behaviour change wheel



The measures that could potentially reduce car-km fall into four broad categories, according to whether they seek to:

- Improve the quality or availability of alternatives to car (options labelled Q in the table below);
- Enable or encourage alternatives to car (options E);
- Discourage or prevent car use, and are within the remit of Local Authorities in the Tactran region (options D-LA);
- Discourage or prevent car use, but would require external intervention to implement because of reserved powers or the need for new primary legislation (options D-ext).

The measures, and their option references are:

- Improve the quality or availability of alternatives to car:
  - Q1: Improve public transport;
  - Q2: Increase active travel;
  - Q3: Expand car clubs and car share;

<sup>25</sup> <https://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-6-42>

- Q4: Mobility hubs;
- Q5: 20-minute neighbourhoods;
- Q6: 20mph zones and road safety improvements;
- Q7: Increased use of home deliveries/ lockers;
- Q8: Broadband improvements;
- Q9: Park & ride/ choose improvements.
- Enable or encourage alternatives to car:
  - E1: Sustainable travel marketing;
  - E2: Travel planning;
  - E3: Car-use minimising development plans;
  - E4: Expanding Mobility as a Service (MaaS);
  - E5: Incentivising reduced car use.
- Discourage or prevent car use, and are within the remit of Local Authorities in the Tactran region:
  - D-LA1: Increased parking charges and controls;
  - D-LA2: Workplace parking levy;
  - D-LA3: Road pricing: cordon-based;
  - D-LA4: Vehicle bans: targeted at car categories;
  - D-LA5: Vehicle bans: temporal;
  - D-LA6: Vehicle bans: spatial.
- Discourage or prevent car use, but would require external intervention to implement because of reserved powers or the need for new primary legislation:
  - D-ext1: Road pricing: distance-based;
  - D-ext2: Rationing car use;
  - D-ext3: Increased fuel duty;
  - D-ext4: Increased Vehicle Excise Duty.

Table 11 shows which of the potential measures listed in the Scottish Government's 20% route map are included in which of the options listed above. It is noted that not all route map measures are included.

Those measures from the route map that are not included are not considered to have a material effect on car use in the region. These measures are listed in Appendix C, where a rationale for their exclusion is also provided.

### 3.2 Potential long-term contributions to traffic reduction

Summary information of the potential long-term effect of each option on net car-km is provided in Table 11, along with an assessment of its cost, deliverability, and distributional effects. More detail on each of these assessments, including information on how their potential effect on car-km has been estimated, is provided in Appendix B.

Note that the table anticipates the effect of each option as if it was implemented in full in all relevant locations throughout the Tactran region. Analysis presented later in this report estimates the potential implementability of each option in advance of the 2030 target date for car-km reduction.

Key for ratings in Table 11:

Rating	Net cost to Government rating	Deliverability rating
xxx	Substantial capital and revenue funding requirements	Substantial delivery challenges are foreseen
xx	Large capital and/or revenue funding requirements	Large delivery challenges are foreseen
x	Modest capital and/or revenue funding requirements	Modest delivery challenges are foreseen
~	Uncertain cost to Government	Uncertain deliverability
✓	Modest revenue surplus to Government	Possibly deliverable
✓✓	Large revenue surplus to Government	Highly likely to be deliverable
✓✓✓	Substantial revenue surplus to Government	Deliverable

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**Table 11. Options to reduce car use**

Option (RM) = option listed in 20% route map, with relevant ref no.	Potential long-term reduction of regional car-km if option fully implemented throughout region * = effect highly dependent on option scope/price to user	Potential net cost to government	Deliverability	Distributional effects
Q1: Improving public transport (RM, in part 3h, 3k, 3l, 3m)	<~4% If investment were made such that public transport use in the region was doubled by 2030	Would require substantial capital and revenue investments xxx	Largely technically feasible, but the potential to substantially increase public transport capacity and demand by 2030 is not proven xx	May primarily benefit urban residents, where public transport services tend to be more effective. Will benefit many non-car users
Q2: Increase active travel (RM, in part 3a, 3b, 3c, 3d)	~3% If high quality active travel infrastructure were to be implemented within and between all the region's communities by 2030	Capital cost of £700M - £1.4bn, plus revenue costs for maintenance xxx	Most measures are feasible, with examples already being implemented in the region, but ability to deliver substantial change by 2030 is not proven xx	Urban dwellers and people that typically make shorter journeys are more likely to benefit. Will benefit many non-car users
Q3: Expanding car clubs and car share (RM 4b)	~2.5% * If car clubs and car share were to be available and popular throughout the region by 2030	Modest capital and revenue funding requirements x	Measures are feasible, though public willingness to widely adopt car clubs/car share remains uncertain ~	Car clubs would likely benefit those who live in the region's urban areas most; car clubs are more viable in areas of greatest population density
Q4: Mobility hubs	~1% * Assumes widescale roll out of mobility hubs across the region by 2030	Would require substantial capital and revenue investments xxx	Deliverable ✓✓	Likely to be most attractive to middle-income users
Q5: 20-minute neighbourhoods <sup>26</sup> (RM 2c, 2d)	~1% Assumes 20-minute neighbourhoods would be implemented in all neighbourhood centres in the region by 2030	Capital cost of at least £250m plus significant revenue funding requirements xxx	Deliverable, but unlikely to be feasible to deliver comprehensively by 2030 ✓	Will be most relevant to households living in urban and suburban areas. Will benefit many non-car users

<sup>26</sup> 20-minute neighbourhood improvements would comprise a part of the 'increase active travel' option outlined above. 20-minute neighbourhoods are included as a separate option because it is specifically identified in the 20% route map

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option (RM) = option listed in 20% route map, with relevant ref no.	Potential long-term reduction of regional car-km if option fully implemented throughout region * = effect highly dependent on option scope/price to user		Potential net cost to government	Deliverability	Distributional effects
Q6: 20mph zones and road safety improvements (RM 2f, 3e)	<b>Modest (&lt;1%)</b>	Assumes widespread implementation of 20mph zones and accompanying road safety measures in all urban/suburban settings by 2030	Capital costs of £5-10m, plus some revenue funding requirements *	Deliverable ✓✓✓	Will only affect those people who are travelling within areas covered by schemes. Will benefit many non-car users
Q7: Increased use of home deliveries/ lockers (RM 2e)	<b>Negligible (~0%)</b>	Limited evidence that increased use of home deliveries reduces net car use	May require on-going revenue support *	Technically feasible but may be difficult to justify use of public funds, given potential modest benefits xx	Limited effectiveness/ effects
Q8: Broadband improvements (RM 1b)	<b>Negligible (~0%)</b>	Limited evidence that improved digital connectivity reduces net car use	Potentially substantial, though largely already committed *	Deliverable, though not by regional partners ✓✓	Would only affect those people who depend on use of the internet, and largely for work or business purposes
Q9: Park & ride/ choose improvements	<b>Modest (&lt;1%)</b>	Limited evidence that park & ride/choose sites can significantly reduce car-km (and may increase them)	Modest capital and possible revenue funding requirements *	Deliverable ✓✓	Likely to be most attractive to middle-income users
E1: Sustainable travel marketing	<b>~4% *</b>	Assumes large scale, effective and repeated campaign activity to all regional residents	Revenue cost of ~£5M per annum if this level of change is to be achieved xx	Deliverable ✓✓✓	Potentially relevant to all car users in the region
E2: Travel planning (RM 1f, 3r, 3s)	<b>~2%</b>	Assumes high-quality and on-going activity at all regional workplaces and educational establishments	Substantial revenue funding requirement xx	Deliverable ✓✓✓	Affects only people travelling to locations at which effective travel planning is provided
E3: Car-use minimising development plans (RM 1a, 2a, 2b)	<b>~1%</b>	If all new developments in the region from 2022 were sited and designed to achieve minimal car use	Minimal direct cost *	Yes by regional partners, subject to market conditions ✓	Only affects people resident in, or travelling to, new developments

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Option (RM) = option listed in 20% route map, with relevant ref no.	Potential long-term reduction of regional car-km if option fully implemented throughout region * = effect highly dependent on option scope/price to user		Potential net cost to government	Deliverability	Distributional effects
E4: Expanding MaaS (RM 4a)	~1%	Limited evidence that MaaS reduces net car use	Modest capital and revenue funding requirements ✕	Deliverable ✓✓✓	Likely to be most attractive to middle-income users
E5: Incentivising reduced car use	Negligible (~0%)	Unlikely to be deliverable in a manner that leads to a sustained reduction in car use	Substantial on-going revenue funding ✕✕	Not considered to be technically feasible on a fair and consistent basis ✕✕	Any scheme which provides financial incentives may be more appealing to people on low incomes
D-LA1: Increased parking charges and controls	~4% *	Assumes high charges and significant controls on on-street parking	Costs could be recouped from charges paid ✓	Likely to face significant public opposition ✕✕	People that live in or frequently travel to urban areas are likely to be affected more. People on low incomes are likely to be more sensitive to price-based changes
D-LA2: Workplace parking levy	~3% *	Assumes levy was to applied to all the region's workplaces	Costs could be recouped from charges paid ✓	Likely to face significant public opposition ✕✕	Only affects people that drive to work
D-LA3: Road pricing: cordon-based	~3% *	Assumes charges are introduced to drive into each of the region's cities	Costs could be recouped from charges paid ✓	Likely to face significant public opposition ✕✕	Has greater effects on urban residents/people that drive to urban areas, and also for people with lower incomes
D-LA4: Vehicle bans: targeted at car categories	~5% *	If LEZ vehicle standards were applied to all roads in the region	Modest capital and revenue funding requirements ✕	Likely to face significant public opposition ✕✕✕	Has a greater effect on owners of older cars, who are more likely to have low incomes
D-LA5: Vehicle bans: temporal	Modest (<1%) *	If bans were introduced to reduce peak-time traffic volumes in large urban areas	Modest capital and revenue funding requirements ✕	Unlikely to be publicly acceptable ✕✕✕	Has a greater effect on urban dwellers/those that drive to town centres
D-LA6: Vehicle bans: spatial	Modest (<1%) *	If vehicles were to be banned from all streets in urban areas that have high levels of pedestrian activity	Modest capital and revenue funding requirements ✕	Only likely to be acceptable at small scale, which will have little effect on net car-km ✕✕	Has a greater effect on urban dwellers/those that drive to town centres



## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option (RM) = option listed in 20% route map, with relevant ref no.	Potential long-term reduction of regional car-km if option fully implemented throughout region * = effect highly dependent on option scope/price to user		Potential net cost to government	Deliverability	Distributional effects
D-ext1: Road pricing: distance-based	~10% *	Assumes pay-as-you-drive charges per km, at a level equivalent to 50% of the petrol/diesel cost of driving, are introduced on all the region's roads	Costs could be recouped from charges paid ✓✓	Likely to face significant public opposition ×××	Has greater effects on people that drive further (so, typically, rural residents), and for people with lower incomes
D-ext2: Rationing car use	~8% *	If a maximum allowance of 10,000 miles per annum were permitted	Potentially substantial capital cost ××	May not be feasible, and likely to face significant public opposition ×××	Likely to have a greater effect on more affluent people and on rural dwellers (who typically drive further)
D-ext3: Increased fuel duty	~3% *	Assumes fuel duty rises such that prices rose by 25%	Increased revenue to Government from fuel duty rise, but would pass to UK Government ✓✓	Likely to face significant public opposition ××	People on low incomes are likely to be more sensitive to price-based changes.
D-ext4: Increased Vehicle Excise Duty	Modest (<1%) *	Assumes a substantial increase in VED	Increased revenue to Government, but would pass to UK Government ✓✓	Likely to face significant public opposition ××	People on low incomes are likely to be more sensitive to price-based changes.

### 3.3 Potential effects by 2030

The analysis above has presented forecasts of the potential long-term effects of options for car-km reduction. This section considers each of the options listed in Table 11 and the effects they might be able to have on car-km reduction in the Tactran region before the 2030 target date, recognising that the complete delivery of many of them will require a much longer period.

For each measure, an anticipated range of effects by 2030 is provided, from which its impact on car-km by that year is estimated. The range is developed from:

- A high-impact scenario; based on an assessment of potential effects assuming that high levels of both political support and funding for implementation is available in the period to 2030, but recognising the practical constraints of region-wide delivery within the next few years; and
- A low-impact scenario; based (unless noted otherwise) on a business-as-usual scenario reflecting anticipated pressures on public sector funding and other delivery challenges.

As some options are complementary and/or overlap, the net effects on car-km of implementing options together is noted where appropriate. Reporting is provided separately for each category of option Q, E and D-LA.

The focus of this section is on the options over which Tactran and its local partners have control of or at least some influence on ; the D-ext options are considered later.

The options that are not forecast to have any quantifiable effect on car-km (Q7: home deliveries, Q8: broadband improvements and E5: incentivising reduced car use) are excluded from consideration.

#### **Potential effects of improving or encouraging use of alternatives to car use**

Table 11 identified seven options to improve alternatives to car use and a further four to encourage use of other modes/ options which could have an appreciable long-term effect on car-km. They are listed and considered in more detail in Table 12 and Table 13 respectively.

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**Table 12. Effects of measures to improve alternatives to car use**

Option	Potential long-term reduction of regional car-km if option fully implemented throughout region (a) <sup>27</sup>	Estimated proportional implementability by 2030 (b) <sup>28</sup>		Potential reduction of car-km by 2030 (c = a x b)		Overlap with other options	Estimated net reduction of car-km by 2030 if all measures promoted (= c less overlap effects)	
		High impact	Low impact	High impact	Low impact		High impact	Low impact
Q1: Improving public transport	<~4%	25%	-25% <sup>29</sup>	1%	-1%	Limited apart from those noted below, so assumed that full benefits can be realised	1%	-1%
Q2: Increase active travel	~3%	25%	0%	~1%	0%	Limited, so assumed that full benefits can be realised	1%	0%
Q3: Expanding car clubs and car share	~2.5%	75%	0%	2%	0%	Limited, so assumed that full benefits can be realised	2%	0%
Q4: Mobility hubs	~1%	50%	0%	0.5%	0%	Limited, so assumed that full benefits can be realised	0.5%	0%
Q5: 20-minute neighbourhoods	~1%	20%	0%	0.2%	0%	Overlaps with active travel improvement (Q2), so potential benefit reduced by approx. half if that was to go ahead	0.1%	0%
Q6: 20mph zones and road safety improvements	<1%	50%	20%	0.5%	0.2%	Overlaps with active travel improvement (Q2), so potential benefit reduced by approx. half if that was to go ahead	0.25%	0.1%
Q9: Park & ride/choose improvements	<1%	50%	10%	0.5%	0.1%	Limited, so assumed that full benefits can be realised	0.5%	0.1%
						<b>Potential net effect of all measures to improve alternatives to car use</b>	<b>~5.5%</b>	<b>~-1%</b>

<sup>27</sup> From Table 11.

<sup>28</sup> The derivations of these proportions are provided in Appendix B.

<sup>29</sup> A negative effect on reducing car-km (equivalent to an increase in car-km) is forecast for public transport in the low impact scenario, reflecting the potential for post-Covid effects to continue to suppress demand for public transport use in 2030 below 2019 levels.

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

**Table 13. Effects of measures to encourage use of alternatives to car use**

Option	Potential long-term reduction of regional car-km if option fully implemented throughout region (a) <sup>30</sup>	Estimated proportional implementability by 2030 (b) <sup>31</sup>		Potential reduction of car-km by 2030 (c = a x b)		Overlap with other options	Estimated net reduction of car-km by 2030 if all measures promoted (= c less overlap effects)	
		High impact	Low impact	High impact	Low impact		High impact	Low impact
E1: Sustainable travel marketing	~4%	100%	10%	4%	0.4%	Overlaps with active travel, public transport, and car share/club improvements, as well as travel planning, so potential benefit reduced by approx. half if those were also to go ahead	2%	0.2%
E2: Travel planning	~2%	75%	0%	1.5%	0%	Limited, apart from those noted in other rows, so assumed that full benefits can be realised	1.5%	0%
E3: Car-use minimising development plans	~1%	25%	0%	0.25%	0%	Limited, so assumed that full benefits can be realised	0.25%	0%
E4: Expanding MaaS	~1%	50%	25%	0.5%	0.25%	Limited, so assumed that full benefits can be realised	0.5%	0.25%
						<b>Potential net effect of all measures to encourage alternatives to car use</b>	<b>~4%</b>	<b>~0.5%</b>

<sup>30</sup> From Table 11.

<sup>31</sup> The derivations of these proportions are provided in Appendix B.

Table 12 and Table 13 demonstrate that, even with high levels of funding and political will for the implementation of a broad range of measures, the maximum reduction in car-km that might be achieved by investment in alternatives to car use by 2030 is around 5.5%, and the maximum from encouraging use of alternatives is around 4%. A **maximum net effect of around 9.5%** may therefore be possible.

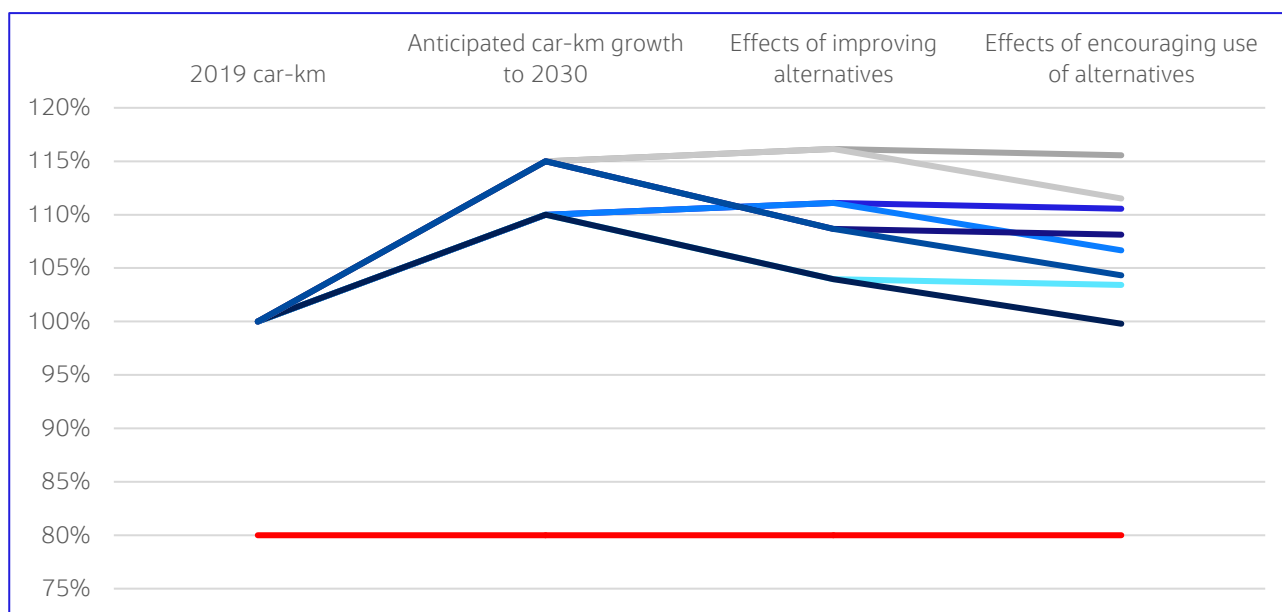
This reduction is less than the anticipated growth in traffic levels during the 2019 to 2030 period of 10-15% (see section 2.2), so even with this significant investment, car-km in the region is forecast to be greater in 2030 than in 2019.

Furthermore, Table 12 and Table 13 demonstrate that the net reduction in car-km generated by investment in alternatives and encouragement to use them might be much lower than 9.5%. Especially if post-Covid effects continue to suppress public transport use, and hence encourage continued use of car (an effect not quantified in section 2.2), it is possible that a business-as-usual activity by Tactran and its regional partners may not result in any reduction in car-km below the forecast in 2030.

Figure 9 summarises the analysis presented to date. The lines on it demonstrate the various potential pathways from the 2019 car-km level that have been described in the text above. They show the effects of predicted traffic growth and the effects of high- and low-impact scenarios for improving alternatives to car use and encouraging use of those alternatives<sup>32</sup>. The 2030 target (of a 20% reduction in car-km) is also shown.

It highlights that almost all scenarios result in car-km in excess of the 2019 level, and that the most optimistic scenario (of low background growth and maximum investment in alternatives) results in car-km only slightly lower than those of 2019, hence that none of these scenarios come close to achieving the 2030 target.

**Figure 9. Summary effects on car-km of investment in alternatives to car use**



The next sections consider the options to discourage car use which could also have an effect on car-km in the region.

### Potential effects of local/regional measures to discourage car use

Table 11 identified six options which could discourage car use and are within the control or influence of the region's Local Authorities. Two of these (temporal or spatial vehicle bans, options D-LA5 and D-LA6) are forecast to have at most, only a modest potential impact on regional car-km, and as such are not considered further.

<sup>32</sup> Note that the purpose of the graph is to show the range of likely outcomes on net car-km levels that different investment option scenarios could deliver

The remaining four could all have an appreciable long-term effect on car-km. They, and their anticipated effects, are:

- Option D-LA1: Increased parking charges and controls, which could reduce regional car-km by around 4% if high levels of charges were introduced, (and effectively enforced) in all on-street locations and off-street car parks within Local Authorities' control throughout all towns and cities in the region;
- Option D-LA2: Workplace parking levy, which could reduce regional car-km by around 3% if introduced (and effectively enforced) at all workplaces in the region with private parking, and at a level commensurate with Nottingham's extant scheme<sup>33</sup>;
- Option D-LA3: Road pricing: cordon-based, which could reduce regional car-km by around 3% if the charge was payable to drive into any of the region's three cities at a level commensurate with that of the London scheme when it was first introduced<sup>34</sup>;
- Option D-LA4: Vehicle bans: targeted at car categories, which could reduce regional car-km by around 5% if the same emissions standards as are being applied for the Dundee LEZ were to be applied to all roads in the region.

The prices, extent of applicability and level of enforcement of each of these options would have a significant effect on their impact on regional car-km; a greater effect than stated is possible, but lesser effects are also possible, especially if dispensations from the charges/regulations are available for some locations and/or people.

However, it is apparent that local partners do have the ability to significantly contribute to a reduction in regional car-km. However, as outlined in Table 11, each of these options is likely to face significant local opposition. They would also create some adverse distributional impacts, especially for people with low incomes that are reliant on car use (the assessment of the distributional impacts of each option is provided in Appendix B). These adverse impacts could be mitigated in part for some people through investment in alternatives to car use, notably where measures to discourage car use are accompanied by improvements to public transport and/or active travel modes on the same transport corridors.

There are uncertainties about the potential maximum net effect on car-km of local options to discourage car use. In addition to uncertainties about costs and extent of applicability, the aggregate effect of the implementation of the four measures would be less than the sum of their individual effects because all tend to primarily target similar car journeys: those into urban areas. We also note the unlikelihood of securing political support for delivering all four concurrently, because of the effect on travel to the region's towns and cities.

As a result, it is not predicted that the net effect is as much as the 15% reduction in car-km that is the sum of the individual measures listed above. Instead, a maximum effect of 7.5% is predicted, half of the sum of the effects of the individual measures.

However, achieving any significant traffic reduction through locally-introduced measures to discourage car use will require substantial political leadership in the face of expected extensive public opposition. It is therefore plausible that there is no effective locally-led action to reduce traffic levels by 2030.

As a result, we forecast that such local action will, by 2030, reduce traffic levels in the range of 0-7.5%. This remains well short of the reduction required to achieve the 2030 target and may, depending on the outcomes of other scenarios discussed previously, be insufficient to reduce traffic in 2030 to 2019 levels, let alone below them.

### 3.4 Potential effects of local/regional measures

The net effects of the analysis presented above are shown in Figure 10, which builds on the information presented in Figure 9, to show the effects of a variety of scenarios to improve and encourage car use alternatives and of local traffic restraint measures<sup>35</sup>.

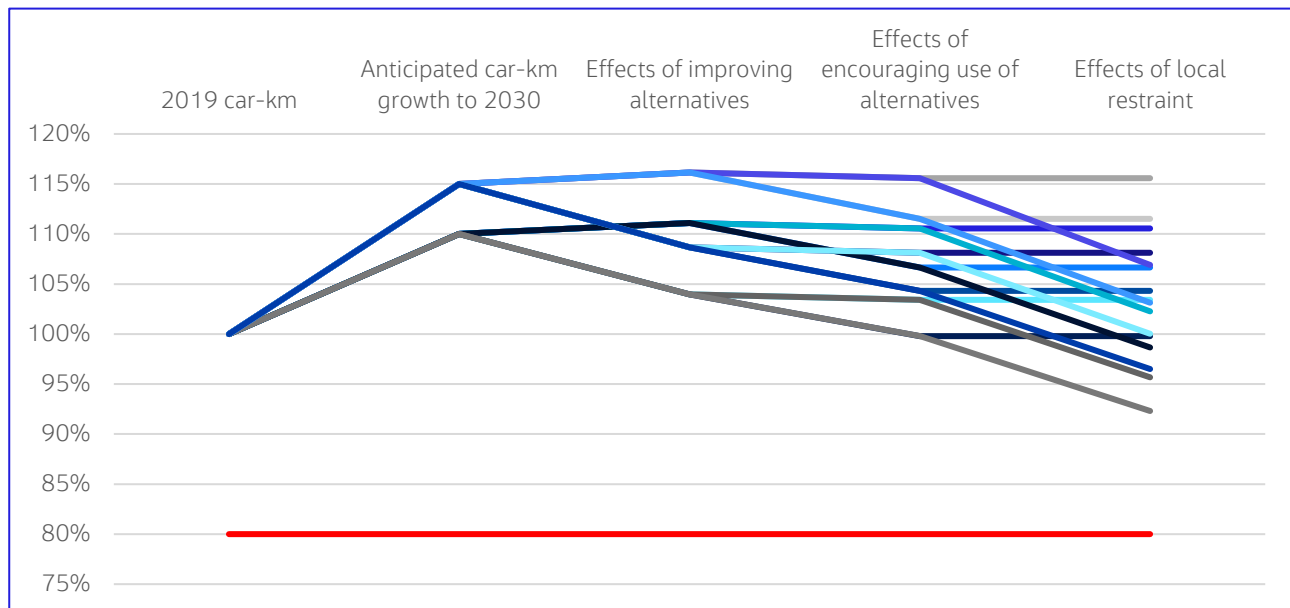
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<sup>33</sup> £458 per annum at the time of writing in December 2022

<sup>34</sup> Which was £5 per vehicle per day when first introduced in 2003, equivalent to just over £10 in 2022 prices

<sup>35</sup> Note that, as with the previous figure, the purpose of the graph is to show the range of likely outcomes on net car-km levels that different investment option scenarios could deliver

**Figure 10. Summary effects on car-km of investment in alternatives to car use and of local restraint measures**



Overall, the assessment has demonstrated that options to improve and encourage use of alternatives to car, alongside introduction of local traffic restraint measures, would result in car-km in the region in 2030 being between around 92% (best case, relying on significant investment and strong local willingness to restrain car use) and 115% (worst case, reflecting a business-as-usual scenario) of those in 2019.

Achieving the 20% car-km reduction target therefore relies at least in part on action outwith the current control of regional partners. If the target was to be achieved, this action would need to reduce car-km from the levels achieved by local actions by between 13% (best case) and 30% (worst case) <sup>36</sup>.

<sup>36</sup> 13% = (92% - 80%) / 92%. 30% = (115% - 80%) / 115%

## **4. How could a 20% reduction in car-km be achieved in the Tactran region?**

### **4.1 Summary of analysis**

Analysis presented within this report has shown that:

- Car-km levels of 20% less than those of 2019 have not been observed in the Tactran region since the early 1990s (Figure 1);
- Only just over a third of all car journeys made in the region are more than 10km long, but this third of journeys comprises nearly 80% of all the car-km (Table 3). Meanwhile, more than 95% of all car-km in region arises on journeys that are entirely within the region or have at least an origin or destination within it (Table 5);
- More affluent people typically drive much more than people on lower incomes (Figure 7), and some types of people have a much greater propensity to reduce car use than others (Table 8);
- Because of anticipated increases in car use within the region over the next few years if no interventions were forthcoming, achieving a level of traffic flow of 20% less than the 2019 baseline requires a reduction in the range of 27-30% on the traffic levels that would otherwise be expected in 2030 (Section 2.2).

A wide range of options that may be able to reduce car-km has been considered, and quantitative estimates of their potential effects made. This has shown that:

- Investment in and encouragement to use alternatives to car use are highly unlikely, even if significant additional funding were to be made in addition to that currently available, to reduce the number of car-km in the Tactran region below that of 2019, let alone get close to the 20% target (Figure 9);
- Regional partners have the powers to introduce measures that would significantly reduce car use. These measures, however, are likely to be unpopular locally and would not be sufficient, even if accompanied by significant investment in alternatives to car use, to achieve the 2030 car-km target (Figure 10);
- Measures to discourage car use will have adverse distributional impacts, with some people facing significant changes to their travel habits (largely dependent on their income and extant travel needs), but some others unaffected. These impacts could be mitigated in part by investments in alternatives to car use, in order that people unable to continue to drive could make at least some of their journeys by other means.

Overall, the assessment has demonstrated that locally-led action could result in car-km in the region in 2030 being between around 92% (best case, relying on significant investment and strong local willingness to restrain car use) and 115% (worst case, reflecting a business-as-usual scenario) of those in 2019, and that action outwith the current control of regional partners is needed for the 20% reduction target to be met (Section 3.4). This would need to reduce car-km from the levels achieved by local actions by between 13% (best case) and 30% (worst case).

Options for this are considered in more detail in the next section.

### **4.2 Options to discourage car use**

There is a variety of options which could discourage car use in the region, over and above the effects of those that are within the control of regional partners. Table 11 identified four:

- D-ext1: Road pricing: distance-based;
- D-ext2: Rationing car use;
- D-ext3: Increased fuel duty;
- D-ext4: Increased Vehicle Excise Duty.

In theory, they could be used in any combination to achieve the 13 – 30% car-km reduction required in order for the regional target to be met.

However, options to increase fuel duty and Vehicle Excise Duty are not considered further within this analysis because, as set out in Table 11, their potential contributions to car-km reductions are not substantial in



comparison with the requirements (increasing VED would have only a modest effect on car-km of less than 1% and increasing fuel duty such that fuel prices increased by 25% is forecast to only reduce car-km by around 3%).

Rationing car use could deliver the target. It is estimated that regional car-km would reduce by 8% if a maximum annual allowance of 10,000 miles was permitted per car; a lower allowance would result in a greater reduction.

There is, however, no legislative framework to enable delivery of such a system, no precedents for its application, and major challenges are envisaged in the development and implementation of it. Additionally, there will be some people who will need to (or perceive they need to) drive more than any allowance level, and the political realities of imposing a rationing scheme are therefore considered to be too great, unless dispensations are available for many drivers, which then undermine its effectiveness. The option of rationing car use is therefore considered not to be realistically implementable.

It is therefore concluded that, of the four options listed above, only distance-based road pricing might be both implementable and able to have an impact on car-km on the scale required in order to achieve the 20% target.

Estimates of the effects of a 5 pence per km charge on all journeys suggest that it could reduce car-km by around 10% (Table 11). Higher charges would reduce traffic levels further, but a substantially higher charge would be needed if road pricing were to deliver all of the 30% car-km reduction that may be required; this may need to be at a level of around 15 pence per km, equivalent to a cost of around £2,400 per car per annum, based on the typical average distance per car of around 16,000km<sup>37</sup>.

Such a road pricing scheme would require new primary legislation to be introduced and there are also significant technological risks to its reliable introduction, as well as substantial political challenges.

It is noted that the costs of introducing and operating a road pricing system to deliver a large reduction in car use are similar to one to deliver a small reduction (as it could be the same system, just operating with different user tariffs), and also that the revenue stream from the former would be much greater than from the latter. Road pricing could therefore be used as the only tool to enable a reduction in regional car-km in line with the 20% target, and could be a cost-effective option, as it can deliver the required traffic reduction without the need for substantial investment to improve and promote alternatives to car use.

Doing so could, however, be significantly inequitable if charging mechanisms were not sufficiently sensitive to individuals' economic circumstances. If applied equally on a cost-per-km basis across the region and with the same charges to all car users, road pricing will place a relatively large financial burden on people with low incomes and many that live in rural areas (or are otherwise required to drive longer distances). More affluent people and those that drive little (who are more likely to live in urban areas) may be relatively unaffected. Hence, care needs to be given in any implementation of cost-based measures to discourage car use to ensure that they meet the principles of a Just Transition to net-zero.

However, the challenges of variable charges need to be considered if they are to be used to help people on low incomes or that otherwise would be substantially disadvantaged. Options are foreseeable which apply different charges to different vehicles and/or in different circumstances, but each requires an increase in the complexity of scheme design, and challenges of comprehensibility for users. It is noted, however, that variable charges are attractive to ensure other policy outcomes are met (including to discourage car use on busy parts of the network/at busy times).

Some of the potential inequality effects of road pricing could be mitigated in part through investment to improve alternatives to car. Focus should be given to public transport options (which tend to provide alternatives for longer journeys than active travel) and to solutions that provide access options in rural areas and for longer interurban connections, as these measures are most likely to benefit those who are less well off. Delivery of these alternatives would require overcoming the delivery capacity and funding challenges noted

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<sup>37</sup> It is understood that on-going work for Transport Scotland suggests that the elasticity of demand for car use with respect to distance-based road pricing is higher than the assessment made in this report. That a 5 pence per km charge would reduce car-km by 10% may therefore be at the lower end of the scale of change, and a cost of less than 15 pence per km may be sufficient to achieve a reduction of 30%. Given that the scale of traffic reduction would also be dependent on the way in which charges are levied, any variability of charging (e.g. by time of day) and any dispensations, additional research is required before confidence can be provided as to the level of charge that would be required in order to achieve any given level of traffic reduction.

elsewhere in this report but could attract some car users in their own right, therefore enabling a reduction in the road price as the achievement of the traffic reduction target would be less onerous.

Road pricing may also be able to provide a mechanism for funding at least some of these improvements to other modes, thereby further promoting a more equitable outcome. However, the implementation timescales of a road pricing scheme are such that it is unlikely to commence substantially before the 2030, hence unable to provide a revenue stream to enable investment in alternatives much before the deadline. Whatever investments can be made in alternatives will still leave many potential journeys in the region without an effective option apart from car use; leaving many people disadvantaged. It is clear, therefore, that the distributional effects of the potential options cannot be fully equalised and that some inequalities are likely to be exacerbated if the 20% target was achieved.

### 4.3 Option themes for consideration

This report has investigated 24 options for measures to reduce car use in the Tactran region, most but not all of which would be able to contribute to a reduction in car-km by 2030.

The options which are potentially deliverable, and which might have an appreciable effect on car-km can be grouped into five themes, which could form the basis of decision-making on the preferred approaches to the implementation of the 20% target in the region. They are summarised in Table 14.

**Table 14. Comparison of option themes**

Option theme	Relative Benefits	Relative disbenefits
1. Additional investment is secured by local/regional partners in order to improve alternatives to car use and encourage use of these alternatives	Relatively easy to secure public and political support for implementation	Very high cost of alternative measures and sources of funding are unclear at the scale that would be required to deliver significant change in car use Would not achieve the 20% car-km reduction target by 2030: maximum feasible reduction is around 9.5%, (which is less than anticipated traffic growth from 2019 to 2030) but budgetary constraints are likely to mean that reductions achieved are significantly less than this Significant risk of improved alternatives not being in place before 2030
2. Additional investment is secured by local/regional partners in order to improve alternatives to car use and encourage use of these alternatives AND local/regional partners work to discourage car use (through parking restraint, WPL, etc)	Might be able to reduce car-km in 2030 to below those of 2019 (though still not to the 80% target level) Revenue raised from measures to reduce car use could help fund improvements to alternatives	Would not achieve the 20% car-km reduction target by 2030: maximum feasible reduction is to achieve car-km in 2030 that are 92% of those in 2019, but budgetary and political constraints are likely to mean that reductions achieved are significantly less than this Very high cost of alternative measures Significant risk of improved alternatives not being in place before 2030 Inequity issues arise as some types of people (typically those on low incomes) and some types of journeys (typically those to urban centres) will be affected more than others Local political challenges to discourage car use

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option theme	Relative Benefits	Relative disbenefits
3. Implementation of a region/nation-wide road pricing scheme	<p>Could achieve the 20% reduction target</p> <p>Cheapest option to implement</p> <p>Limited local political leadership needed (if a national scheme)</p> <p>Significant on-going revenue stream from charges</p>	<p>The most inequitable option, with significant disbenefits to people on low incomes and those that need to drive furthest (typically those living in rural areas)</p>
4. Additional investment is secured by local/regional partners in order to improve alternatives to car use and encourage use of these alternatives AND implementation of a region/nation-wide road pricing scheme (i.e. combining option themes 1 and 3)	<p>Could achieve the 20% reduction target</p> <p>Improving the alternatives if road pricing mechanisms were in place is likely to be more publicly acceptable than road pricing alone</p> <p>Limited local political leadership needed (if a national road pricing scheme)</p> <p>Improved alternatives reduce inequality effects</p> <p>Significant on-going revenue stream from road charges may be able to fund improved alternatives</p>	<p>Very high cost of alternative measures</p> <p>Significant risk of improved alternatives not being in place before 2030</p> <p>Some parts of the region may not benefit from improved alternatives, leaving some people/places disadvantaged</p>
5. Additional investment is secured by local/regional partners in order to improve alternatives to car use and encourage use of these alternatives AND local/regional partners work to discourage car use (through parking restraint, WPL, etc) AND implementation of a region/nation-wide road pricing scheme (i.e. combining option themes 2 and 3)	<p>Could achieve the 20% reduction target</p> <p>Improving the alternatives if road pricing mechanisms were in place is likely to be more publicly acceptable than road pricing alone</p> <p>Improved alternatives reduce inequality effects</p> <p>Lowest level of road charge required, so may reduce inequalities for people on low incomes and those that need to drive furthest (typically those living in rural areas)</p> <p>On-going revenue stream from road charges may be able to fund improved alternatives</p>	<p>Very high cost of alternative measures, and lower road charge than option theme 4, may lead to smaller on-going revenue stream</p> <p>Significant risk of improved alternatives not being in place before 2030</p> <p>Some parts of the region may not benefit from improved alternatives, leaving some people/places disadvantaged</p> <p>Local political challenges to discourage car use</p>

## **5. Potential effects on main transport corridors**

*Anticipated effects to be added once the main focus of the conclusions has been agreed*

## A. Personas

The tables below describe a range of characteristics for each of the 17 Acorn household classifications. These provide insight into people's typical levels of extant car use and journey choices, their attitudes towards car use and to transport alternatives, based on factors such as income and health, their potential propensity to reduce car use, and impacts of not being able to drive as much as currently.

The development of personas is useful in considering the potential inclusion and equality impacts of measures, akin to an equalities impact assessment, to aid decision-making on what measures might be appropriate.

A summary of the potential impacts on different household types is summarised in section 2, Table 8, above. The tables in this appendix provides more detailed insight into each of the household types, to provide further context to the assumptions provided.

## Group A: Lavish Lifestyles<sup>38</sup>

Typical journey choices	Many will have long commute/business journeys to cities by car and/or rail (many likely to be cross-regional) Equally many may have less typical travel to work patterns or work from a home office (more so post-pandemic) Many leisure journeys will be undertaken Younger people will rely on escort journeys by car; this may include longer journeys to private school Reliance on the car for accessing local shops for everyday essentials
Car ownership and use	High car ownership and use Multiple cars; many will be luxury models; comfortable with technology so one may already be an electric/hybrid model Travel will almost exclusively be undertaken by car, even for very short journeys Younger people will aspire to drive when they are old enough
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Public transport and active travel options will be limited for those living in rural or semi-rural areas In low-density suburban areas there is likely to be public transport access on radial routes, but few will have high-frequency services
Physical and mental health issues	Physical health and mental wellbeing likely to be very good for most, although high car use results in sedentary behaviour
Financial considerations	Due to their affluence, no financial barriers to transport choices exist
Likely attitudes towards alternatives to car use	Whilst rail may be used for some commute and business journeys, public transport largely seen as unaspirational and irrelevant to these households Walking and cycling more likely to be seen as leisure pursuits rather than for functional journeys, in part due to limited infrastructure and perceptions of safety
Propensity to reduce car use	Low, due to affluence will be unaffected by any fiscal controls Public transport and active travel seen as irrelevant options Car seen as a status symbol for many Car will be used extensively for short journeys
Potential impact of being unable to drive/access a car	Potentially significant reduction in distance travelled, but this is unlikely to affect overall quality of life

"I enjoy driving; having a high-quality car is important to me"

"My older children will want to start driving as soon as they are able to"

"I have no need to use public transport"

<sup>38</sup> **Group A Lavish Lifestyles:** *Exclusive enclaves; Metropolitan money; Large house luxury* – these are middle aged and retired people, financially successful; living in rural, semi-rural and suburban areas

## Group B: Executive Wealth<sup>39</sup>

Typical journey choices	Many will have long commute/business journeys by car and/or rail (many cross-regional) although many will be now working from home more post-pandemic; Many leisure journeys will be undertaken Younger people will rely on escort journeys by car Some may walk or cycle for leisure but not to travel (although some may be serious commuter cyclists)
Car ownership and use	High car ownership and use Many households have multiple cars; comfortable with technology so one may already be an electric/hybrid model Travel will almost exclusively be undertaken by car, even for very short journeys Younger people will aspire to drive when they are old enough
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Those living in suburbs will have access to public transport along radial routes to main centres, but services may not be very frequent Limited options for active travel journeys Those living in semi-rural locations will have very limited public transport options; little or no active travel options
Physical and mental health issues	Physical health and mental wellbeing likely to be very good for most, although high car use results in sedentary behaviour
Financial considerations	Unlikely to be any significant barriers to transport choices, but cost of commute travel will be significant outgoing for many Significant outgoings associated with multiple car ownership
Likely attitudes towards alternatives to car use	Comfortable with rail use, but bus is perceived to be poor quality and unaspirational Walking and cycling more likely to be seen as leisure pursuits
Propensity to reduce car use	Low; unaffected by any fiscal controls Many will have settled into a new hybrid working pattern and so commute costs/time already lower than pre-pandemic Bus and active travel seen as irrelevant options for journeys
Potential impact of being unable to drive/access a car	Significant reduction in distance travelled for work and leisure, but still able to access a full range of social needs

"We would find it difficult to give up any of our cars"

"We lead busy lives with the children's extra-curricular activities; we always need to be taking them somewhere"

"I work from home more following the pandemic, so commute time and cost has dropped significantly"

<sup>39</sup> **Group B Executive Wealth:** Asset rich families; Wealthy countryside commuters; Financially comfortable families; Affluent professionals; Prosperous suburban families; Well-off edge of towners – these are wealthy families in suburbs, edge of towns and semi-rural locations

## Group C: Mature Money<sup>40</sup>

Typical journey choices	Frequent journeys will be made for leisure, shopping and personal business Many journeys will be discretionary; have fewer time pressures Few journeys will be made to the centres of cities or large towns
Car ownership and use	High car ownership and use Many households have two cars; others have downsized to one. Some may choose not to drive, or may have given up driving Households are typically rural so rely on the car for accessing services not available in their local community
Availability of alternatives to car use (public transport, DRT, active travel, etc)	The nearest rail station may be some distance away; bus services may be very limited Little or no options for active travel journeys May own an electric bike, predominately for leisure journeys
Physical and mental health issues	Physical health and mental wellbeing likely to be good for most, though declining ability to walk/drive will be inhibiting transport choices of older residents
Financial considerations	Although they have good retirement incomes, having more than one car in the household may be seen as an unnecessary expense Many will be entitled to free or discounted travel on public transport with their concessionary travel pass
Likely attitudes towards alternatives to car use	Many may not have had much experience of using public transport but may become more dependent on it as they get older Many will consider walking and cycling for leisure rather than functional journeys
Propensity to reduce car use	Medium; whilst car use is high for many, declining health/ability to drive may influence decisions around car use Will be more sensitive to fiscal controls as are reliant on retirement incomes Bus and active travel seen as less relevant options for journeys
Potential impact of being unable to drive/access a car	Significant reduction in distance travelled for leisure, but still able to access most social needs, although may be more difficult given home location and access to transport alternatives

"I'll keep driving as long as I can; it gives me independence"

"I don't want to have to rely on other people to get around"

"I don't feel confident using public transport, and services near me are limited"

<sup>40</sup> **Group C Mature Money:** *Better-off villagers; Settled suburbia, older people; Retired and empty nesters; Upmarket downsizers* – these are prosperous older and retired couples in rural towns, villages, and suburbs of larger towns



## Group D: City Sophisticates<sup>41</sup>

Typical journey choices	Mostly in urban locations, many will be making short journeys to work and for leisure by active and sustainable modes Cycling for functional and leisure journeys may be more common Many are likely to shop locally within their neighbourhood
Car ownership and use	Low; many are unlikely to own a car Those that do use a car will do so for longer, less frequent journeys May use or be willing to use other forms of shared transport such as public bike hire, car clubs
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Many will have good access to bus and rail services More commonly use taxis Journeys by active travel modes will be relatively easy for most Ability to store a bike may be a barrier for some
Physical and mental health issues	Households are predominantly younger and most will have good physical and mental health, and are more likely to be active on a daily basis through travel choices
Financial considerations	Above average earnings and fewer households with dependents, so many will have high disposable income, but cost of owning, parking and driving a car may be seen as an unjustifiable expense Many will consider rail fares to be a significant financial outgoing
Likely attitudes towards alternatives to car use	Comfortable with bus and rail use, and with other forms of shared transport Walking considered to be an appropriate transport choice, although barriers to cycling may exist
Propensity to reduce car use	Medium; whilst car use is low for many, those that do own and use a car will be more sensitive to fiscal and regulatory controls Relatively good access to range of transport alternatives Being more environmentally and lifestyle/health aware may encourage uptake of cycling
Potential impact of being unable to drive/access a car	Modest, as able to access most goods and services locally and due to generally better access to a range of transport alternatives, and lower reliance on car

"I can't justify the cost of running a car; I'd rather spend my money on other things"

"The cost and hassle of parking a car near my house isn't worth it"

"Active, public and shared transport options give me flexibility and keep costs of travel down"

<sup>41</sup> **Group D City Sophisticates:** *Townhouse cosmopolitans; Younger professionals in smaller flats; Metropolitan professionals; Socialising young renters* – these are affluent younger singles and couples who own flats in major towns and cities

## Group E: Career Climbers<sup>42</sup>

Typical journey choices	<p>Mostly in urban locations; many will be travelling to work and for leisure by active and sustainable modes</p> <p>Rising house prices may be pushing households out of cities and into more affordable suburban areas</p> <p>Cycling for functional and leisure journeys may be more common</p> <p>Young families may enjoy walking for leisure</p>
Car ownership and use	<p>Young families are likely to own a car</p> <p>Singles and couples are less likely to own a car and rely more on other transport options, including shared car access such as car clubs or peer-to-peer car hire</p> <p>Those that move to more affordable suburban areas more likely to depend on car</p> <p>For many, the inability to park a car close to home may be a barrier</p>
Availability of alternatives to car use (public transport, DRT, active travel, etc)	<p>Generally good for most, although living on the edges of urban areas may only have access to bus services on radial routes into main centres</p> <p>Bike storage may be a barrier for those living in flats</p>
Physical and mental health issues	<p>Predominantly younger people so generally in good physical health although for some, the burden of cost of living/debt may create mental health issues</p>
Financial considerations	<p>Travel costs likely to be a financial burden for many who are already facing significant outgoings</p> <p>Cost of living will affect many households, particularly those with families</p>
Likely attitudes towards alternatives to car use	<p>Generally comfortable using both bus and rail, and other forms of shared transport</p> <p>Walking considered to be an appropriate transport choice, although barriers to cycling may exist</p>
Propensity to reduce car use	<p>Low; largely due to overall low car ownership levels</p> <p>Relatively good access to range of transport alternatives</p> <p>Many already use active and sustainable modes</p>
Potential impact of being unable to drive/access a car	<p>Could affect ability to access employment, but limited effect on access to other goods and services, due to generally better access to a range of transport alternatives, and lower reliance on car</p>

"I can get around for most of my journeys on foot or by bike; the buses are pretty good too"

"A car can be handy to have, but it's so expensive to own one"

"I use the train but it costs a lot of money"

<sup>42</sup> **Group E Career Climbers:** Career driven young families; First time buyers in small, modern homes; Mixed metropolitan areas – these are younger singles, couples and families with young children in flats and smaller houses in towns and cities

## Group F: Countryside Communities<sup>43</sup>

Typical journey choices	Mostly in rural and semi-rural locations; high car dependence to access services and facilities. More likely to work at or close to home or are retired. Children likely to have to travel further to school Journeys will be fewer in number and likely to combine several activities into one trip May be able to do some shopping and personal business in the nearest town but will have a need to travel to larger centres less often
Car ownership and use	High dependency on car; many households have at least two cars Many may keep driving as long as they possibly can as they age
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Very little scheduled public transport; some DRT services may exist to connect people into the nearest town or village Many will have to travel some distance to access public transport services on radial routes to main centres, including Park and Ride services Options for active travel journeys are limited
Physical and mental health issues	Many will be in good health, although mobility will be declining with age; leading to feelings of isolation and loss of independence associated with limited transport choices
Financial considerations	Unlikely to be a barrier to day-to-day transport choices, however many may downsize to one car per household as they get older
Likely attitudes towards alternatives to car use	Lack of public transport serving their area will be a concern for many as they age; they would like to see some form of bus/DRT service provided to connect to the nearest town Walking and cycling likely to be seen as leisure pursuits rather than for functional journeys Perceptions of safety for cycling in rural, semi-rural areas may be low. Lack of pavement infrastructure on rural roads means walking is not an attractive alternative
Propensity to reduce car use	Low; high car dependency due to rurality of location, longer journeys and lack of suitable transport alternatives
Potential impact of being unable to drive/access a car	Significant impact on ability to access essential goods and services, with increased risk of social isolation and reliance on others, partly due to fewer transport alternatives

"For us, the car is the only option to get around; we live some distance from the nearest supermarket, and we don't use the internet to do online shopping"

"I worry about how I'm going to get shopping when I can no longer drive"

"There are no bus services; there is a minibus but I'm not sure how it works"

<sup>43</sup> **Group F Countryside Communities:** Farms and cottages; Larger families in rural areas; Owner occupiers in small towns and villages – these are older people in remote rural areas, smaller villages and outskirts of small towns

## Group G: Successful Suburbs<sup>44</sup>

Typical journey choices	Many have long commutes by car or rail Few have amenities very close to home; journeys to shops and for leisure likely to be by car People that don't have car access (especially young and older people) have constrained journey choices, so there are more escort journeys by car for these people
Car ownership and use	High dependency on car; most households likely to have at least one, and many have several. Cars are used frequently for many short journeys Ageing residents may have had to give up driving
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Mainly living in low-density suburbs; many will have public transport access on radial routes to nearby main town and city centres, but few will have high-frequency services Active travel options may be a reasonable option for very local journeys but less attractive for journeys into town or city centres
Physical and mental health issues	Physical health and mental wellbeing likely to be good for most, though declining ability to walk/drive will be inhibiting transport choices of older residents
Financial considerations	Unlikely to be a significant barrier to day-to-day transport choices, however many may downsize to one car as they get older Commute costs will be a burden on incomes but reluctant to give up convenience of the car
Likely attitudes towards alternatives to car use	Comfortable with rail use for commute journeys, but bus is perceived to be poor quality and unaspirational (Park & Ride might be an exception) Walking and cycling likely to be seen as leisure pursuits rather than for functional journeys
Propensity to reduce car use	Medium; whilst car use is high for many, some will be more sensitive to fiscal and regulatory controls and so may consider how they can reduce car use Declining health/ability to drive for older people may influence decisions around car use
Potential impact of being unable to drive/access a car	Significant reduction in distance travelled for work and leisure, and would have some effect on access a full range of social needs, including employment

"By the time I've driven to the station, paid to park and for the train fare, getting to the office is expensive and time-consuming"

"The children expect to be driven everywhere; bus services aren't good and they don't want to walk or cycle"

"So many things are harder since I had to stop driving"

<sup>44</sup> **Group G Successful Suburbs:** Comfortably-off families in modern housing; Larger family homes, multi-ethnic areas; Semi-professional families, owner occupied neighbourhoods – these are comfortably off home-owning families in stable suburban and semi-rural locations

## Group H: Steady Neighbourhoods<sup>45</sup>

Typical journey choices	Frequent, short journeys for work, education, shopping and leisure Few have amenities very close to home; many journeys by car, although many will also use bus services People that don't have car access (especially young and older people) have constrained journey choices. Many escort journeys will be undertaken by car
Car ownership and use	Most households will own a car; many will have two Cars are used frequently for many short journeys. But within the household, some are too young to drive, and ageing residents may have had to give up driving
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Many in suburban areas will have public transport access on radial routes to main centres, but few will have high-frequency services Active travel options may be a reasonable option for very local journeys but less attractive for journeys into town or city centres
Physical and mental health issues	Most will be in good physical and mental health although for some, the burden of cost of living may create mental health issues Declining ability to walk/drive will be inhibiting transport choices of older residents
Financial considerations	Some households will find the cost of car ownership a burden, and wish they could downsize to one car, albeit with reluctance to give up the convenience Many may downsize to one car per household as they get older
Likely attitudes towards alternatives to car use	Bus services considered acceptable by many, although many will not use despite local service available Rail services used less frequently and more likely for leisure journeys; considered expensive Walking and cycling likely to be seen as leisure pursuits rather than for functional journeys
Propensity to reduce car use	Medium; whilst car use is high for many, many will be sensitive to fiscal controls and so may consider how they can reduce car use Declining health/ability to drive for older people may influence decisions around car use
Potential impact of being unable to drive/access a car	Significant reduction in distance travelled for work and leisure, and would have some effect on access a full range of social needs, including employment

"We're considering downsizing to one car as it's costing us a lot of money to run two"

"We need the car for shopping and personal business as we have no local facilities"

"We need to drive the kids everywhere; they are too young to use the bus or walk or cycle alone"

<sup>45</sup> **Group H Steady Neighbourhoods:** Suburban semis, conventional attitudes; Owner occupied terraces, average income; Established suburbs, older families – these are comfortably off families with younger and older children, and empty nesters in suburban and urban areas

## Group I: Comfortable Seniors<sup>46</sup>

Typical journey choices	Travel by these households is not extensive, and likely to be in their local area for shopping and personal business Many live alone and may rely on others to get around or to do shopping for them
Car ownership and use	Most households will own a car; many will have two Cars are used frequently for many short journeys. But within the household, some are too young to drive, and ageing residents may have had to give up driving
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Many in suburban areas will have public transport access on radial routes to main centres, but few will have high-frequency services Active travel options may be a reasonable option for very local journeys but less attractive for journeys into town or city centres
Physical and mental health issues	Most will be in good physical and mental health although for some, the burden of cost of living may create mental health issues Declining ability to walk/drive will be inhibiting transport choices of older residents
Financial considerations	Some households will find the cost of car ownership a burden, and wish they could downsize to one car, albeit with reluctance to give up the convenience Many may downsize to one car per household as they get older
Likely attitudes towards alternatives to car use	Bus services considered acceptable by many, although many will not use despite local service available Rail services used less frequently and more likely for leisure journeys; considered expensive Walking and cycling likely to be seen as leisure pursuits rather than for functional journeys
Propensity to reduce car use	Medium; whilst car use is high for many, many will be sensitive to fiscal controls and so may consider how they can reduce car use Declining health/ability to drive for older people may influence decisions around car use
Potential impact of being unable to drive/access a car	Significant reduction in distance travelled, and would have some effect on access a full range of social needs

"I have to rely on family and friends to drive me around, or get my shopping for me"

"It's more difficult since we gave up the car; there are buses, but it's a long walk to the stop"

"Without the bus I wouldn't get out much"

<sup>46</sup> **Group I Comfortable Seniors:** *Older people, neat and tidy neighbourhoods; Elderly singles in purpose-built accommodation* – these are retired and older couples in established neighbourhoods and purpose-built accommodation

## Group J: Starting Out<sup>47</sup>

Typical journey choices	Many are making a large number of journeys for work, shopping and leisure into nearby town and city centres and other destinations Many will be travelling to work within the local area, although there will be those who have longer commute journeys Many households have pre-school children so will soon be making school run journeys too Services and facilities will be within walkable distance for many
Car ownership and use	Many households will have a car, although car ownership overall is low due to a combination of income and need Many may aspire to own a car, or a better car Those living closer to town centres are more likely to use active and sustainable modes
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Generally good; most live in areas where public transport is reasonable, having access to a variety of bus services and some having walk-in access to train Those living on the edges of urban areas may only have access to services on radial routes which are unlikely to be high frequency Local areas are generally good for walking, but there are barriers to cycling, especially for women and young children
Physical and mental health issues	Predominantly younger people so generally in good physical health, although for some the burden of cost of living/debt may create mental health issues
Financial considerations	The cost of car ownership is likely to be a financial burden for many who are already facing significant outgoings
Likely attitudes towards alternatives to car use	Generally comfortable with bus services amongst those who use them Are likely to be more time-poor, which may impact decision-making on transport choices Many will find the cost of rail journeys to be significant Walking will be seen as an acceptable travel choice; cycling less so
Propensity to reduce car use	High; these households will be significantly affected by regulatory or fiscal measures that seek to control car use Generally good access to transport alternatives means that many could change
Potential impact of being unable to drive/access a car	Would affect ability to access some essential goods and services, and including employment, training and education, particularly for those reliant on escort journeys

"I need to have a car to get to work, but it's so expensive to run"

"Unless you use buses regularly to justify a season ticket they can be expensive"

"Hopefully we'll be able to afford a better car soon"

<sup>47</sup> **Group J Starting Out:** *Educated families in terraces, young children; Smaller houses and starter homes – these are younger couples and young families in smaller, first homes in towns and outskirts of cities*

## Group K: Student Life<sup>48</sup>

Typical journey choices	Many are making a large number of journeys, but mostly local, for study, leisure and work Most travel in and around city centres, although others will be living at home and making long, often inter-regional journeys to education Some that are in early stages of their careers are commuting
Car ownership and use	Car ownership is low, both because of limited need and due to modest incomes Car use is likely to be occasional and for longer journeys for leisure and to visit friends and family Some may choose not to drive, or may not have learned to drive
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Most reside in areas where public transport is reasonably good, having access to a variety of bus services and some having walk-in access to train May use or be willing to use car clubs Many will own a cycle, or access one through public bike hire, and pedestrian provision will be reasonably good in urban areas
Physical and mental health issues	Few people in these households are constrained by physical or mental health issues
Financial considerations	Disposable income is modest but for students, transport costs are only a small proportion of expenditure The cost of commuting is a significant burden to those in work, however
Likely attitudes towards alternatives to car use	Most will be regular (if not all very frequent) users of public transport; cost of public transport is a barrier to some journeys Content to use sustainable transport choices and to be able to spend travel time working online Likely to be few barriers to walking and cycling; many individuals in these households are comfortable and confident in using cycles
Propensity to reduce car use	Medium; although car ownership and use for these households is relatively low, those that do drive would be significantly affected by fiscal controls Generally good access to transport alternatives means that many could potentially change
Potential impact of being unable to drive/access a car	Modest, as able to access most goods and services locally, and with access to good range of transport alternatives

"I mostly walk or cycle everywhere, though use the coach or train for longer journeys"

"I borrow my parents' car when I go home to visit"

"I don't think I'll be able to afford a car, even when I start earning"

<sup>48</sup> **Group K Student Life:** *Student flats and halls of residence; Term-time terraces; Educated young people in flats and tenements* – these are students and young people starting their careers, in shared accommodation in urban areas



## Group L: Modest Means<sup>49</sup>

Typical journey choices	Largely urban and suburban dwellers who are travelling frequently for work and education in and to town and city centres There is some discretionary leisure/social travel too, but journeys will be relatively short
Car ownership and use	Medium; car ownership is lower than the regional average, especially for those people living closer to larger town centres But cars are seen as essential to get to work and for retail by many people living in suburbs Many young people will depend on escort journeys to connect to education, friends, social activities, etc
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Many people will have good levels of bus service in their areas, living close to several routes on the approaches to town and city centres Journeys by active travel will be more common, although mostly on foot, as many households will not own cycles (at least not by all family members)
Physical and mental health issues	Residents are younger than the regional average, so health is reasonable, but physical activity levels are less than recommended The cost of living/debt will be a burden on mental health for many
Financial considerations	Disposable income is modest so transport costs, especially to travel to work, are a drain for some Some of those households that need to have a car find the cost a burden
Likely attitudes towards alternatives to car use	An essential choice for those living in suburban areas that do not have access to a car Some almost never use buses, either because they have a car or because they live within walking distance of services Train is used by some for commuting, but the costs are significant
Propensity to reduce car use	Medium; although car ownership and use for these households is lower than average, those that do drive would be significantly affected by fiscal controls Generally good access to transport alternatives will support change
Potential impact of being unable to drive/access a car	Significant reduction in distance travelled, and would have some effect on access a full range of social needs, including employment, training and education

"I need to have a car to get to work, but it's so expensive to buy and run"

"Hopefully we'll be able to afford a better car soon"

"Bus services seem to be good around here, but I don't use them often"

<sup>49</sup> **Group L Modest Means:** *Low-cost flats in suburban areas; Semi-skilled workers in traditional neighbourhoods; Fading owner occupied terraces; High occupancy terraces* – these are singles, families and single parents in lower cost housing in urban and suburban areas

## Group M: Striving Families<sup>50</sup>

Typical journey choices	Largely village and semi-rural dwellers who will be travelling frequently for work and education Journeys to nearest town will be needed to access facilities and services that are not available in local area Some discretionary leisure/social travel too
Car ownership and use	Car ownership is lower than the regional average, but cars are seen as essential to get to work and for retail by many people living in suburbs or villages
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Most people will have access to at least a bus service to the local town although likely to be only a basic service level and not necessarily suitable for journeys to work Older people make good use of their concessionary bus passes and may use a DRT service Some may walk for functional and leisure journeys in their local area, but cycle ownership levels will be low
Physical and mental health issues	Some areas have a higher than average prevalence of older people, some of whom will struggle to walk far or travel independently Younger residents' health is reasonable, but physical activity levels are less than recommended The cost of living/debt will be a burden on mental health for many
Financial considerations	Disposable income is limited so transport costs, especially to travel to work, are a significant drain Those households that need to have a car find the cost a burden
Likely attitudes towards alternatives to car use	The car is seen as a lifeline by some, but cost is a barrier to use, especially for families Those living in villages without access to a car likely to feel restricted by relatively limited public transport choice Cycling not seen as a mode of transport; opportunities for walking are limited to local area
Propensity to reduce car use	Low; those households who are reliant on a car will feel that they have no other choices available due to lack of suitable alternatives and the need to travel Many older residents are already using public transport
Potential impact of being unable to drive/access a car	Significant reduction in ability to access many essential goods and services, particularly employment, due to home location and lack of transport alternatives

"Bus services are there if I need them, but there's only one route and it's not very frequent, so it's not convenient"

"We have a car, but my partner needs it to get to work"

"We need to have a car living here; the nearest supermarket is ten miles away"

<sup>50</sup> **Group M Striving Families:** *Labouring semi-rural estates; Struggling young families in post-war terraces; Families in right-to-buy estates; Post-war estates, limited means* – these are low-income families in council and social housing estates in villages and semi-rural settings

## Group N: Poorer Pensioners<sup>51</sup>

Typical journey choices	Many people are walking, wheeling or using buses regularly for shopping, social and other reasons But many are unable to travel independently, relying on lifts from family, friends or neighbours Some people very reliant on minicabs or DRT services Journeys tend to be short and restricted to the local area; leisure journeys will be limited in number and more likely to be local
Car ownership and use	Low, because of a combination of low incomes and age
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Many are living in areas with decent public transport services to local town centres, but some in suburban areas will have relatively poor services and/or challenging walk-in distances to access public transport Lack of high-quality pedestrian provision may be a barrier for some walk journeys; hardly any will cycle due to age or ability
Physical and mental health issues	Physical and cognitive health challenges constrain journey choices for many, through both inabilities to drive or walk far
Financial considerations	Transport choices are constrained by income. High reliance on concessionary bus journeys by those able to make use of them Transport exclusion exists for many people that are not able to use public transport or travel actively, due to physical mobility constraints of lack of appropriate services
Likely attitudes towards alternatives to car use	Bus services seen as a lifeline for many Frustration at cost of alternatives for those without concessionary travel Strong reliance by some on DRT Active travel journeys seen as less relevant, due to age and ability; some may walk for leisure or to access very local services
Propensity to reduce car use	Low, as a result of existing low car ownership and relatively limited travel horizons
Potential impact of being unable to drive/access a car	Significant reduction in ability to access some essential goods and services, particularly for people with reduced mobility that are most car-dependent; leading to increased risk of social isolation and increased reliance on others

"I really need the car to get anywhere, but it's so expensive to run"

"My daughter takes me shopping once a week in her car, and I have neighbours who helpfully run errands for me"

"It's more difficult since we gave up the car; there are buses, but it's a long walk to the stop"

<sup>51</sup> **Group N Poorer Pensioners:** Pensioners in social housing, semis and terraces; Elderly people in social rented flats; Low-income older people in smaller semis; Pensioners and singles in social rented flats – these are pensioners and older people, mostly renting social housing or in retirement accommodation

## Group O: Young Hardship<sup>52</sup>

Typical journey choices	Largely younger people who are travelling in and around urban areas for work, retail, education and training There is relatively little discretionary travel for leisure purposes More likely to work in employment that cannot be done from home, or that requires shift work, meaning that many do need to travel frequently to work and at times of day when public transport unavailable
Car ownership and use	Car ownership is mostly lower than average, though will be a necessity for some households, especially to access employment
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Many are living in suburban areas or close to town and city centres with decent public transport services or walking routes to a range of local facilities Public transport is essential for some to access job opportunities, education and training, but those opportunities may not be in the centres or at times of day when services are most prevalent Household cycle ownership levels will be low, and ability to store a bike at home will be a barrier
Physical and mental health issues	A few suffer physical and/or mental health challenges that constrain ability to walk far, but on the whole health is reasonably good given younger age
Financial considerations	Some households' transport choices are constrained by income, particularly for discretionary and leisure journeys; car ownership consumes a high proportion of household income for many Even short public transport journeys can be relatively expensive for young families
Likely attitudes towards alternatives to car use	Car is seen as a lifeline by some, but cost is a barrier to use, especially for families Bus services seen as a lifeline for many; considered to be acceptable although are expensive for some Walking seen as an acceptable option for many local journeys, but cycling much less so due to lack of access to/storage for cycles
Propensity to reduce car use	Low; due to existing low car ownership and relatively high public transport and active travel (walking) use for shorter journeys Those who rely on a car will feel that they have no other choices available
Potential impact of being unable to drive/access a car	Significant reduction in ability to access many essential goods and services, particularly employment, due to home location and lack of transport alternatives

"I use the bus to get to college, but the times aren't convenient, so I have a long wait"

"We would like to travel to get out more, but it's too expensive to go far unless we need to"

"I need the car to get to work, but it costs a lot to buy and run"

<sup>52</sup> **Group O Young Hardship:** *Young families in low-cost private flats; Struggling younger people in mixed tenure; Young people in small, low-cost terraces* – these are singles, couples and families in mix of low-rise estates, purpose-built flats and low-cost houses in and around towns

## Group P: Struggling Estates<sup>53</sup>

Typical journey choices	Largely households with families travelling in and around urban centres for work, retail and education There is very little discretionary travel for leisure purposes Work in employment that cannot be done from home, or that requires shift work, meaning that many do need to travel frequently to work and at times of day when public transport unavailable
Car ownership and use	Car ownership is low, though will be a necessity for some households, especially to access employment
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Many are living in or close to town and city centres with decent public transport services or walking routes to a range of local facilities Public transport is essential for many to access job opportunities, education and training, but those opportunities may not be in the centres or at times of day when services are most prevalent Household cycle ownership levels will be low, and ability to store a bike at home will be a barrier
Physical and mental health issues	Some suffer physical and/or mental health challenges that constrain ability to walk far General health and physical activity levels will be poorer than average
Financial considerations	Transport choices are significantly constrained by income particularly for discretionary and leisure journeys Car ownership requires a high proportion of household income The high proportion of families mean that even short public transport journeys can be relatively expensive; less likely to be making use of under 22 free concessionary bus scheme
Likely attitudes towards alternatives to car use	Car is seen as a lifeline by some, but cost is a significant barrier to use, especially for families Bus services seen as a lifeline for many although are expensive for some; likely to be a high proportion that never use public transport Walking seen as an acceptable option, but cycling much less so due to lack of access to/storage for cycles.
Propensity to reduce car use	Low, due to existing low car ownership levels Those who rely on a car will feel that they have no other choices available
Potential impact of being unable to drive/access a car	For those that are most car-dependent, significant reduction in ability to access some essential goods and services, particularly employment and education

"All the bus services go into the city centre, but I work on the edge of town so have to drive"

"We would like to travel to get out more, but it's too expensive to go far unless we need to"

"I need the car to get to work, but it costs a lot to buy and run"

<sup>53</sup> **Group P Struggling Estates:** *Poorer families, many houses, terraced housing; Low-income terraces; Multi-ethnic, purpose-built estates; Deprived and ethnically diverse in flats; Low-income large families in socially rented semis* – these are low-income families and single parents renting flats and social housing in urban areas of towns and cities

## Group Q: Difficult Circumstances<sup>54</sup>

Typical journey choices	These households travel significantly less than average and overall travel horizons are limited; there are very little discretionary journeys made Those working will work in employment that cannot be done from home, or more likely to work shift patterns
Car ownership and use	Car ownership is very low, because of low income
Availability of alternatives to car use (public transport, DRT, active travel, etc)	Many are living in urban areas with decent public transport services to local town and city centres, but cost of transport is a significant barrier to use Public transport is essential to access job opportunities, but those opportunities may not be in centres or at times of day when services are most prevalent, and this provides a barrier to employment
Physical and mental health issues	Some suffer physical and/or mental health challenges that constrain ability to walk far General health and physical activity levels will be poorer than average
Financial considerations	Transport choices are significantly constrained by income Car ownership requires a high proportion of household income The high proportion of families mean that even short public transport journeys can be relatively expensive; less likely to be making use of under 22 free concessionary bus scheme
Likely attitudes towards alternatives to car use	Car is seen as a lifeline by some, but cost is a significant barrier to use, especially for families Bus services seen as a lifeline for many although are expensive for some; likely to be a high proportion that never use public transport and there may be frustration that public transport does not provide direct access to a wider range of employment opportunities Walking seen as an essential option, but not cycling due to lack of access to/storage for cycles
Propensity to reduce car use	Low, due to existing low car ownership levels and low travel horizons
Potential impact of being unable to drive/access a car	Significant reduction in ability to access some essential goods and services, particularly for people with reduced mobility that are most car-dependent

"Buses don't run at the times that my shift times change"

"We don't travel far; it's too expensive to go anywhere"

"I have to walk quite far to get to work as I can't afford to use the bus"

<sup>54</sup> **Group Q Difficult Circumstances:** Social rented flats, families and single parents; Singles and young families, some receiving benefits; Deprived areas and high-rise flats – these are young families, single parents and older people in deprived urban neighbourhoods

## B. Options Assessment

The tables below describe and forecast the effects of each of the potential options identified as those that could significantly influence car-km in the Tactran region.

For each option presented, a description is provided of the option, and the percentage reduction in car-km that the option is anticipated to deliver (as summarised in Table 11 above), along with the assumptions and calculations used to derive this figure (based on available evidence where available, or professional judgement where not).

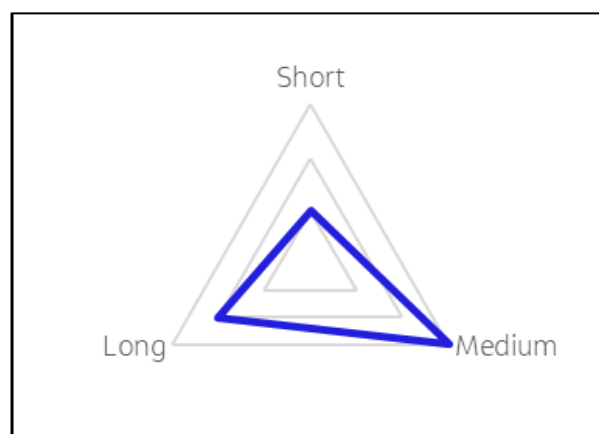
An assessment of potential costs (for capital and revenue) and deliverability (technical feasibility, public acceptability and deliverability by regional/national partners) is also made.

Furthermore, for each option, we present an assessment using a four-point scale (zero to three) of the option's anticipated effect on journey length, journey purpose and effect on urban/rural journeys. We also provide an assessment of the effect on household type using the scale with an accompanying narrative (based on the personas developed and presented in Appendix A).

To help illustrate how these assessments have been developed, some examples for different options are provided here.

In the example to the right, improving public transport (option Q1), will likely have the greatest effect on medium-length journeys.

The effects are lower for journeys that are short (and for which active travel becomes more appropriate) and for longer journeys, for which car becomes more attractive due to fewer public transport options.



In the example to the right, an assessment is made of the effect of increased vehicle excise duty (option D10) on the types of journeys made.

There is the expectation that the effect would be moderate, irrespective of the purpose of the journey (except going for a walk with no effect).

This is because the charge is unrelated to mileage driven, so it is assumed that any increase would affect only car ownership levels, not the use of existing cars.



In the example below, an assessment is made of the effect that introducing 20mph zones and road safety improvements (option Q6) is likely to have on urban/rural journeys.

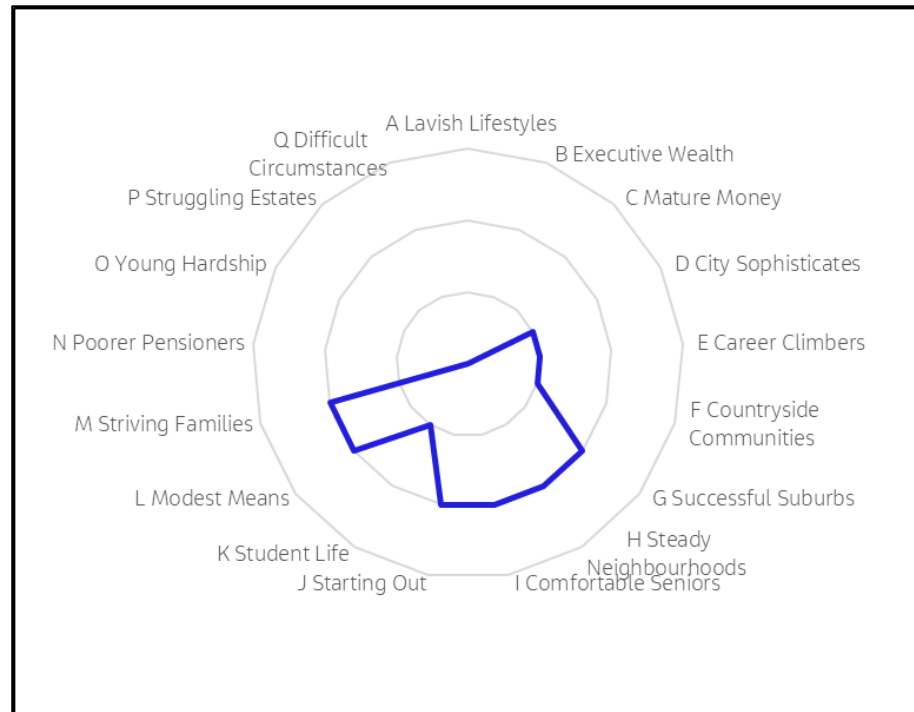
As new or expanded zones and associated improvements would be introduced in cities, towns and villages throughout the region (typically residential streets and those in neighbourhood centres, then the effects are greatest for journeys within large urban areas, other urban areas and accessible small towns. Effects on journeys between other area types would be low.

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	3	1	1	1	1	1
	Other urban	1	3	1	1	1	1
	Acc small towns	1	1	3	1	1	1
	Remote small towns	1	1	1	2	1	1
	Acc rural	1	1	1	1	1	1
	Remote rural	1	1	1	1	1	1

In the final example, an assessment is made on the likely effects of sustainable travel marketing (option E1) on different household types. This suggests that some households more than others will be influenced by messages delivered through marketing activities, such as saving money through reduced car use. This will exclude those households at the upper and lower ends of the income scale; as either car ownership is not a financial concern, or because car ownership and use is already low.

This option will also largely benefit those households for which there are high quality, available transport alternatives to promote, which is more likely to be for those living in urban and suburban areas.





## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q1		Improving public transport
<b>Description</b> Improve public transport within and between communities in the region to enable and encourage its use		
Potential reduction of regional car-km		<~4%
<b>Assumptions and calculations</b> Currently, passenger-km using public transport in the region is 15% of car-km (Table 6). The Department for Transport's WebTAG guidance suggests assuming that, for public transport improvement projects, 27% of new public transport journeys typically switch from car <sup>55</sup> . The potential rate of increased use of public transport in the Tactran region would depend on the nature and scale of improvements made to infrastructure, services, accessibility, pricing, marketing and more; the scoping of which is beyond the remit of this commission. In order to provide a guide as to the potential effect on car-km, however, it is assumed that sufficient investment could be made to provide increased capacity and attractiveness of use such that public transport patronage would double in the region. In this case, and assuming that average public transport journey distances remain unchanged, the number of public transport km travelled would double, but if 27% of those km switched from car, the number of car-km would be expected to reduce by only ~4% (=15% x 27%). Appendix D provides an indication of the relative attractiveness of public transport and car for journeys in the region, and highlights the challenges of providing public transport which is a competitive alternative to car. Given this, the large scale of investment required, likely of both capital and revenue funding has potential to create increased public transport capacity and attractiveness, with its 4% reduction in car-km considered to be the upper estimate of what could be achieved by improving public transport.		
<b>Estimated proportional implementability by 2030</b> <b>High impact scenario:</b> it is estimated that a maximum of a quarter of the investment required to double public transport patronage in the region could be delivered by 2030 <b>Low impact scenario:</b> it is estimated that public transport patronage could be below that of 2019 in 2030 if post-Covid effects continue to suppress demand		
Likely effect by journey length	Likely effect by journey purpose	

<sup>55</sup> WebTAG Data Book table A5.4.7

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option Q1

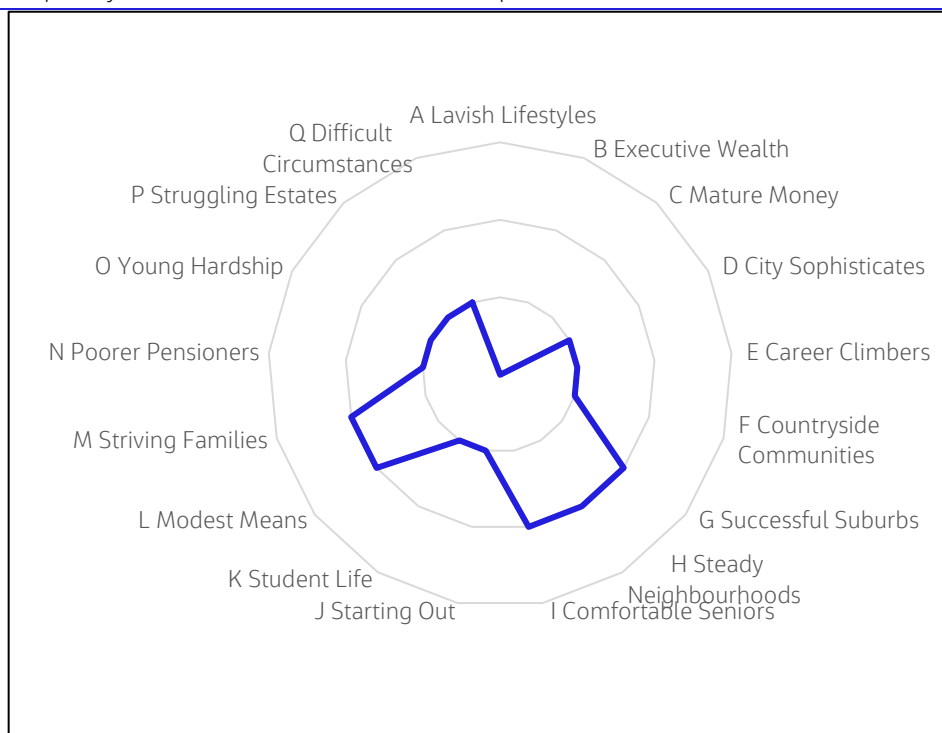
### Improving public transport

Effect by urban-rural class		To						
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural	
From	Large urban	3	3	2	2	1	1	
	Other urban	3	3	2	2	1	1	
	Acc small towns	2	2	1	1	1	1	
	Remote small towns	2	2	1	1	1	1	
	Acc rural	1	1	1	1	1	1	
	Remote rural	1	1	1	1	1	1	

### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects



This option would likely give greatest benefit those who live in or travel to the region's urban areas, where improving public transport tends to be more effective.

Improving bus services would be less effective on changing behaviour amongst higher-income groups, although improved rail services may be more attractive. A higher proportion of lower-income households already use buses, and whilst investment will deliver improved services, this is more likely on existing journey patterns rather than instead of reduced car use. Improvements to rail services are unlikely to benefit lower-income households as the costs of fares are already high.

A large proportion of public transport patronage is already entitled to free (to the user) bus travel (under 22s and over 60s).

### Potential cost

Capital		Revenue	
Significant capital costs would be required to provide the capacity to cater for large increases in demand for increased public transport use		Significant revenue costs would be required to promote use of public transport across the region including, potentially, to subsidise fares on an on-going basis if a substantial increase in demand is to be realised	
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q1			
Improving public transport			
Largely technically feasible, but potential to increase public transport capacity and demand substantially by 2030 is not proven	General public support	Yes (in part)	Yes (in part)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q2	Increase active travel
<b>Description</b> Improve active travel infrastructure within and between all communities in the region, and enable and encourage its use	
Potential reduction of regional car-km	~3%

### Assumptions and calculations

If high quality active travel infrastructure, alongside complementary improvements to urban spaces and reducing perceived danger from traffic, was comprehensively delivered everywhere in the Tactran region, analysis completed for Transport Scotland suggests that active travel mode share (of journeys undertaken, not of km travelled) would slightly more than double (from around 20% to around 43%)<sup>56</sup>: mode share for walking is forecast to increase from 19% to 24%, and cycling from 0.6% to 19%.

If average walk and cycle trip lengths remain unaltered, the proportion of total km travelled that are walked would increase from around 6% (Table 6) to around 8% and the proportion cycled from around 1% to 32%. Net active travel km could therefore (following the comprehensive delivery of active travel investment throughout the region) increase from around 7% to around 40% (= 8% + 32%). This would provide a net increase in active travel mode share of around 33 percentage points (= 40 - 7).

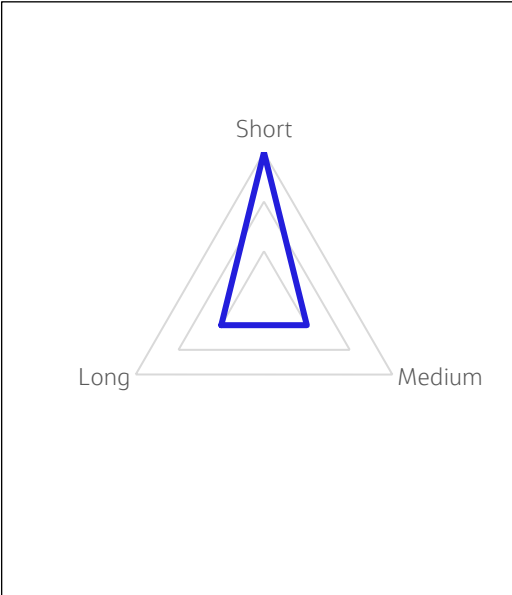
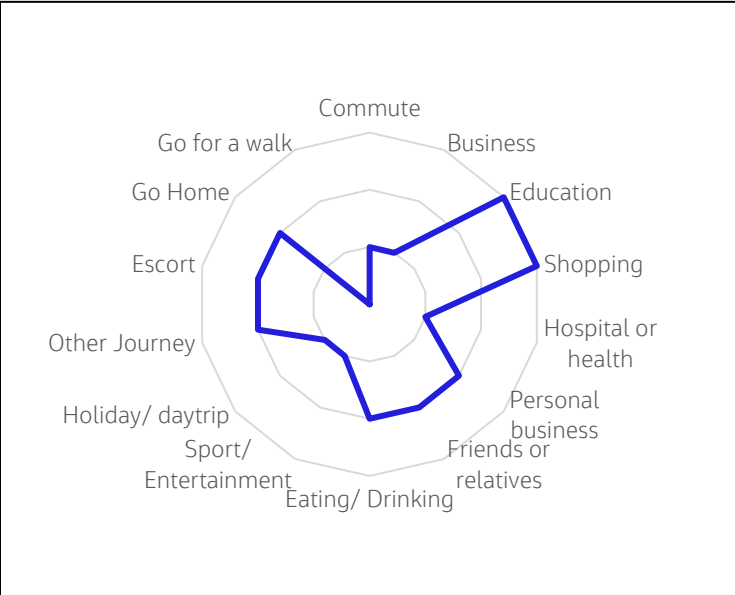
A significant increase in popularity of e-bike use is likely to increase average journey distances by bike, so could potentially increase this further.

However, evidence collated for the Department for Transport suggests that only 11% of new active journeys would be expected to switch from car<sup>57</sup>. If this was the case in the Tactran region, a net reduction in car-km of around 3% (= 33% x 11%) would be anticipated

### Estimated proportional implementability by 2030

**High impact scenario:** it is estimated that a maximum of a quarter of the investment required to provide high quality active travel infrastructure throughout the region could be delivered by 2030

**Low impact scenario:** it is estimated that a business-as-usual scenario would not deliver sufficient change in active travel infrastructure in the region for it to generate any significant change in car-km

Likely effect by journey length	Likely effect by journey purpose
	

<sup>56</sup> STPR2 Draft Technical Report, Transport Scotland, 2022

<sup>57</sup> WebTAG Data Book table A5.4.7

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q2		Increase active travel					
Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	3	1	1	1	1	1
	Other urban	1	3	1	1	1	1
	Acc small towns	1	1	3	1	1	1
	Remote small towns	1	1	1	2	1	1
	Acc rural	1	1	1	1	1	1
	Remote rural	1	1	1	1	1	1

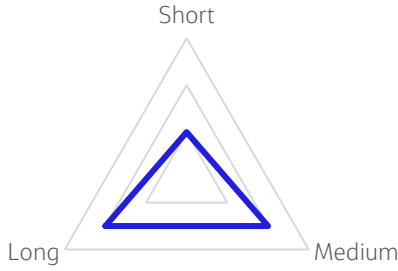

Likely effect by persona	
Propensity to reduce car use as a result of this option	Potential effects
	<p>Urban dwellers and people that typically make shorter journeys are more likely to benefit, as active travel options are more realistic for short journeys.</p> <p>Active travel improvements are unlikely to influence the most affluent households due to home location and attitudes towards non-car modes, but there are many households in higher income groups who may take up opportunities to cycle more for commute journeys. Benefits for lower-income households could be significant but would only be fully realised through improved access to cycles.</p>

Potential cost			
Capital		Revenue	
Potential capital cost in the range £700M - £1.4bn for comprehensive, high-quality active travel infrastructure to be provided throughout the region (based on extrapolation of costs provided in STPR2 draft recommendations)		Not quantified, but significant revenue funding required to ensure active travel infrastructure is maintained to high standard	
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q2			
Increase active travel			
Most measures are feasible, with examples already being implemented in the region, but ability to deliver substantial change by 2030 is not proven	General public support, but some vocal minority opposition	Yes	N/A (deliverable by local partners)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q3		Expanding car clubs and car share
<b>Description</b> Create new or expand existing car club and car share schemes <i>Note that this option refers to formal car club and car share; there is much informal using of car share by friends/neighbours/colleagues, and scope for this to reduce car-km in the region, but this is addressed as part of the sustainable travel marketing option (E1)</i>		
Potential reduction of regional car-km		~2.5%
<b>Assumptions and calculations</b> This option would provide new or expanded car club schemes, to encourage reduced car ownership and usage. Evidence shows that around one-third of members dispose of at least one household vehicle after joining and drive an average of 4,500 fewer kilometres per year (approximately half of the average car-km in the region) <sup>58</sup> . This option would also create and promote car share schemes (formal and informal) to encourage a higher vehicle occupancy for relevant journeys. Extensive work has been undertaken in some settings throughout the region to promote car clubs and car share, but with modest results. If, therefore, more concerted effort could encourage 5% of current car owners in the region to switch to car clubs/share, and if they each reduced mileage by half, then a net saving of around 2.5% would be achieved.		
<b>Estimated proportional implementability by 2030</b> <b>High impact scenario:</b> it is estimated that a maximum of a 75% of the investment required to provide new or expanded car club schemes throughout the region could be delivered by 2030 <b>Low impact scenario:</b> it is estimated that a business-as-usual scenario would not deliver sufficient change in car club use in the region for it to generate any significant change in car-km		
Likely effect by journey length		Likely effect by journey purpose
		

<sup>58</sup> CoMo, Car Club Annual Survey for Scotland: 2019/20 Full Report, 2020, [https://como.org.uk/wp-content/uploads/2020/04/CoMoUK\\_FullCarClubAnnualSurvey19-20-Final.pdf](https://como.org.uk/wp-content/uploads/2020/04/CoMoUK_FullCarClubAnnualSurvey19-20-Final.pdf)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q3		Expanding car clubs and car share					
Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	2	2	1	1	1	1
	Other urban	2	2	1	1	1	1
	Acc small towns	1	1	1	1	1	1
	Remote small towns	1	1	1	1	1	1
	Acc rural	1	1	1	1	1	1
	Remote rural	1	1	1	1	1	1

### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects



Car clubs would likely benefit those who live in the region's urban areas most; car clubs are more viable in densely populated areas. Formal car share schemes will be most effective for those households making regular journeys to a specific destination, such as a workplace setting, however informal sharing would benefit more types of journeys and for different purposes. Households whose car ownership and use form a significant proportion of household outgoings could benefit from car clubs and car sharing; this would be for middle and lower-income groups, with higher-income groups unlikely to be influenced.

### Potential cost

Capital	Revenue
Modest capital costs would be required for on-street infrastructure associated with car club provision	Modest revenue costs would be required to promote use of car clubs and car share

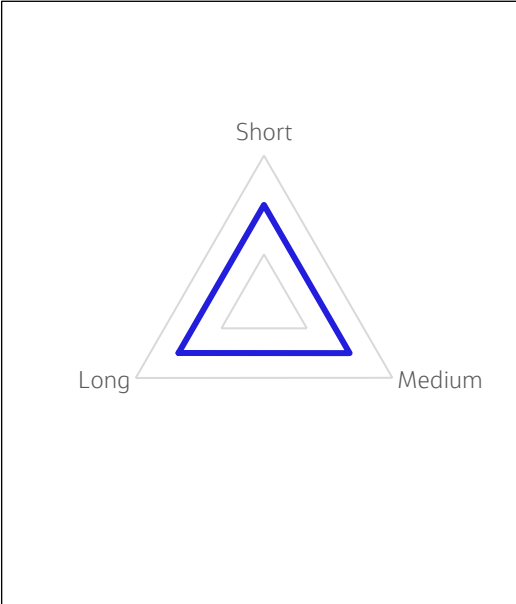
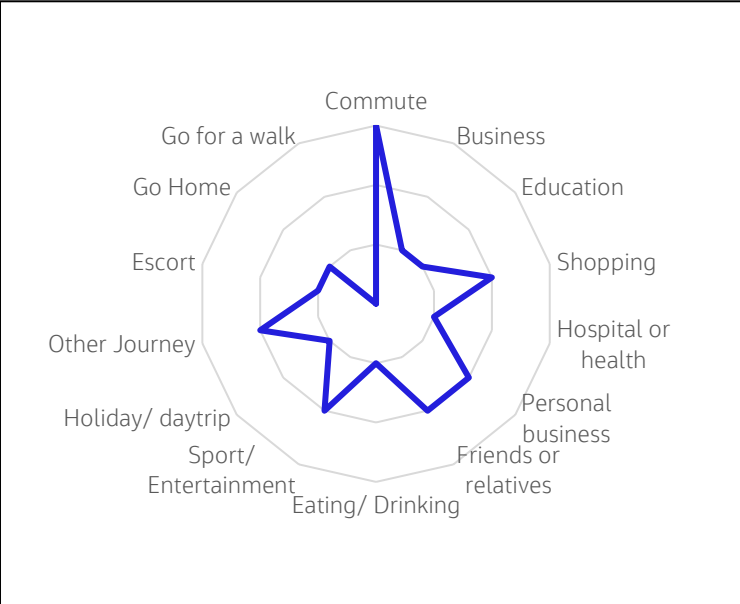


Achieving a 20% Reduction in Car-km: Options for the Tactran Region

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Likely effect by persona			
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	General public support	Yes	N/A (deliverable by local partners)

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q4		Mobility hubs
<b>Description</b>		Increased provision of mobility hubs to enable improved access to a range of sustainable transport choices (likely to include public transport, EV charging, shared cars and bikes)
<b>Potential reduction of regional car-km</b>		~1%
<b>Assumptions and calculations</b>		<p>This option would increase the provision of mobility hubs, enabling ready access for many of the region’s population. As such, more people would gain ready access to a broader range of attractive sustainable transport options.</p> <p>It is assumed that access would be easier in urban and suburban areas, where population density is higher and hence demand greater.</p> <p>Although hubs have been created in some locations, and are subject to increasing interest in Scotland, robust evaluation of their effects is limited, but does suggest that only modest reductions in car use are often achieved, at least if not combined with improvements to transport services (which are covered under other options).</p> <p>We therefore estimate that a reduction in car-km of only around 1% would be realised if hubs are introduced without complementary investments. However, mobility hubs could have a significant role to play as enablers of active and public transport use, so could be a part of efforts to create attractive, accessible sustainable travel networks.</p>
<b>Estimated proportional implementability by 2030</b>		<p><b>High impact scenario:</b> it is estimated that a maximum of a half of the investment required to provide mobility hubs throughout the region could be delivered by 2030</p> <p><b>Low impact scenario:</b> it is estimated that a business-as-usual scenario would not deliver sufficient investment in mobility hubs in the region for them to generate any significant change in car-km</p>
Likely effect by journey length		Likely effect by journey purpose
		

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option Q4 Mobility hubs

Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	2	2	2	1	1	1
	Other urban	2	2	2	1	1	1
	Acc small towns	2	2	2	1	1	1
	Remote small towns	1	1	1	1	1	1
	Acc rural	1	1	1	1	1	1
	Remote rural	1	1	1	1	1	1

### Likely effect by persona

Propensity to reduce car use as a result of this option	Potential effects
	<p>Mobility hubs are likely to be most attractive to households on middle incomes: those with the highest incomes may be less incentivised to reduce car use, those with the lowest may have less propensity to make journeys for which multi-modal options are relevant.</p> <p>Mobility hubs are more relevant for those living and travelling to and within urban and suburban areas, where greater population density will mean increased demand for facilities and services provided at a hub.</p>

### Potential cost

Capital	Revenue
Substantial capital investment required if hubs are to be available for a significant proportion of regional journeys	Substantial revenue investment required for on-going operation of hub-based services

### Deliverability

Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	Largely publicly acceptable	Yes	N/A (deliverable by regional partners)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option Q5

### 20-minute neighbourhoods

#### Description

Deliver 20-minute neighbourhoods in towns and neighbourhood centres across the region, so that residents can meet their day-to-day needs within a 20-minute walk of their home (10 minutes there, 10 minutes back)

Potential reduction of regional car-km ~1%

#### Assumptions and calculations

This option assumes that 20-minute neighbourhoods would be implemented in all relevant town and neighbourhood centres, and that a broad range of services and facilities (not exclusively related to transport) would be introduced. Transport-related improvements would create safer, more inclusive environments for people walking, wheeling, cycling, and spending time in their local areas.

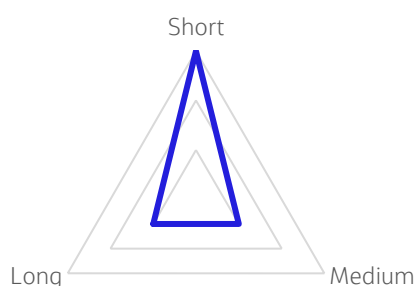
A large proportion of journeys could be influenced by this option, but as they are typically short, the impact on net car-km is limited. 20-minute neighbourhoods would deliver less than half of the effect on car-km of a wider range of measures to promote active travel (option Q2). Those comprehensive active travel measures are estimated to have the potential to reduce car-km by ~3%, so 20-minute neighbourhoods are estimated to reduce car-km by around 1%.

#### Estimated proportional implementability by 2030

**High impact scenario:** it is estimated that a maximum of a one fifth of the investment required to provide high quality 20-minute neighbourhoods in all relevant communities throughout the region could be delivered by 2030

**Low impact scenario:** it is estimated that a business-as-usual scenario would not deliver sufficient change in 20-minute neighbourhood provision in the region for it to generate any significant change in car-km

#### Likely effect by journey length

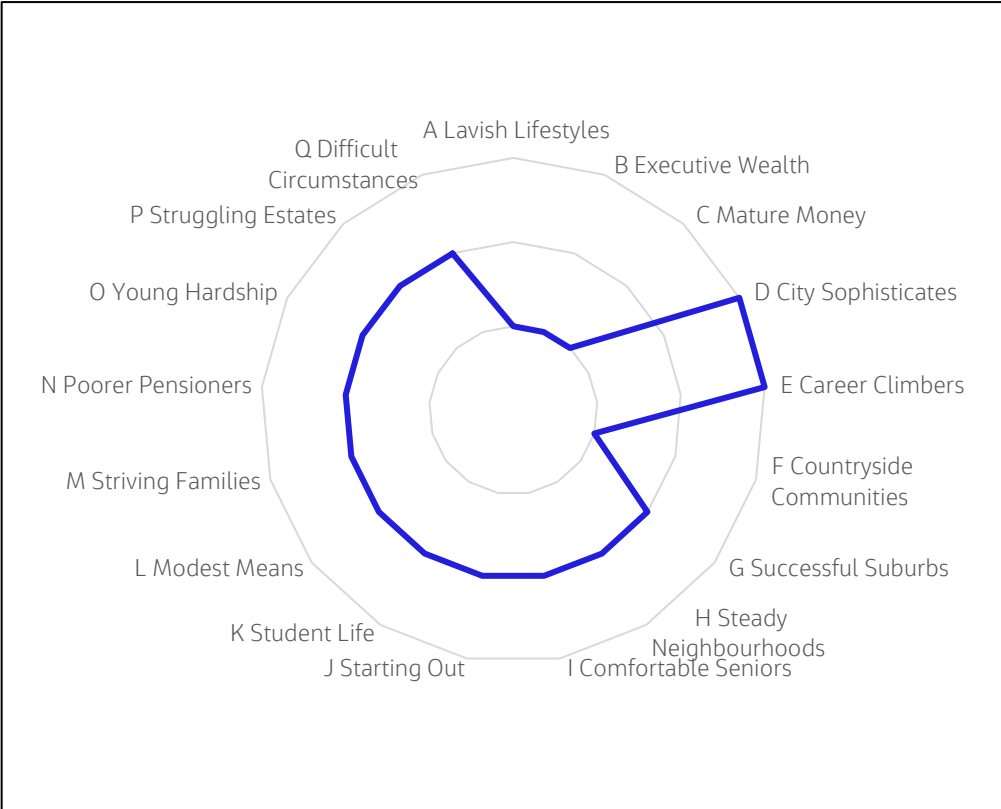


#### Likely effect by journey purpose

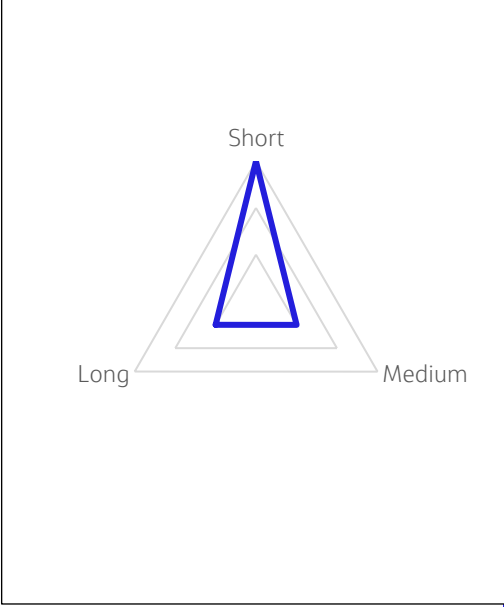
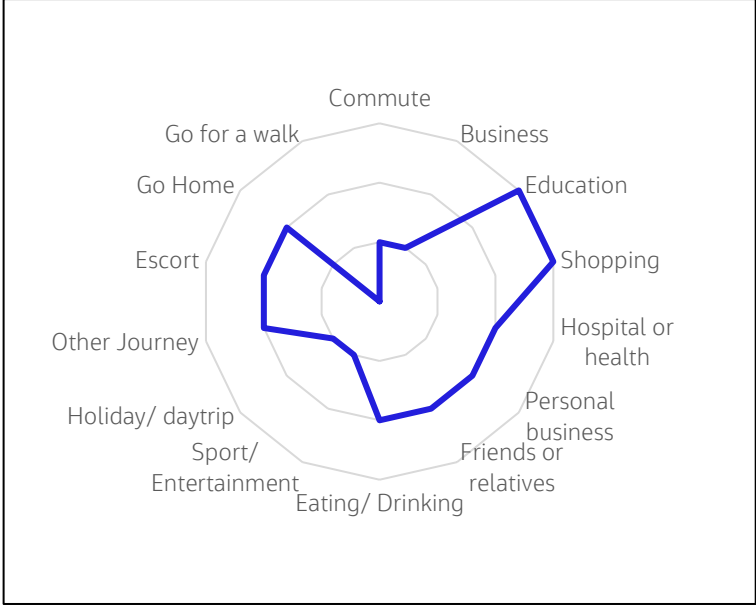


Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	3	1	1	1	1	1
	Other urban	1	3	1	1	1	1
	Acc small towns	1	1	3	1	1	1
	Remote small towns	1	1	1	2	1	1
	Acc rural	1	1	1	1	1	1
	Remote rural	1	1	1	1	1	1

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q5		20-minute neighbourhoods			
Likely effect by persona					
Propensity to reduce car use as a result of this option		Potential effects			
		<p>Will be most relevant to households living in urban and suburban areas, where there are generally better opportunities for improving sustainable travel facilities.</p> <p>Will benefit many households who do not have access to a car; enabling them to access essential opportunities and services without the need to drive, with resulting inclusion and health benefits. This includes lower-income households, and households with younger and older people.</p>			
Other effects					
<p>Supports wider objectives for healthy, inclusive transport, and placemaking</p> <p>Delivery will rely on many different partners for implementation of a broad range of services and facilities</p>					
Potential cost					
Capital		Revenue			
Capital cost of transport interventions of £5-10m per neighbourhood are estimated. Costs of provision of other community services would be additional. If implemented around 50 neighbourhood centres in the region, net capital costs of >£250m are anticipated		Not quantified, but significant revenue funding required to ensure infrastructure and services are maintained/delivered to high standard			
Deliverability					
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?		
Technically feasible from a transport investment perspective, although challenges around co-ordination with other partner agencies regarding implementation of other services/facilities	General public support, but some vocal minority opposition	Yes	N/A (deliverable by local partners)		

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q620mph zones and road safety improvements	
<b>Description</b> Introduce new or expanded 20mph schemes with associated road safety improvements	
Potential reduction of regional car-km	Modest (<1%)
<b>Assumptions and calculations</b> This option assumes that 20mph zones would be introduced on appropriate roads in cities, towns and villages throughout the region (typically residential streets and those in neighbourhood centres and near other key trip generators where there are high levels of pedestrian activity). A 2% reduction in car-km is estimated to have arisen in Edinburgh following the widespread adoption of 20mph zones there <sup>59</sup> . Given that no significant effect on rural car use may be expected, a smaller net effect on traffic in the Tactran region is to be expected. Given that less than half of car-km in the region has either an origin or destination in a town (Table 2), this option is forecast in its own right to reduce net regional car-km by <1%. However, reducing road danger is an important enabler of active travel uptake for some people, so 20mph zones are likely to have a role in achieving modal shift to active travel (the effects on car-km of which are addressed by option Q2).	
<b>Estimated proportional implementability by 2030</b> <b>High impact scenario:</b> it is estimated that a maximum of a half of the investment required to provide 20mph zones and road safety improvements in all relevant locations in the region could be delivered by 2030 <b>Low impact scenario:</b> it is estimated that a business-as-usual scenario would delivery around a fifth of the investment required to delivery 20mph zones and road safety improvements in all relevant locations in the region	
Likely effect by journey length	Likely effect by journey purpose
	

<sup>59</sup> <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0261383#:~:text=Twelve%20months%20after%20a%2020mph,of%20overall%20speeds%20also%20shifted>

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

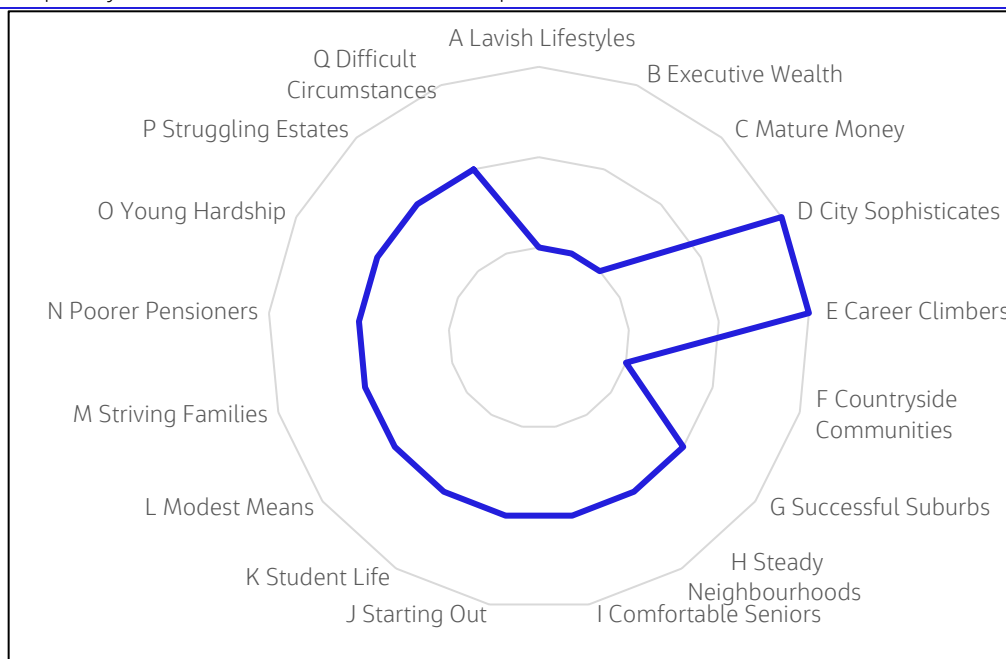
### Option Q6 20mph zones and road safety improvements

Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	3	1	1	1	1	1
	Other urban	1	3	1	1	1	1
	Acc small towns	1	1	3	1	1	1
	Remote small towns	1	1	1	2	1	1
	Acc rural	1	1	1	1	1	1
	Remote rural	1	1	1	1	1	1

### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects



Will only affect those people who are travelling within areas covered by schemes.  
Will benefit households whose members walk, wheel or cycle by creating safer environments for them to do so; with particular benefits for households with younger people and families, older people and disabled people.

### Other effects

Supports wider objectives for healthy, inclusive transport, and placemaking  
Supports delivery of Scotland's Road Safety Framework to 2030

### Potential cost

Capital	Revenue
Implementation costs for a network of 20mph schemes in urban areas are likely to be significant, with a capital cost estimated to be in the range of £1 – 3 million (data extrapolated from STPR2). Complementary physical measures alongside the 20mph zone would result in additional costs; net costs of £5 – 10 million are anticipated.	Not quantified, but moderate revenue funding required to ensure infrastructure and services are maintained/delivered to high standard, and for traffic speed enforcement

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q6 20mph zones and road safety improvements			
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	General public support	Yes, using existing TRO powers	N/A (deliverable by local partners)



## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option Q7

### Increased use of home deliveries/lockers

#### Description

Increased use of home deliveries and local delivery lockers/points to reduce the need for car use to access goods

#### Potential reduction of regional car-km

Negligible (~0%)

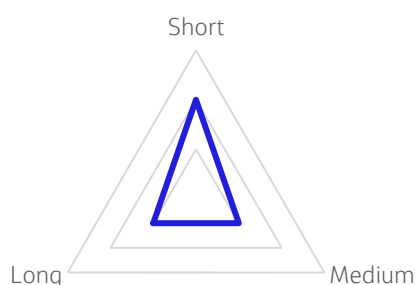
#### Assumptions and calculations

This option would promote increased use of home deliveries. This has the potential for more efficient vehicle use for people to access goods than them all using their own cars.

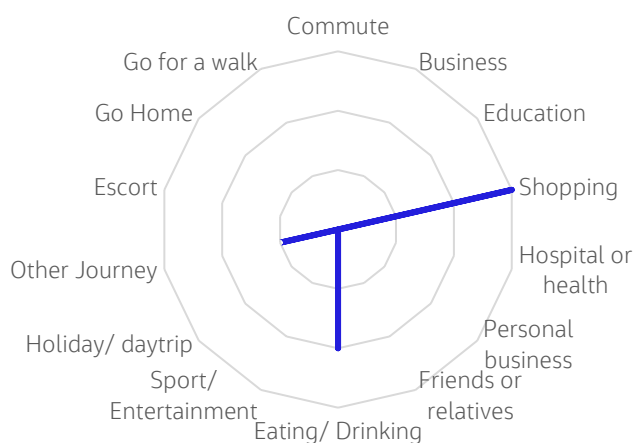
However, evidence from covid bounceback<sup>60</sup> has indicated that any reductions in car trips generated from reduced travel to access goods and services is largely compensated by increases in car use for other journey purposes (though the impact on typical trip lengths remains unclear). Furthermore, there is potential for a proportion of any car mileage saved to be replaced by increased delivery vehicle mileage.

We therefore see no reliable evidence that increased use of home deliveries/lockers will lead to an appreciable reduction in car-km, so despite significant uncertainty in this forecast, we predict a central case of no change.

#### Likely effect by journey length



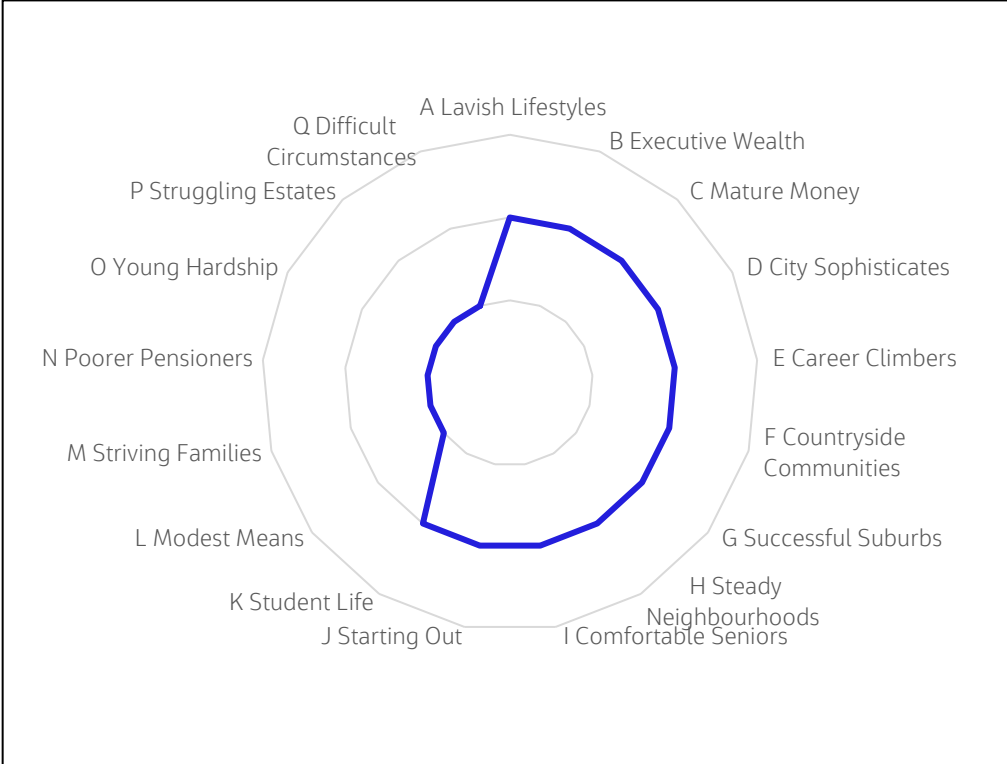
#### Likely effect by journey purpose



Effect by urban-rural class		To						
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural	
From	Large urban	2	2	2	2	2	2	2
	Other urban	2	2	2	2	2	2	2
	Acc small towns	2	2	2	2	2	2	2
	Remote small towns	2	2	2	2	2	2	2
	Acc rural	2	2	2	2	2	2	2
	Remote rural	2	2	2	2	2	2	2

<sup>60</sup> Including Transport Scotland's Covid travel trend data: <https://www.transport.gov.scot/publication/covid-19-transport-trend-data-30-august-5-september-2021/>

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q7		Increased use of home deliveries/lockers	
Likely effect by persona			
Propensity to reduce car use as a result of this option		Potential effects	
		<p>This option is potentially more relevant to higher-income households, who have a greater disposable income and internet access to shop online, and already have well-established online shopping habits, albeit that recent US evidence suggests increasing use of home deliveries by people on low incomes<sup>61</sup>. The availability of delivery lockers may be limited in many rural and semi-rural areas.</p>	
Potential cost			
Capital		Revenue	
N/A		May require on-going revenue support if improved service provision is required	
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	May be difficult to justify use of public funds, given potential modest benefits	Yes	N/A (deliverable by regional partners)

<sup>61</sup> <https://nielseniq.com/global/en/insights/analysis/2021/low-income-shoppers-present-a-unique-omnichannel-opportunity-in-beauty-and-personal-care>

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option Q8

### Broadband improvements

#### Description

Extend superfast broadband to 100% of premises across the region

#### Potential reduction of regional car-km

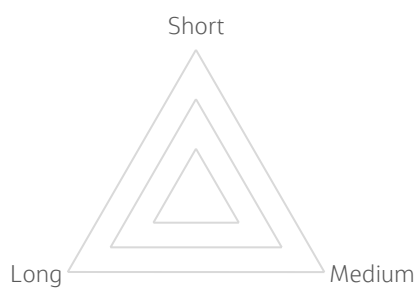
Negligible (~0%)

#### Assumptions and calculations

This option assumes that superfast broadband is available throughout the region, with the hope that some journeys are replaced by electronic communications.

It is expected to have almost no impact on car-km reduction in the region. Evidence from covid bounceback<sup>62</sup> and UK broadband study has indicated that any reductions in car-km generated from, for example, increased home working, is largely compensated by increases in car use for other journey purposes. We therefore see no reliable evidence that broadband improvements will lead to an appreciable reduction in car-km.

#### Likely effect by journey length



#### Likely effect by journey purpose



Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	0	0	0	0	0	0
	Other urban	0	0	0	0	0	0
	Acc small towns	0	0	0	0	0	0
	Remote small towns	0	0	0	0	0	0
	Acc rural	0	0	0	0	0	0
	Remote rural	0	0	0	0	0	0

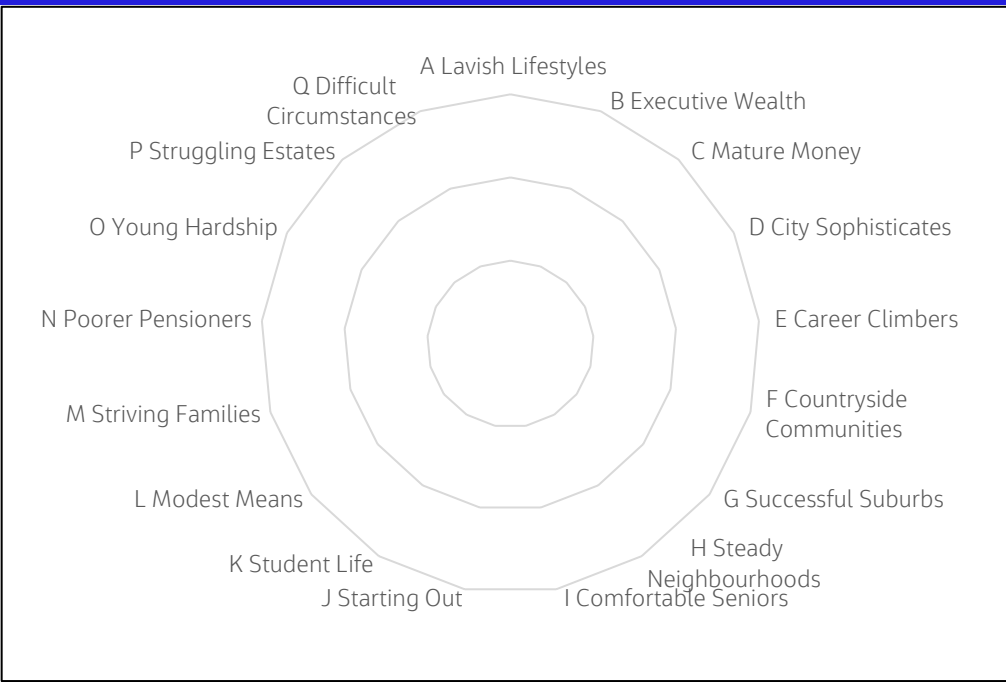
#### Likely effect by persona

Propensity to reduce car use as a result of this option

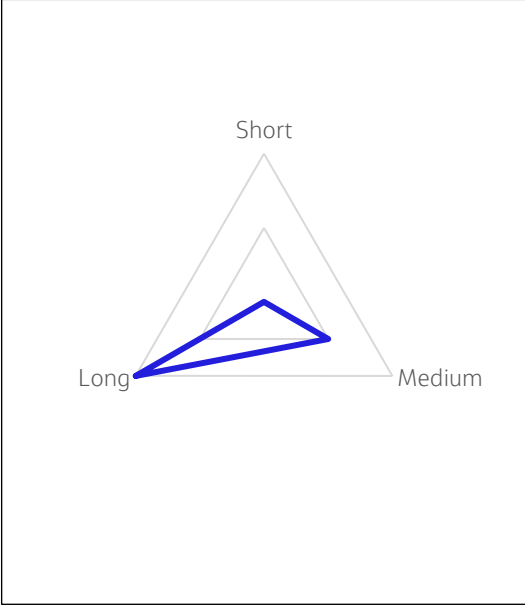
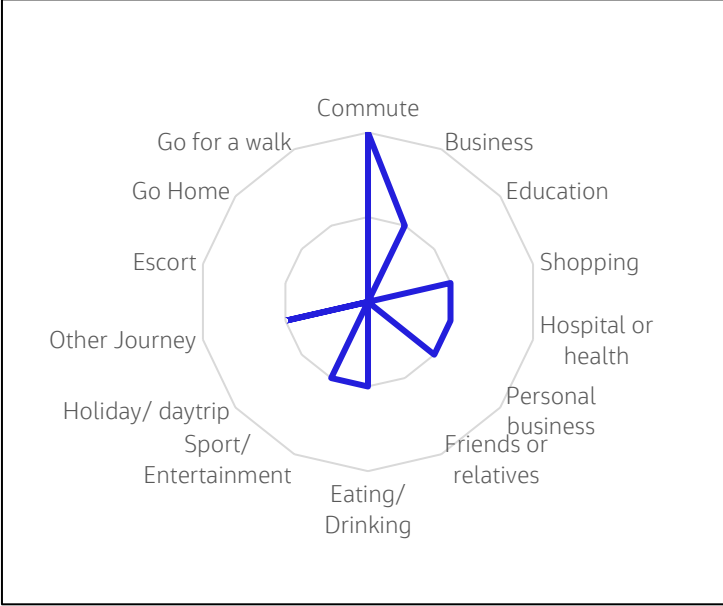
Potential effects

<sup>62</sup> Including Transport Scotland's Covid travel trend data: <https://www.transport.gov.scot/publication/covid-19-transport-trend-data-30-august-5-september-2021/>

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q8		Broadband improvements		
		Would only affect those people who depend on use of the internet, and largely for work or business purposes. This would be relevant only to those households whose type of employment or business means they can work from home, and who use a car, however evidence suggests that increased car use for other purposes may result. Households that require to travel for employment or business, or who do not have access to a car would be unaffected.		
Other effects				
Supports broader objectives for improving digital connectivity across Scotland				
Potential cost				
Capital		Revenue		
Potentially substantial, though largely already committed		Assumed to be zero, as increased revenue costs covered by user charges		
Deliverability				
Technical feasibility		Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible		High levels of public support	No	No – connectivity is reserved to UK Government, and dependent on private sector investment

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option Q9		Park & ride/choose improvements
<b>Description</b> More, higher capacity or improved park & ride/choose sites and services, such that it is easier to interchange from car to more sustainable modes. Sites could either be focussed on local journeys (typically facilitating transfer from car to bus for journeys into urban centres) and/or strategic journeys (for transfer from car to rail/coach for longer trips).		
Potential reduction of regional car-km		Modest (<1%)
<b>Assumptions and calculations</b> There is evidence that local park & ride/choose sites, while they can be effective at reducing traffic levels in congested urban centres, tend to increase net car-km <sup>63</sup> . Strategic park & ride/choose sites can, however, be effective at reducing net car-km. Recent work for Tactran into options for a strategic park & ride near Stirling has generated forecasts of a net saving in vehicle-km of up to 650,000 per annum. If ten such sites were delivered across the region, and they all delivered this level of saving, then a net saving of 6.5 million car-km would be realised p.a. This may make an appreciable difference to car traffic levels on some routes, but the overall saving is less than one fifth of one percent of the 4,500 million regional car-km, so we forecast that no significant overall change would occur.		
<b>Estimated proportional implementability by 2030</b> <b>High impact scenario:</b> it is estimated that a maximum of a half of the potential investment required to deliver park & ride/choose facilities throughout the region could be delivered by 2030 <b>Low impact scenario:</b> it is estimated that a business-as-usual scenario would deliver one tenth of the potential investment required to deliver park & ride/choose facilities throughout the region by 2030		
Likely effect by journey length		Likely effect by journey purpose
		

<sup>63</sup> E.g. Parkhurst, G., Meek, S. (2014). The Effectiveness of Park-and-Ride as a Policy Measure for more Sustainable Mobility. Chapter 9 in Ison, S. & Mulley, C. (Eds) Parking Issues and Policies. Emerald, 185-211. <https://uwe-repository.worktribe.com/output/825928/the-effectiveness-of-park-and-ride-as-a-policy-measure-for-more-sustainable-mobility>

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option Q9

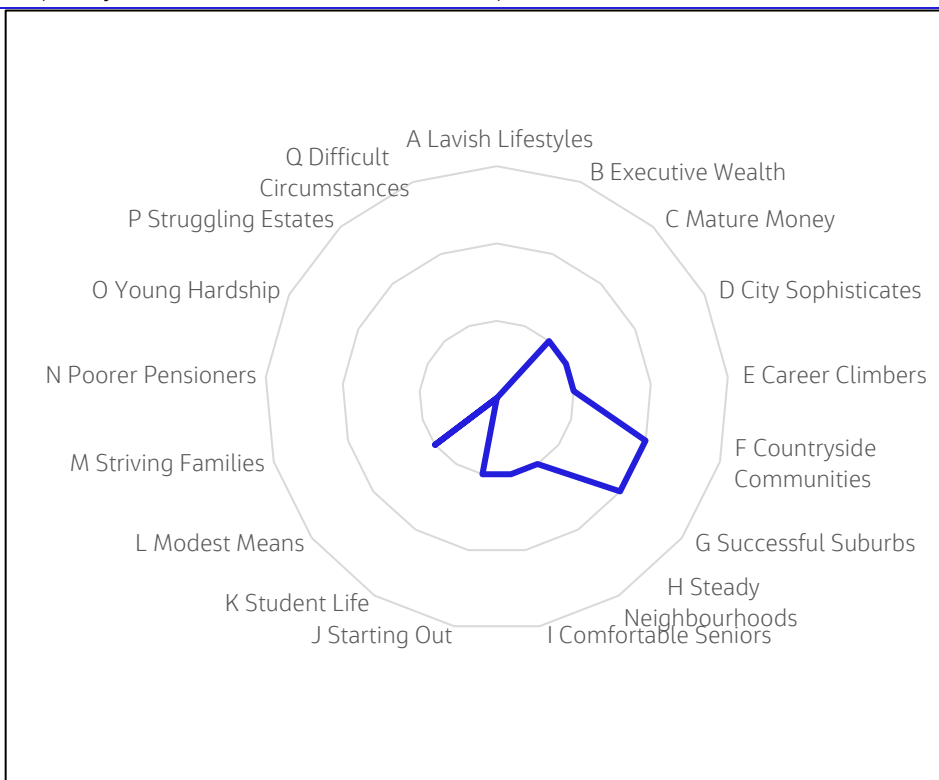
### Park & ride/choose improvements

Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	1	0	0	0	0	0
	Other urban	2	0	0	0	0	0
	Acc small towns	2	0	0	0	0	0
	Remote small towns	2	0	0	0	0	0
	Acc rural	2	0	0	0	0	0
	Remote rural	2	0	0	0	0	0

### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects



Likely to be of most relevance to people on low/middle incomes, and that regularly travel either into major urban areas or on strategic corridors.

### Potential cost

#### Capital

Potentially significant capital costs for the development of new facilities

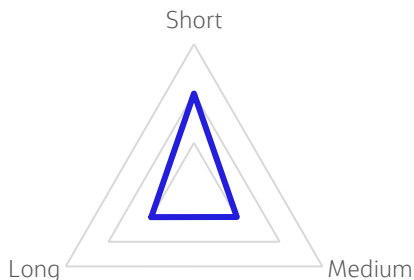

#### Revenue

Some revenue funding may be required to maintain high quality transport services from the sites

### Deliverability

Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	General public support	No (reserved to UK Government)	No (reserved to UK Government)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option E1 Sustainable travel marketing	
<b>Description</b> A range of marketing, promotion and communications activities to raise awareness of and encourage uptake of sustainable travel choices (including active travel, public transport and car sharing) in preference to car use	
<b>Potential reduction of regional car-km</b> ~4%	
<b>Assumptions and calculations</b> This option could provide encouragement for people to reduce their car use. However, the potential for this to result in a long-term reduction is debatable as behaviours wane over time and there is a need for ongoing investment in activities, not least because around one third of the population experience a change in circumstances that could affect travel behaviour each year <sup>64</sup> . Research suggests that behaviour change initiatives can typically reduce car use by 8-18% <sup>65</sup> . Given that these initiatives typically include interventions beyond only marketing (such as incentives to use public transport or active travel, and which are part of other interventions considered in this review), we assume a maximum effect at the lower end of this scale, and also that effects are likely to diminish over time, even if ongoing activities are promoted to all car drivers in the region. A net effect on regional car-km of 4% is therefore predicted.	
Likely effect by journey length	Likely effect by journey purpose
	

<sup>64</sup> Going Smarter: the effects of the Smarter Choices, Smarter Places programme, Transport Scotland, 2013

<sup>65</sup> Department for Transport, TAG Unit M5.2: Modelling Smarter Choices, 2014, suggests initiatives deliver a typical reduction in car use of 8 – 18% [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/938915/tag-m5-2-modelling-smarter-choices.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938915/tag-m5-2-modelling-smarter-choices.pdf)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option E1		Sustainable travel marketing					
Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	2	2	1	1	1	1
	Other urban	2	2	1	1	1	1
	Acc small towns	2	2	1	1	1	1
	Remote small towns	1	1	1	1	1	1
	Acc rural	1	1	1	1	1	1
	Remote rural	1	1	1	1	1	1

Likely effect by persona	
Propensity to reduce car use as a result of this option	Potential effects
	<p>Some households more than others will be influenced by messages delivered through marketing activities, such as saving money through reduced car use. This will exclude those households at the upper and lower ends of the income scale; as either car ownership is not a financial concern, or because car ownership and use is already low. Will also largely benefit those households for which there are high quality, available transport alternatives to promote, which is more likely to be for those living in urban and suburban areas</p>

Other effects	
<p>Supports a broad range of investment in transport infrastructure, services and facilities by encouraging their use</p> <p>Supports other areas of public Government activity to promote healthier, low carbon lifestyles, and inclusive communities</p>	

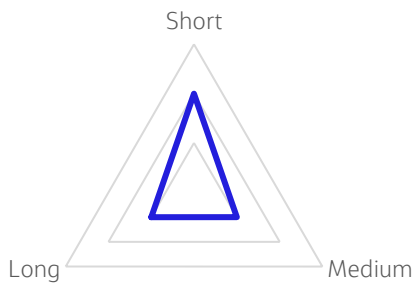

Potential cost	
Capital	Revenue
N/A	<p>Revenue-funded Activities within this option will largely be considered as revenue funded. Programmes in the region have suggested that investment of around £30/person is reasonable to elicit significant travel changes. Repeated intervention is required if changes are to be sustained, with an estimate of action every three years being reasonable. Applying this to the region's</p>



Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option E1		Sustainable travel marketing	
		population of 510,000 therefore suggests a revenue funding requirement of around £5M per annum.	
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	General public support	Yes	Yes, SG could lead on delivery of some activities

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option E2		Travel planning
<b>Description</b> Travel planning activities targeted at workplaces, education and other key trip generators		
<b>Potential reduction of regional car-km</b> ~2%		
<b>Assumptions and calculations</b> This option could provide encouragement for people to reduce their car use, and assumes that travel planning measures are promoted at employment, healthcare and education facilities (community-based travel planning activities are assumed to be covered by option E1). However, the potential for this to result in a long-term reduction is debatable as behaviours wane over time and there is a need for ongoing investment in activities, not least because around one third of the population experience a change in circumstances that could affect travel behaviour each year <sup>66</sup> . An estimated 8%-18% reduction in car use (of number of journeys and car-km) for journeys to work and education could be achieved <sup>67</sup> , but the lower estimate is considered more likely to be representative of a potential on-going reduction. Journeys for commute and education currently account for 29% of car-km (Figure 6), and we estimate from the data in Table 7 that hospital/health journeys are another 2% of car-km. 31% of car-km may therefore be in scope for travel planning activity. If so a net reduction of around 2% (= 31% x 8%) of regional car-km could be expected from implementation of this option.		
Likely effect by journey length		Likely effect by journey purpose
		

<sup>66</sup> Going Smarter: the effects of the Smarter Choices, Smarter Places programme, Transport Scotland, 2013

<sup>67</sup> Department for Transport, TAG Unit M5.2: Modelling Smarter Choices, 2014, suggests initiatives deliver a typical reduction in car use of 8 – 18%

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/938915/tag-m5-2-modelling-smarter-choices.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938915/tag-m5-2-modelling-smarter-choices.pdf)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option E2		Travel planning					
Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	2	2	1	1	1	1
	Other urban	2	2	1	1	1	1
	Acc small towns	2	2	1	1	1	1
	Remote small towns	0	0	0	0	0	0
	Acc rural	0	0	0	0	0	0
	Remote rural	0	0	0	0	0	0

Likely effect by persona	
Propensity to reduce car use as a result of this option	Potential effects
	<p>Some households more than others will be influenced by messages/activities delivered through travel planning, such as saving money through reduced car use. This would exclude those households at the upper and lower ends of the income scale; as either car ownership is not a financial concern, or because car ownership and use is already low.</p> <p>Travel planning will be more relevant to those households making journeys to work and education and for which there are high quality, available transport alternatives to promote. This is more likely to be for journeys to and within urban and suburban areas.</p>

Other effects	
Supports a broad range of investment in transport infrastructure, services and facilities by encouraging their use	
Potential cost	
Capital	Revenue
Modest capital costs associated with infrastructure, e.g. cycle parking, signage, showers/lockers, etc	Substantial revenue costs for delivery of activities and events

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option E2			
Travel planning			
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	General public support	Yes	N/A (deliverable by local partners)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option E3

### Car-use minimising development plans

#### Description

For all new developments in the region to be designed so as to achieve minimum levels of car use, in line with best practice of developments elsewhere

Potential reduction of regional car-km ~1%

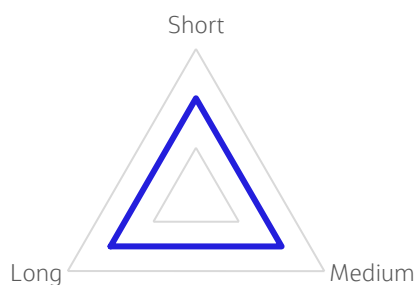
#### Assumptions and calculations

This option assumes that all new housing and other developments in the region would be sited and designed so as to achieve levels of car use that are in line with those of the most sustainable developments elsewhere, with none being in locations that encourage high car dependency.

Local development plans suggest that a net increase in the number of households in the region is expected by 2030. Without transport policy intervention, it is assumed that these new households would therefore increase net car-km in the region by 2% (Table 9).

If this option was to be successful in halving the traffic effects of new developments, the assumed 2% growth in car-km as a result of new developments would be reduced to 1%: a net saving as a result of the interventions of 1%.

#### Likely effect by journey length



#### Likely effect by journey purpose



Effect by urban-rural class		To						
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural	
From	Large urban	2	2	2	2	1	1	
	Other urban	2	2	2	2	1	1	
	Acc small towns	2	2	2	2	1	1	
	Remote small towns	2	2	2	2	1	1	
	Acc rural	1	1	1	1	1	1	
	Remote rural	1	1	1	1	1	1	

#### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option E3		Car-use minimising development plans	
		<p>This option will affect only those people resident in, or travelling to, new developments. Will likely benefit middle- and lower-income households who would welcome reducing costs associated with car ownership. Would also benefit households with residents who do not have access to a car, through age, income or health, by enabling improved access to local opportunities and services.</p>	
Other effects			
Supports wider objectives for healthy, inclusive transport, and placemaking			
Potential cost			
Capital		Revenue	
Development requirements that are not closely aligned to market needs may reduce potential for capital receipts to local authorities from developers		Negligible impact	
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	Low-car use developments may not accord with development market needs	Yes, subject to market needs and commercial interests	N/A (deliverable by local partners)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option E4

### Expanding Mobility as a Service (MaaS)

#### Description

Expand the availability of the ENABLE MaaS platform across the region, to encourage more residents to plan, book and pay for travel using a range of sustainable transport choices

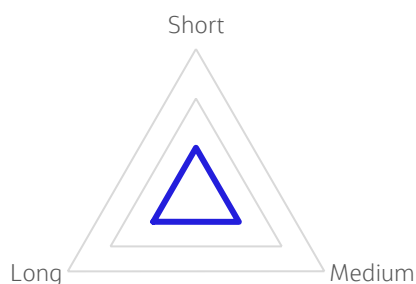
Potential reduction of regional car-km ~1%

#### Assumptions and calculations

MaaS can be an enabler of change in travel behaviour for some people, supporting a switch to active and public transport. This option would roll-out the current ENABLE pilot scheme across more of the region, and to be applicable to a larger proportion of journeys. It is assumed that roll-out would be prioritised for urban, suburban and more accessible areas, where provision of sustainable travel options is typically better.

Until the evaluation of the ENABLE pilot, and other MaaS Investment Fund pilot schemes, are reported, robust evidence of the effects of MaaS is limited; until then, only a small reduction in car-km as a direct result of MaaS is assumed, although there are benefits for improved availability and awareness of information on transport alternatives.

#### Likely effect by journey length



#### Likely effect by journey purpose



Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	1	1	1	0	0	0
	Other urban	1	1	1	0	0	0
	Acc small towns	1	1	1	0	0	0
	Remote small towns	0	0	0	0	0	0
	Acc rural	0	0	0	0	0	0
	Remote rural	0	0	0	0	0	0

#### Likely effect by persona

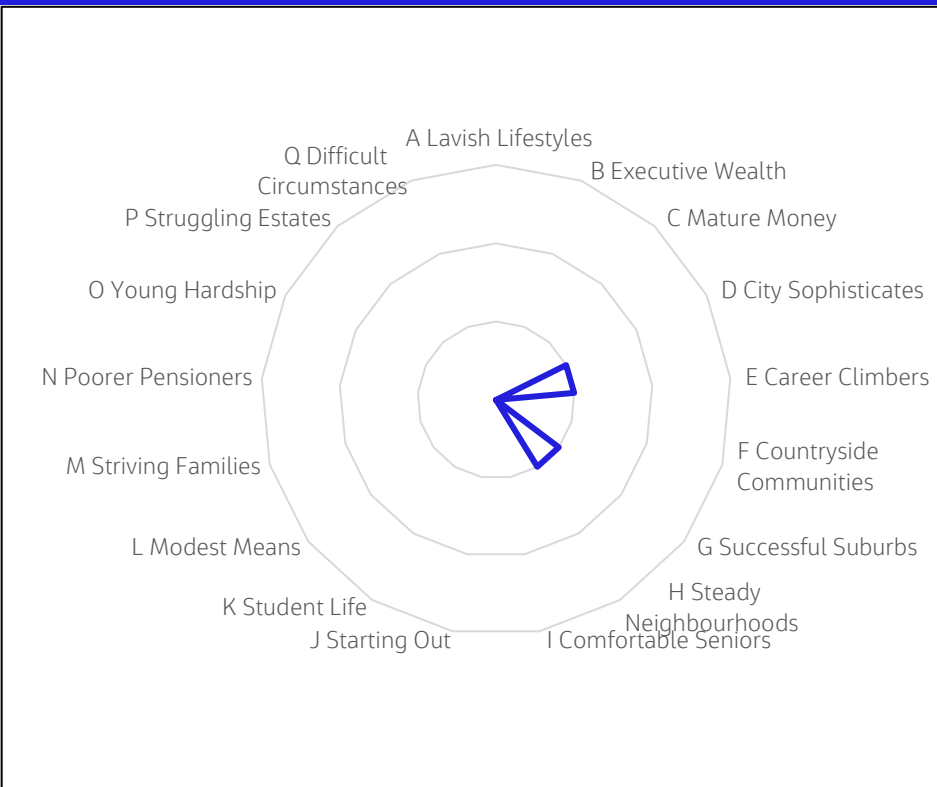
Propensity to reduce car use as a result of this option

Potential effects

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option E4

Expanding Mobility as a Service (MaaS)



MaaS is likely to be most attractive to users on middle incomes: those with the highest incomes may be less incentivised to reduce car use, and those on low incomes likely to have less need to consider full range of alternatives due to lower baseline car use.

Likely to benefit those who live in or to travel to urban areas where service provision, and hence opportunities to promote greater range of options, is better.

MaaS would be used as one potential tool in broader travel planning/marketing activities, and so some households more than others may respond better to these initiatives.

Potential cost

Capital	Revenue
Modest capital investment required; MaaS platform already exists in the region, and potential to share costs with neighbouring regions	Modest revenue investment required for maintenance of platform and for promotion of MaaS across the region

Deliverability

Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	Publicly acceptable	Yes	Yes (due to funding of MaaS)



## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option E5

### Incentivising reduced car use

#### Description

People are incentivised to reduce the number of car-km they drive

#### Potential reduction of regional car-km

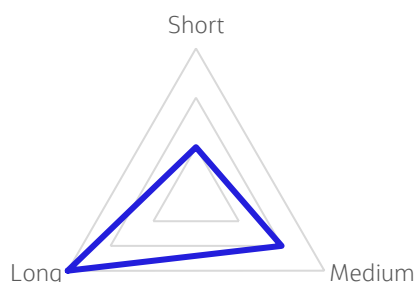
Negligible (~0%)

#### Assumptions and calculations

This option could provide financial or other incentives for people to reduce their car use, with a potential option to provide increased payments for a greater proportional reduction in car-km for those that currently drive the most. However, the potential for this to result in a long-term reduction is debatable (as to provide on-going payments for car use below a one-off baseline is unfeasible) and, as such, a workable scheme that will have a long-term effect on car use has not been identified. Any initiatives which would provide on-going work to promote other modes (including potential public transport fares offers) would be covered by other options, including Q1 and E1.

No long-term reduction in regional car-km is therefore claimed as a result of incentives to reduce car use.

#### Likely effect by journey length



#### Likely effect by journey purpose



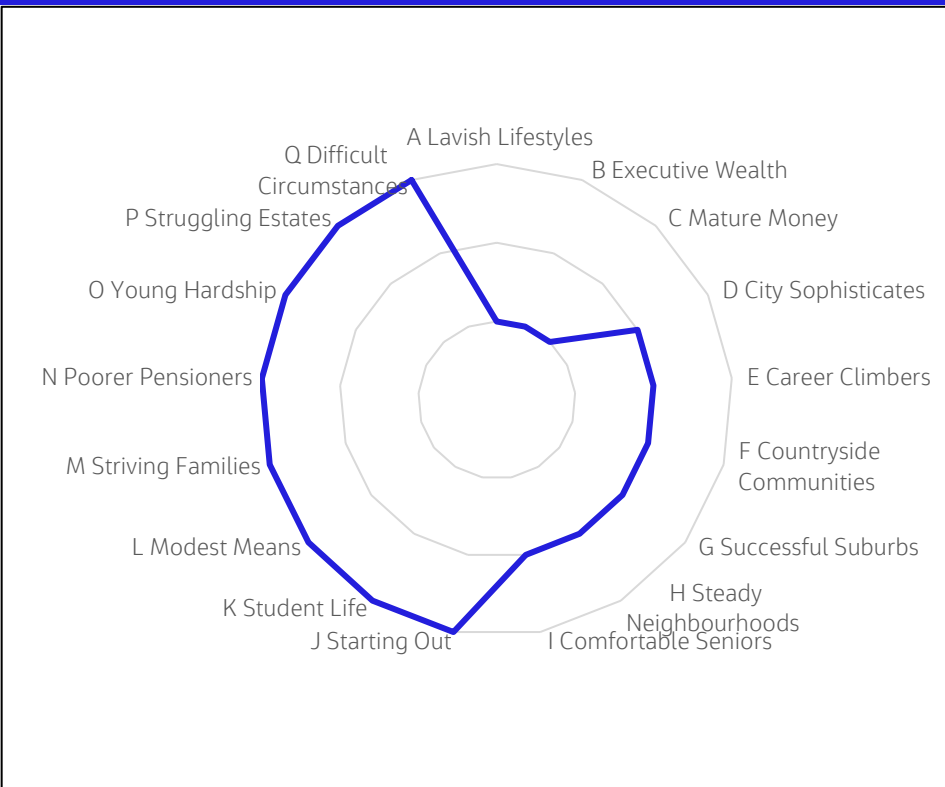
Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	1	2	2	3	3	3
	Other urban	2	1	2	3	3	3
	Acc small towns	2	2	2	3	3	3
	Remote small towns	3	3	3	3	3	3
	Acc rural	3	3	3	3	3	3
	Remote rural	3	3	3	3	3	3

#### Likely effect by persona

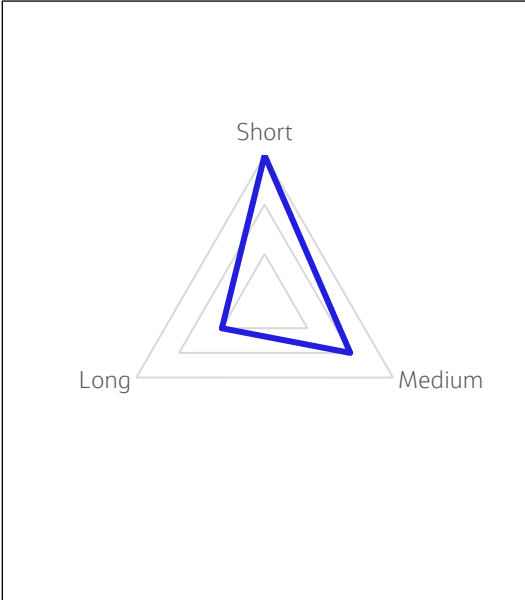
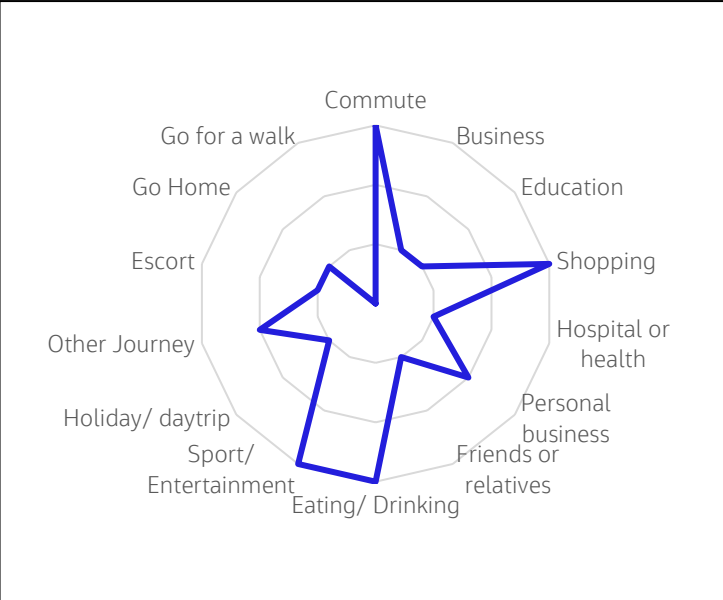
Propensity to reduce car use as a result of this option

Potential effects

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option E5		Incentivising reduced car use					
		<p>Any scheme which provides financial incentives may be more appealing to people on middle and lower incomes. Given those lower-income households have a lower baseline car use, however, their potential to benefit from the scheme is reduced. Middle income households whose car ownership and use could form a significant proportion of household outgoings are more likely to respond.</p> <p>There will be many households, such as those in rural areas, who have limited opportunity to reduce their car-km as they are reliant on a car to access essential services and opportunities.</p>					
Potential cost							
Capital		Revenue					
Capital cost of implementation of the scheme would be minimal		Substantial on-going revenue funding would be required in order to provide continued incentives					
Deliverability							
Technical feasibility		Public acceptability		Deliverable by regional partners?		Deliverable by Scottish Government?	
Not considered to be technically feasible on a fair and consistent basis		Potential for unpopularity due in part to lack of comprehension of the scheme		Only on a voluntary basis		Only on a voluntary basis	

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-LA1		Increased parking charges and controls
<b>Description</b> The introduction of/increase in parking charges and expansion of parking controls (e.g. CPZs)		
<b>Potential reduction of regional car-km</b>		~4%
<b>Assumptions and calculations</b> This option would increase extant parking charges, introduce them in locations where there are currently none, and also increase regulation of parking, all in order to deter car use. Given that charges can only effectively be enforced in locations where parking is controllable, it is assumed that this option would only be applicable in the region's urban areas but that, through a combination of off- and on- street charges (including Controlled Parking Zones in urban areas, but excluding any mandatory charges for parking on private land) then many journeys in the region would be affected. Currently, around 57% of car-km in the region are to class 1, 2 or 3 urban areas (Table 2). It is assumed that one-quarter of these journeys are to locations which could be subject to increased charges/control. Journeys comprising 14% (= 57% x 25%) of regional car-km would therefore be affected. Elasticity of parking demand with respect to price is typically estimated to be around -0.3 <sup>68</sup> , extrapolation of which could suggest that substantial increases in parking price/controls such that overall charges are doubled, could reduce traffic to these charged/controlled locations by around 30%. A net effect of around 4% of regional car-km could therefore be anticipated (= 14% x 30%). Differing levels of parking control/pricing or their application to more or fewer areas could result in different levels of impact on regional car-km.		
Likely effect by journey length		Likely effect by journey purpose
		

<sup>68</sup> [https://eprints.whiterose.ac.uk/2023/2/ITS15\\_The\\_evidence\\_base\\_for\\_parking\\_policies\\_UPLOADABLE.pdf](https://eprints.whiterose.ac.uk/2023/2/ITS15_The_evidence_base_for_parking_policies_UPLOADABLE.pdf)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option D-LA1

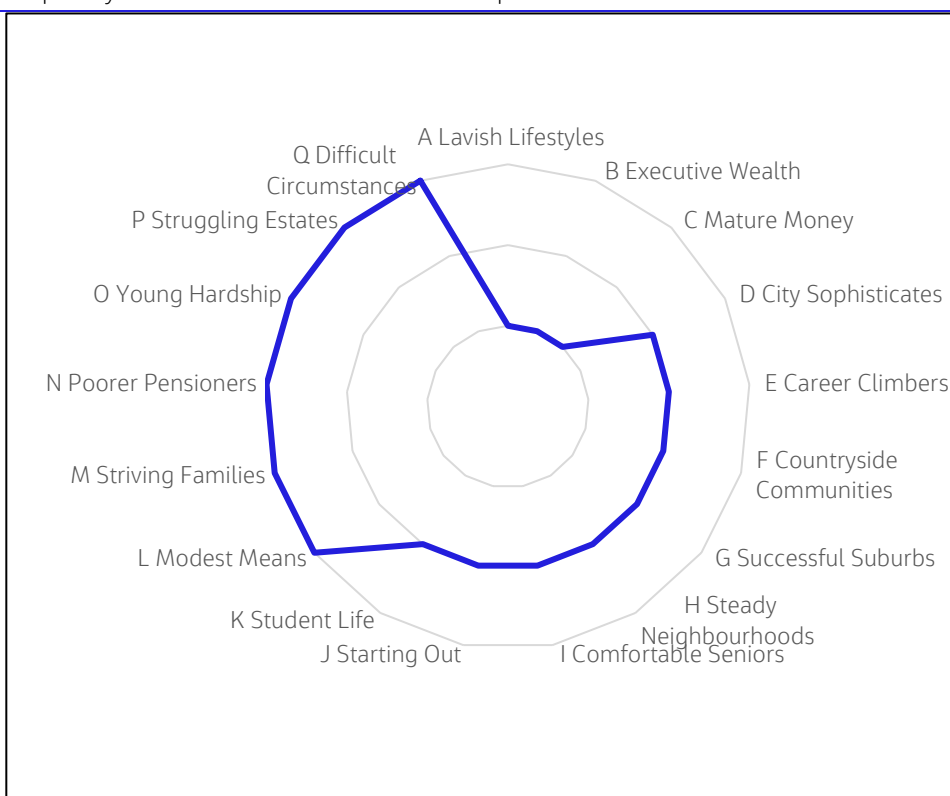
### Increased parking charges and controls

Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	3	2	2	1	0	0
	Other urban	3	2	2	1	0	0
	Acc small towns	3	2	2	1	0	0
	Remote small towns	3	2	3	1	0	0
	Acc rural	3	2	3	1	0	0
	Remote rural	3	2	3	1	0	0

### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects



People that live in or frequently travel to urban areas are likely to be affected more.  
People on lower incomes are likely to be more sensitive to price-based changes; particularly as car ownership and use already forms a significant part of household financial spend. This may impact on their ability to access employment and other essential opportunities. Households on higher incomes will largely be unaffected by fiscal controls.

### Other effects

City/town centre only charges may undermine effects to promote urban vitality

### Potential cost

Capital	Revenue
Modest capital costs	Likely to provide some on-going revenue stream for implementing authorities

### Deliverability

Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
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Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-LA1		Increased parking charges and controls	
Technically feasible	Likely to face significant public opposition	Yes	N/A (deliverable by regional partners)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option D-LA2

### Workplace parking levy

#### Description

Introduction of workplace parking levies (WPL)

Potential reduction of regional car-km ~3%

#### Assumptions and calculations

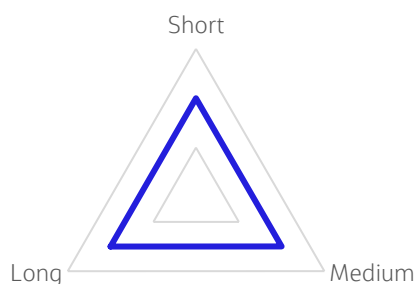
This option would introduce WPL at every workplace in the region which provides off-street parking, including at public sector employers. The effect on car use would depend on the level of the charge and the number of workplaces that it is applied to.

Other WPL schemes have led to an 8-25% reduction in car commuters<sup>69</sup>, and of the number of car-km commuted.

25% of car-km in the region are for commuting (Figure 6).

If WPL was able to be applied to all workplaces in the region, but assuming that only two-thirds of commuters park in a workplace car park, and taking a central estimate of the scheme reducing car mileage to work by 16% (midway between the 8 and 25% reductions suggested above), then the net reduction in car-km in the region would be around 3% (= 16% x 25% x 2/3).

#### Likely effect by journey length



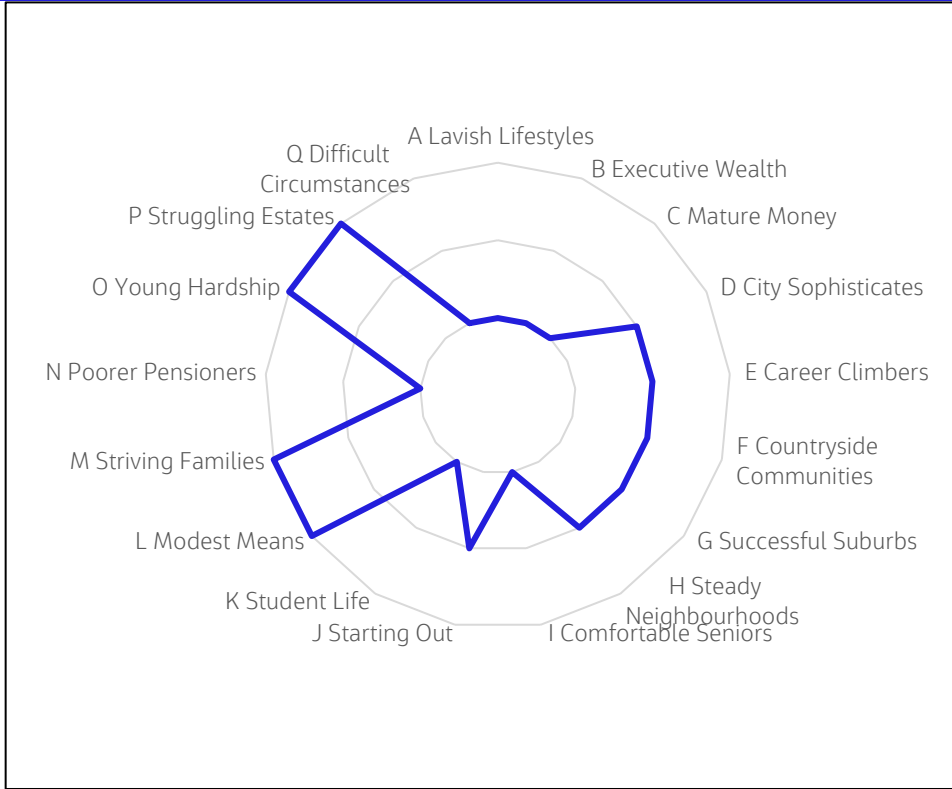
#### Likely effect by journey purpose



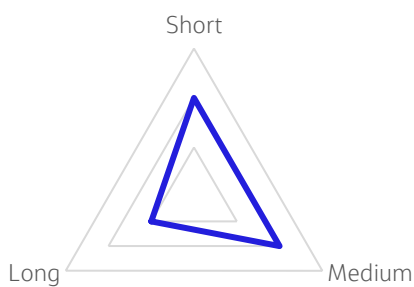

Effect by urban-rural class		To						
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural	
From	Large urban	3	2	2	1	0	0	
	Other urban	3	2	2	1	0	0	
	Acc small towns	3	2	2	1	0	0	
	Remote small towns	3	2	3	1	0	0	
	Acc rural	3	2	3	1	0	0	
	Remote rural	3	2	3	1	0	0	

<sup>69</sup> <https://theconversation.com/12-best-ways-to-get-cars-out-of-cities-ranked-by-new-research-180642>

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-LA2		Workplace parking levy			
Likely effect by persona					
Propensity to reduce car use as a result of this option		Potential effects			
		<p>This option would only affect people that travel to work. Likely to have a greater effect on working people with lower incomes whose car ownership and use will already be a significant financial burden. Opportunities to reduce car use will be dependent on availability of transport alternatives, which are likely to be better for those travelling from urban and suburban areas.</p>			
Other effects					
Likely to have the most significant effect on workers that have no alternative options for travel to work					
Potential cost					
Capital		Revenue			
Some capital cost for scheme implementation, which could be recouped from charges paid		Likely to provide some on-going revenue stream for implementing authorities			
Deliverability					
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?		
Technically feasible, though challenging to implement at workplaces where the number of available spaces is difficult to define	Likely to face significant public opposition	Yes	N/A (deliverable by regional partners)		

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-LA3		Road pricing: cordon based
<b>Description</b>		
Cordon-based road pricing schemes are introduced to discourage car use		
<b>Potential reduction of regional car-km</b>		~3%
<b>Assumptions and calculations</b>		
<p>This option would introduce cordon-based road pricing schemes for cars, such that a payment is needed to enter a specified area. For the purposes of this assessment, it is assumed that a charge is made to drive into the urban areas of any of the region's three cities from outside them.</p> <p>When it was first introduced in 2003 (with a £5 charge), London's congestion charge scheme led to a 33% reduction in number of chargeable cars entering the zone<sup>70</sup> (though the reduction in vehicle-km within the zone was smaller because vehicles already inside were not charged).</p> <p>41.4% of all car-km in the region are to the region's 'large' or 'other' urban areas (Table 2).</p> <p>6.3% of these are from areas with the same urban rural classification. Unfortunately, the data does not distinguish between which of those are within the same urban area (so could be within any new cordon) or between them (so would be subject to any charge).</p> <p>However, we know that the number of journeys made between the urban areas will be much smaller than the numbers staying within them (as suggested by average trip lengths, see Table 3), but that the average trip length of the inter-urban journeys is much greater than for intra-urban ones.</p> <p>If we therefore assume that half of the 6.3% of car-km is between the urban areas, then a total of 38.2% [= 41.4% - (6.3% / 2)] of car-km is to the region's 'large' or 'other' urban areas from outside them.</p> <p>If we assume that the cordons of the road pricing scheme in the region were set such that half of these car-km would be affected (i.e. would pass one of the cordon boundaries), then car journeys comprising around 19% of all car-km would be affected.</p> <p>If, then, the 33% reduction in traffic entering the cordon observed in London was realised by the scheme, it is therefore estimated that journeys comprising around 6% (= 19% x 33%) of regional car-km would therefore stop entering cities. However, some of the car-km for these journeys will remain (as people react to the charge by driving to other locations, or to park &amp; ride/choose sites), so the 6% of journeys affected would not lead to a 6% reduction in regional car-km.</p> <p>If half of the potential 6% of car-km would be retained in this way, a net saving of around 3% in regional car-km would result.</p>		
Likely effect by journey length		Likely effect by journey purpose
		

<sup>70</sup> <https://content.tfl.gov.uk/demand-elasticities-for-car-trips-to-central-london.pdf>



## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option D-LA3

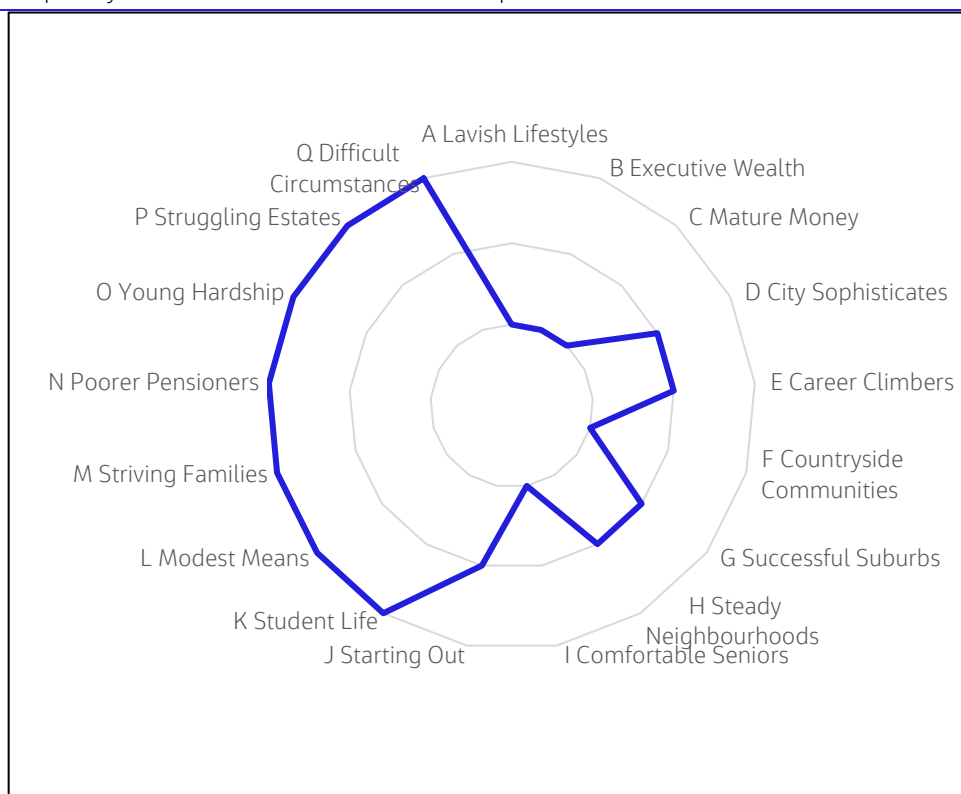
### Road pricing: cordon based

Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	2	2	2	2	2	2
	Other urban	3	3	2	2	2	2
	Acc small towns	3	3	0	0	0	0
	Remote small towns	3	3	0	0	0	0
	Acc rural	3	3	0	0	0	0
	Remote rural	3	3	0	0	0	0

### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects



This option would have greatest impact on those people that live in or travel to the region's cities often. Any charge-based option is likely to have a lower impact on households with higher incomes, as they will be largely unaffected by fiscal controls. However, it could have a substantial impact on lower-income households who rely on a car and need to make frequent journeys to cities for employment or other essential purposes.

### Other effects

Likely to be contrary to policies to promote city centre vitality

### Potential cost

#### Capital

Significant capital cost for scheme implementation, which could be recouped from charges paid

#### Revenue

Likely to provide some on-going revenue stream for implementing authorities

### Deliverability

#### Technical feasibility

#### Public acceptability

#### Deliverable by regional partners?

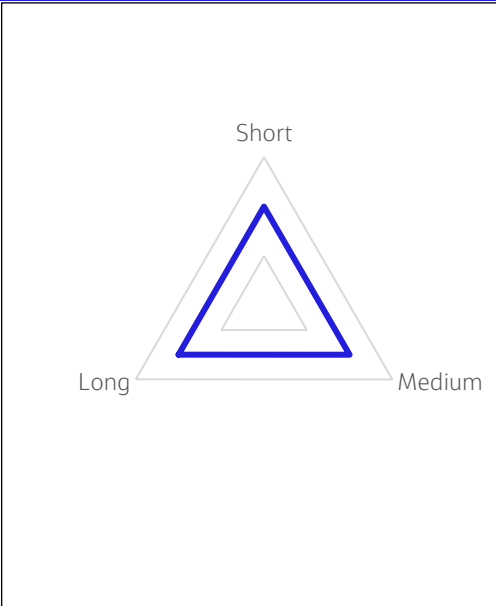
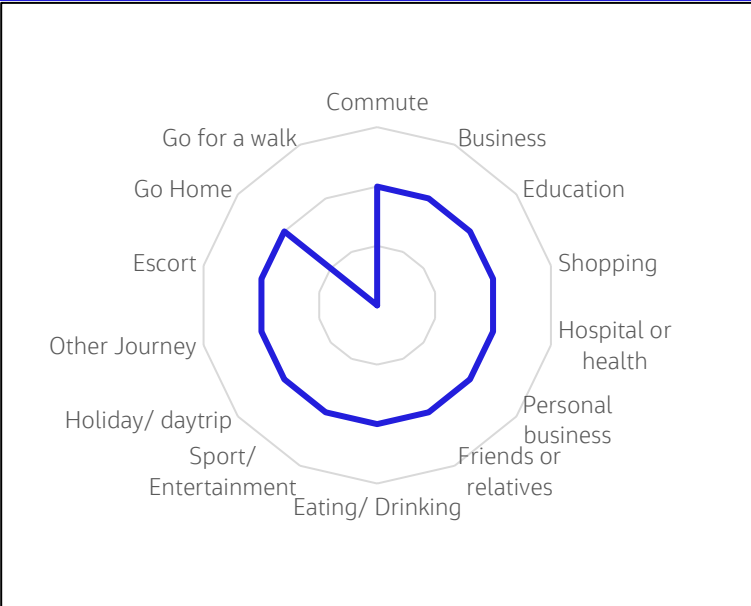
#### Deliverable by Scottish Government?

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

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Option D-LA3		Road pricing: cordon based	
Technically feasible	Likely to face significant public opposition	Yes	N/A (deliverable by regional partners)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-LA4		Vehicle bans: targeted at car categories
<b>Description</b> Some types of cars are banned from some roads in the region		
<b>Potential reduction of regional car-km</b> ~5%		
<b>Assumptions and calculations</b> Depending on the scale of the bans, this option could in theory be effective in removing a large proportion of car-km. For the sake of this assessment, it is assumed that the bans extend current LEZ proposals such that older, more polluting cars are prevented from using all of the region's roads. SEPA's work in preparation for the Dundee LEZ estimated that, in 2017, 32% of the car fleet was not compliant with the proposed emissions standards <sup>71</sup> . Almost all of these were diesel cars that were registered before the 2015 Euro 6 standards were implemented. By 2030 (the aspirational date for achievement of the 20% reduction in car-km), these cars will be 15 years or more old. Currently, 21% of cars registered in the UK are older than 13 years (the closest band to 15 years published in DfT statistics) <sup>72</sup> . Expanding LEZ restrictions region-wide would therefore be expected to remove around 20% of current vehicles (a little less than the 21% that are 13 years old) from the road. We assume, however, that many owners of older vehicles would replace them with newer ones in the event of this option being implemented. It is assumed that 75% of vehicle owners would do this, resulting in a reduction in car ownership, and hence use, of around 5% (= 20% x 75%).		
Likely effect by journey length		Likely effect by journey purpose
		

<sup>71</sup> [https://www.dundee.gov.uk/sites/default/files/publications/2021-10-05\\_dundee\\_lez\\_model\\_report\\_sept\\_2021.pdf](https://www.dundee.gov.uk/sites/default/files/publications/2021-10-05_dundee_lez_model_report_sept_2021.pdf)

<sup>72</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/985937/veh0207.ods](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/985937/veh0207.ods)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option D-LA4

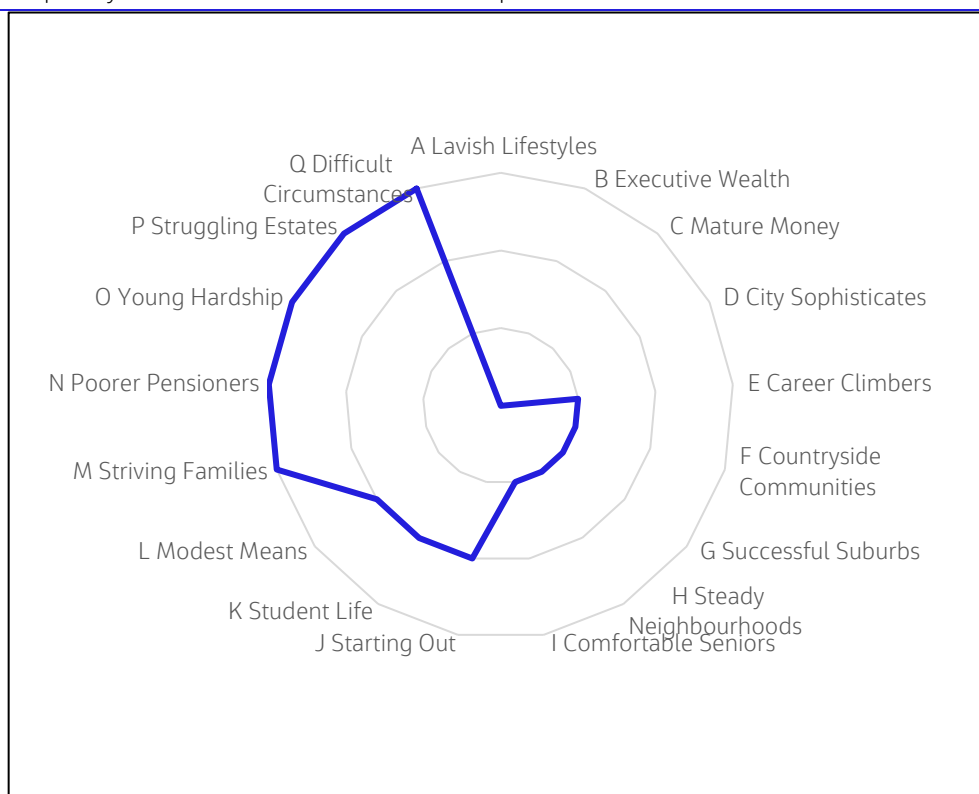
### Vehicle bans: targeted at car categories

Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	2	2	2	2	2	2
	Other urban	2	2	2	2	2	2
	Acc small towns	2	2	2	2	2	2
	Remote small towns	2	2	2	2	2	2
	Acc rural	2	2	2	2	2	2
	Remote rural	2	2	2	2	2	2

### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects



This option will have little effect on members of more affluent groups, who are more likely to own newer cars that are LEZ-compliant, but could have a substantial impact on car use amongst the region's more deprived households, who are less likely to be able to afford to upgrade their vehicle.

This option is more likely to affect those households who rely on a car to access employment and other opportunities, and lower-income households will be disproportionately affected.

### Potential cost

#### Capital

Capital cost of implementation of the bans themselves would be minimal

#### Revenue

Modest revenue cost for enforcement

### Deliverability

Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	Likely to substantially unpopular	No: potentially requires new primary legislation	Unlikely: potentially requires new primary legislation

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option D-LA5

### Vehicle bans: temporal

#### Description

Cars are banned from some roads in the region at some specific times

#### Potential reduction of regional car-km

Modest (<1%)

#### Assumptions and calculations

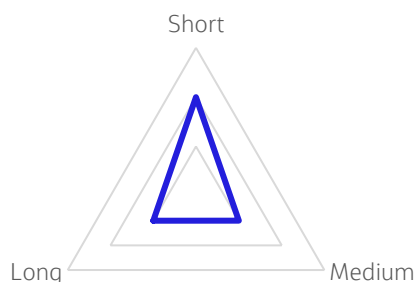
Depending on the scale of the bans, this option could in theory be effective in removing a large proportion of car-km.

For the sake of this assessment, it is assumed that the bans are developed in order to reduce peak-time car volumes in the region's large urban areas.

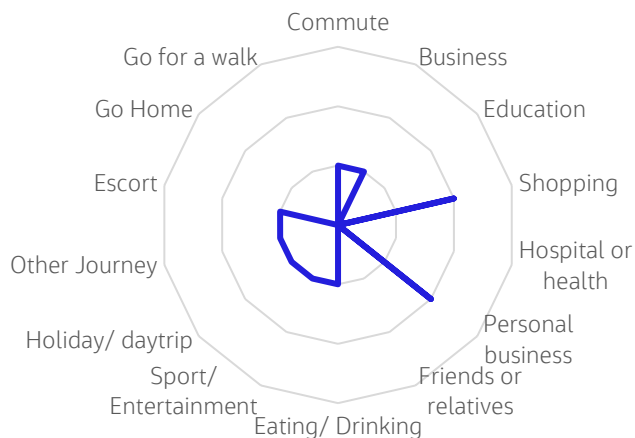
The impacts of these would be highly dependent on how much the bans seek to reduce traffic levels, but it may be reasonable to assume that bans could affect 5% of car-km in the large urban areas.

Around 13% of car-km in the region are to these areas (Table 2), hence this option might reduce regional car-km by <1%.

#### Likely effect by journey length



#### Likely effect by journey purpose



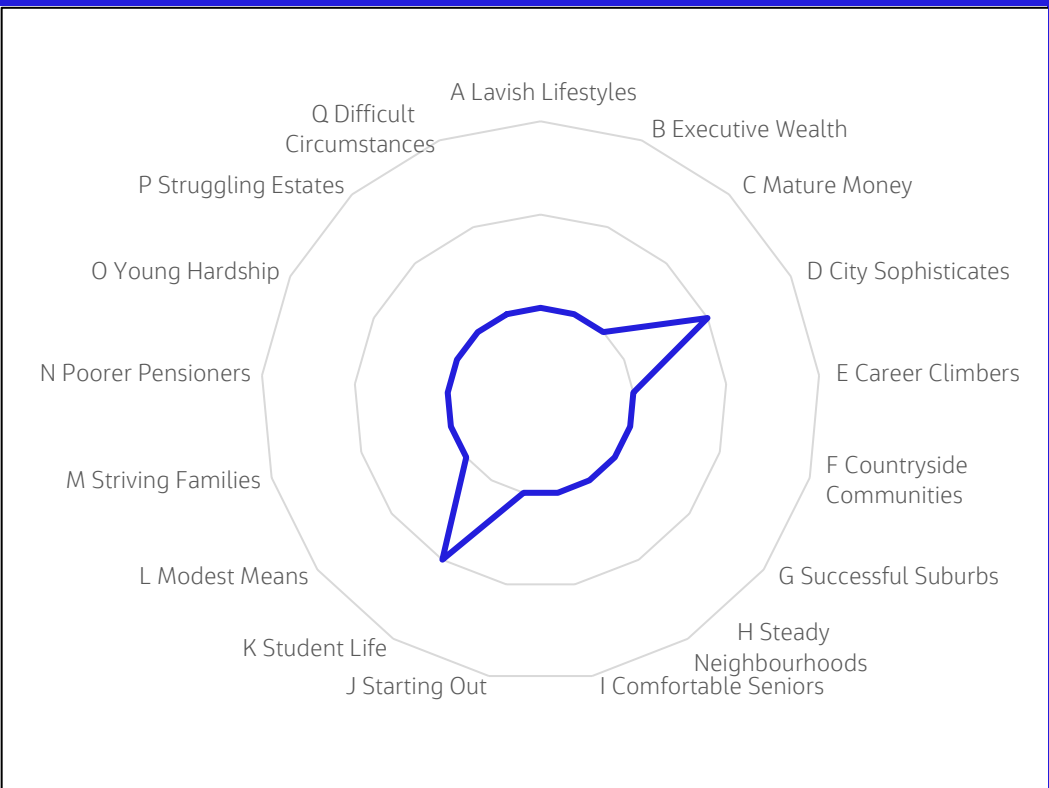
Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	2	2	1	1	0	0
	Other urban	2	2	1	1	0	0
	Acc small towns	2	2	1	1	0	0
	Remote small towns	2	2	1	1	0	0
	Acc rural	2	2	1	1	0	0
	Remote rural	2	2	1	1	0	0

#### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-LA5		Vehicle bans: temporal	
		<p>This option will tend to have a greater effect on urban dwellers and those that drive to the centre of the region's cities and towns. Some households more than others will rely on access to streets in urban areas for employment, education, etc.</p>	
Other effects			
<p>Supports wider objectives for healthy, inclusive transport, and placemaking May conflict with objectives to support city/town centre regeneration</p>			
Potential cost			
Capital		Revenue	
Capital cost of implementation of the bans themselves would be minimal		Modest revenue cost for enforcement	
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technical feasibility remains to be tested; would depend on scheme design	Likely to substantially unpopular	Uncertain: would depend on nature of bans and whether could be implemented under extant TRO legislation	Uncertain: would depend on nature of bans and whether could be implemented under extant TRO legislation

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option D-LA6

### Vehicle bans: spatial

#### Description

Cars are banned from some roads in the region

#### Potential reduction of regional car-km

Modest (~1%)

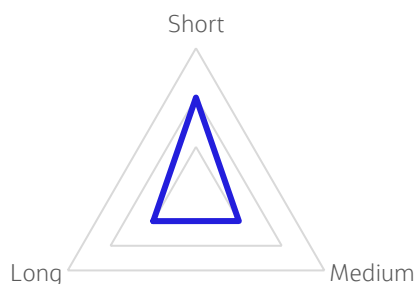
#### Assumptions and calculations

This option would ban cars from some roads. Depending on the scale of the bans, this option could in theory be effective in removing a large proportion of car-km.

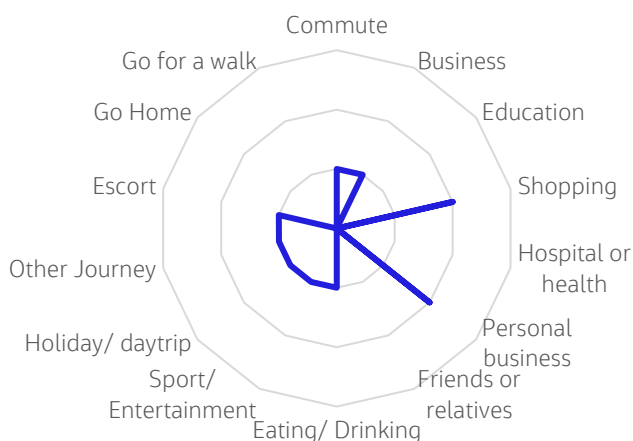
For the sake of this assessment, it is assumed that the bans apply only to streets in the region's urban areas that have high levels of pedestrian activity (i.e. increased city/town centre pedestrianisation), and that other roads would be unaffected.

Only a small impact on net car-km is therefore anticipated. Local car bans could, however, support other options, including that for 20-minute neighbourhoods.

#### Likely effect by journey length



#### Likely effect by journey purpose



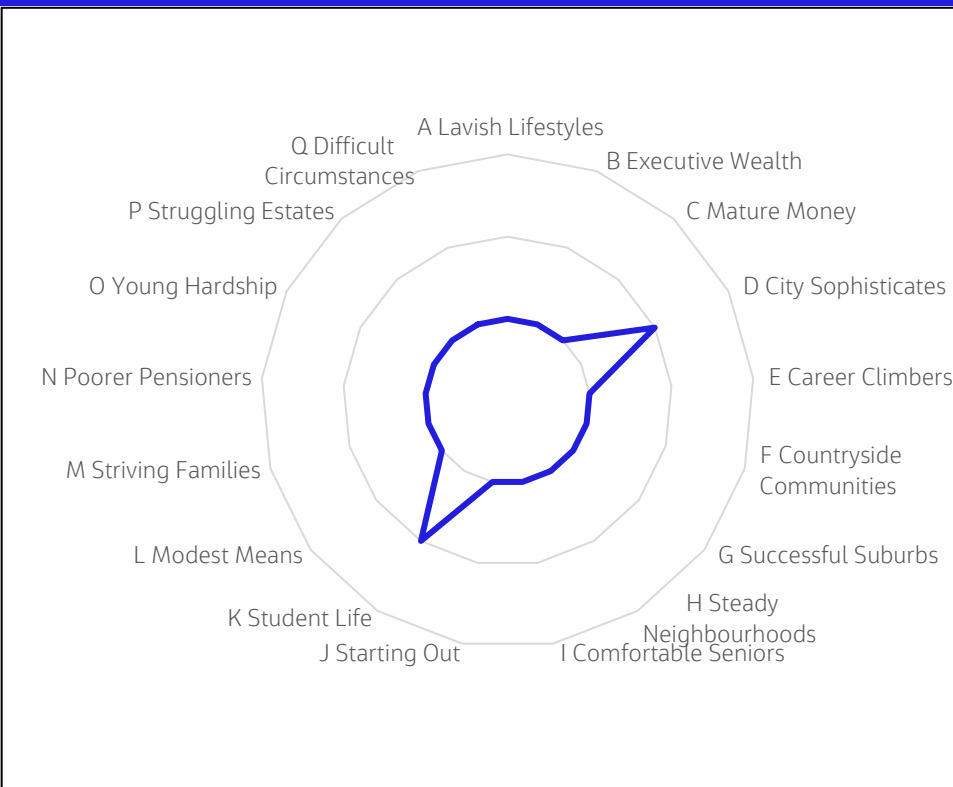
Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	2	2	1	1	0	0
	Other urban	2	2	1	1	0	0
	Acc small towns	2	2	1	1	0	0
	Remote small towns	2	2	1	1	0	0
	Acc rural	2	2	1	1	0	0
	Remote rural	2	2	1	1	0	0

#### Likely effect by persona

Propensity to reduce car use as a result of this option

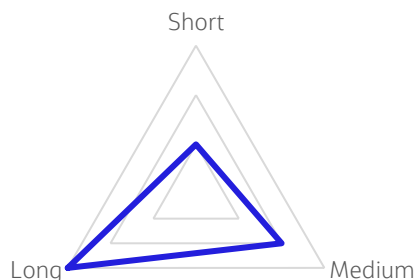

Potential effects

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-LA6		Vehicle bans: spatial	
		<p>This option will likely have a greater effect on urban dwellers and those that drive to the centre of the region's cities and towns. Some households more than others will rely on access to streets in urban areas for employment, education, etc.</p>	
Other effects			
<p>Supports wider objectives for healthy, inclusive transport, and placemaking</p> <p>May conflict with objectives to support city/town centre regeneration</p>			
Potential cost			
<b>Capital</b>		<b>Revenue</b>	
Capital cost of implementation of the bans themselves would be minimal (though should typically be accompanied by investment to improve streetscape/urban realm)		Modest revenue cost for enforcement	
Deliverability			
<b>Technical feasibility</b>	<b>Public acceptability</b>	<b>Deliverable by regional partners?</b>	<b>Deliverable by Scottish Government?</b>
Technically feasible	Some further pedestrianisation schemes may be acceptable; broader vehicle bans are unlikely to be so	Yes, using existing TRO powers	N/A (deliverable by local partners)



## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-ext1		Road pricing: distance based	
<b>Description</b>			
Road pricing, based on total distance driven (pay as you drive)			
Potential reduction of regional car-km		~10%	
<b>Assumptions and calculations</b>			
This option would introduce distance-based road pricing. Different charges could be applied on different roads and in congested/uncongested conditions.			
The effect on regional car-km would depend on the charges levied, and also on the payment mechanisms.			
To estimate the potential impact of increasing cost of driving on demand, evidence from fuel prices has been used.			
Fuel price elasticity of demand is typically estimated to be around -0.3 <sup>73</sup> . However, the recent substantial increases in the price of petrol/diesel, which have not been accompanied by a substantial fall in car use, suggests that the elasticity may be less than previously estimated; we therefore assume a more conservative elasticity of -0.2.			
If this elasticity of -0.2 is also applicable to a congestion charge, and if that charge was the equivalent to increasing fuel cost by 50% (around 10 pence per mile based on current fuel costs for a typical car), then a reduction in car-km of around 10% (= 50% x 0.2) could be expected.			
Different charging rates, payment methods and regimes would lead to different reductions in net car use, and these could potentially be set to deliver any chosen level of traffic reduction.			
Likely effect by journey length		Likely effect by journey purpose	
			

<sup>73</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/395119/road-traffic-demand-elasticities.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/395119/road-traffic-demand-elasticities.pdf)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

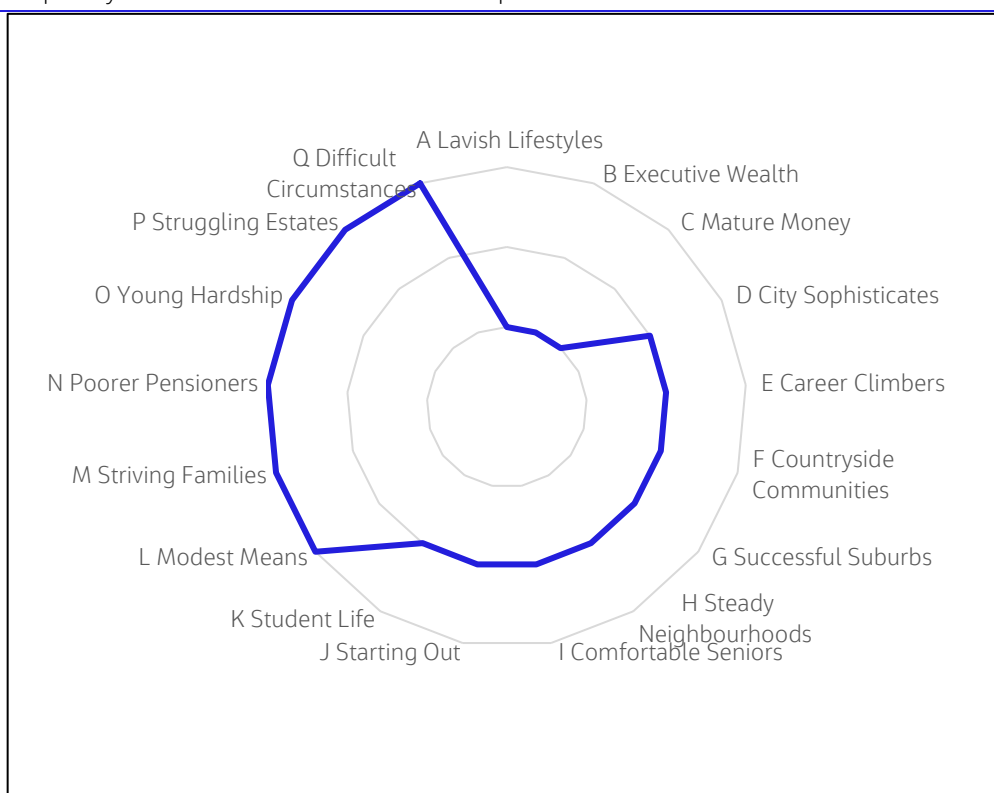
### Option D-ext1 Road pricing: distance based

Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	1	2	2	3	3	3
	Other urban	2	1	2	3	3	3
	Acc small towns	2	2	2	3	3	3
	Remote small towns	3	3	3	3	3	3
	Acc rural	3	3	3	3	3	3
	Remote rural	3	3	3	3	3	3

### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects



Any charge-based option is likely to have a lower impact on households with higher incomes, as they will be largely unaffected by fiscal controls. However, it could have a substantial impact on lower-income households who rely on a car, and depending on where the charges were introduced, the effect would be greater for households in rural areas whose travel distances are greater, and who have fewer alternative transport options for essential journeys.

### Potential cost

Capital	Revenue
Significant capital cost for scheme implementation, which could be recouped from charges paid	Likely to provide some on-going revenue stream for implementing authorities

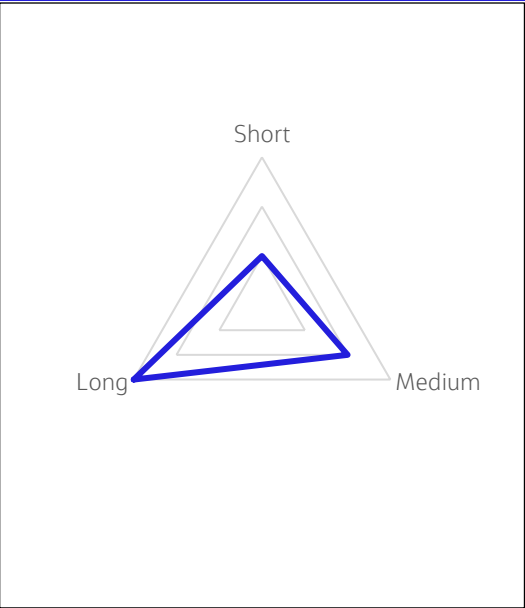
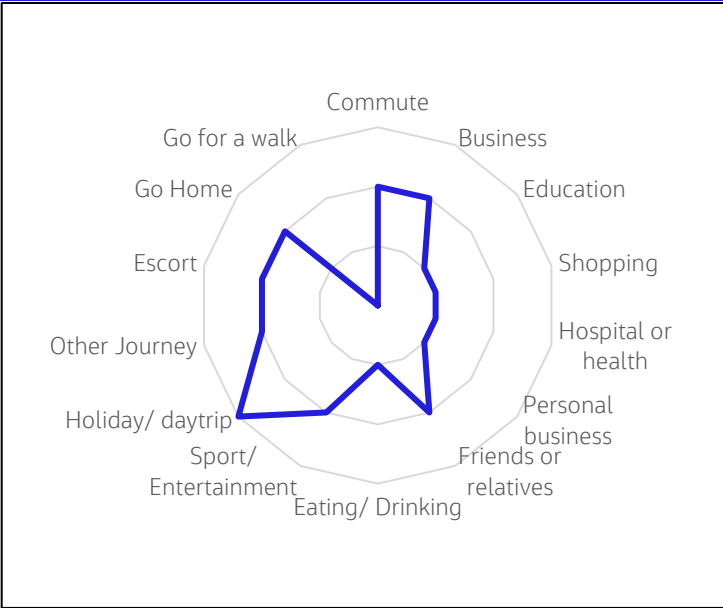
### Deliverability

Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
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Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-ext1		Road pricing: distance based	
Technically feasible, though requires vehicle monitoring systems not currently in use in the UK	Likely to face significant public opposition	TBC: may require primary legislation to enable vehicle monitoring	TBC: may require primary legislation to enable vehicle monitoring

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-ext2		Rationing car use
<b>Description</b> Car use is rationed to a maximum mileage per vehicle per annum		
Potential reduction of regional car-km		~8%
<b>Assumptions and calculations</b> Depending on the scale of the rationing, this option could in theory be effective in removing a large proportion of car-km. For the sake of this estimation, a scheme which enables a maximum allowance of 10,000 miles per car per annum has been considered. Data for England <sup>74</sup> suggests that around 17% of the car fleet covers more than 10,000 miles per annum, but that they are responsible for nearly 40% of car-km. The data also suggests that if those cars had all driven only 10,000 miles each then net car-km (of the entire car fleet, not only those that drive more than 10,000 miles per annum) would have been 15% lower. However, we consider that, were a ration to be introduced, a large proportion of the mileage that would be restricted by it would be transferred to other vehicles, as drivers seek to get around the rationed level. A reduction in net regional car-km of 8% (half of the 15% of net car-km which is accrued by cars travelling more than 10,000 miles per annum) is therefore estimated. Different maximum distance thresholds would lead to different reductions in net car-km.		
Likely effect by journey length		Likely effect by journey purpose
		

<sup>74</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1017061/nts0904.ods](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1017061/nts0904.ods)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-ext2		Rationing car use					
Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	1	1	2	3	3	3
	Other urban	1	1	2	3	3	3
	Acc small towns	2	2	2	3	3	3
	Remote small towns	3	3	3	3	3	3
	Acc rural	3	3	3	3	3	3
	Remote rural	3	3	3	3	3	3

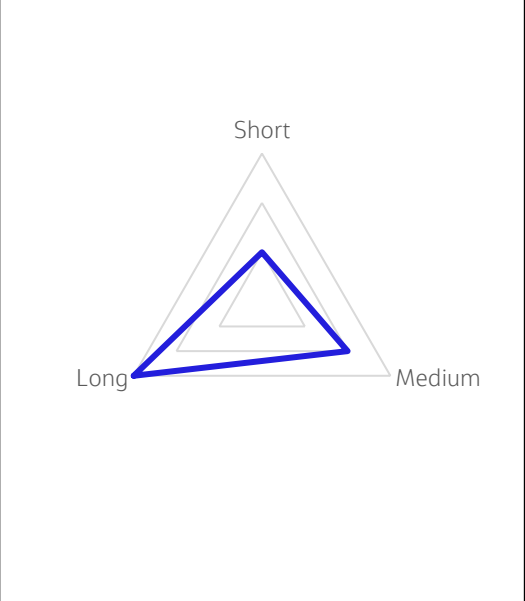
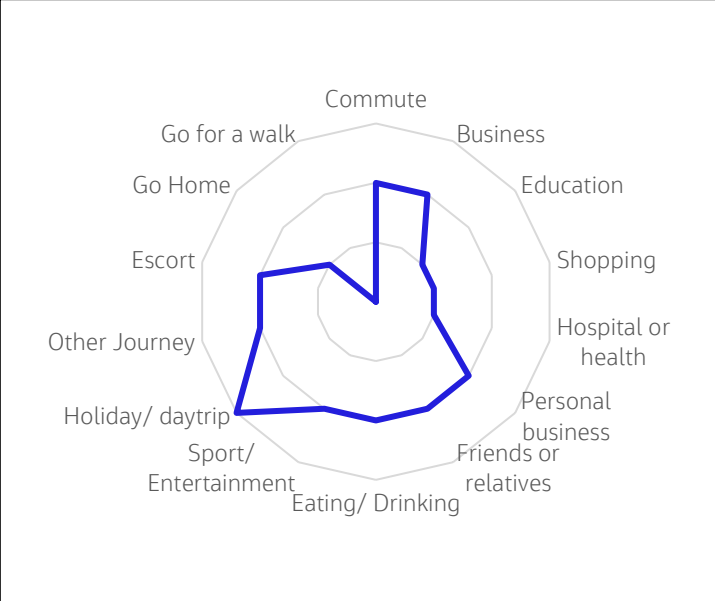
Likely effect by persona	
Propensity to reduce car use as a result of this option	Potential effects
	<p>This option is likely, in general, to have a greater impact on car use for people in higher income groups (who tend to drive further), but may have a lesser impact on those with the highest incomes, many of whom have access to more than one car.</p> <p>Residents of rural areas are likely to be affected much more than urban dwellers, because of their larger typical travel distances. For those that are reliant on a car to access employment and essential opportunities, or rely (particularly if only one car in the household), this could have a substantial impact</p>

Other effects	
This option is likely to have a much greater impact on longer car journeys, so impacting rural journeys more significantly. As well as impacting rural dwellers, this may have a significant impact on the rural economy, as car journeys to rural areas may be suppressed	
Potential cost	
Capital	Revenue
Potentially substantial capital cost to implement a scheme	Modest revenue cost for enforcement

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-ext2			
Rationing car use			
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technical feasibility is not proven	Likely to substantially unpopular	No: would require new primary legislation	Uncertain: would require primary legislation, likely from the UK Government

Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-ext3		Increased fuel duty
<b>Description</b> Increased fuel duty to discourage car use		
<b>Potential reduction of regional car-km</b>		~3%
<b>Assumptions and calculations</b> This option would increase fuel duty. It is assumed that the increases would affect petrol and diesel prices, and not electricity costs for EVs. The effect on net car-km would depend on the level of increase. Fuel price elasticity has typically been estimated to be around -0.3 <sup>75</sup> , though as outlined above (under option D1) we have assumed that a more conservative estimate of -0.2 may be more realistic. If, therefore, fuel duty was to be increased such that prices rose by 25%, then car-km of petrol/diesel-powered cars would fall by around 5% (= 25% x 0.2). We assume that usage of EVs would be unaffected by this measure (though EV usage may be affected by electricity prices, it is assumed that those prices could not be controlled separately for vehicle charging from other domestic/business electricity use, hence controlling EV use through such charges would not be directly possible). Although electric vehicle sales are increasing rapidly, we assume that petrol/diesel powered cars will still comprise the majority of car-km in 2030, and that therefore a net reduction of around 3% in car-km would follow an increase in fuel duty which would raise prices by 25%. Different increases in fuel duty would result in different levels of change in car-km.		
Likely effect by journey length		Likely effect by journey purpose
		

<sup>75</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/395119/road-traffic-demand-elasticities.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/395119/road-traffic-demand-elasticities.pdf)

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

### Option D-ext3 Increased fuel duty

Effect by urban-rural class		To					
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural
From	Large urban	1	2	2	3	3	3
	Other urban	2	1	2	3	3	3
	Acc small towns	2	2	2	3	3	3
	Remote small towns	3	3	3	3	3	3
	Acc rural	3	3	3	3	3	3
	Remote rural	3	3	3	3	3	3

### Likely effect by persona

Propensity to reduce car use as a result of this option	Potential effects
	<p>People on middle and lower incomes are likely to be more sensitive to price-based changes; particularly as car ownership and use already forms a significant part of household financial spend. This may impact on their ability to access employment and other essential opportunities.</p> <p>Households on higher incomes will be unaffected by fiscal controls. Those on the very lowest incomes will also largely be unaffected due to low baseline car ownership and use.</p>

### Potential cost

Capital	Revenue
N/A	N/A (increased revenue to Government from fuel duty rise, but would pass to UK Government)

### Deliverability

Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	Likely to face significant public opposition	No (reserved to UK Government)	No (reserved to UK Government)



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### Option D-ext4

### Increased Vehicle Excise Duty

#### Description

Increased Vehicle Excise Duty (VED) to discourage car use

#### Potential reduction of regional car-km

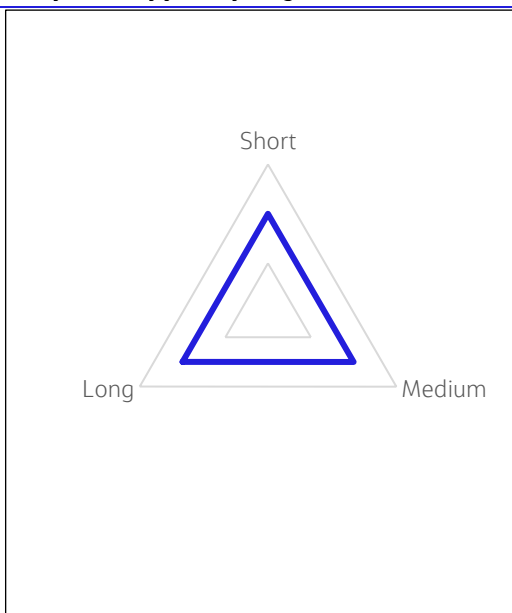
Modest (<1%)

#### Assumptions and calculations

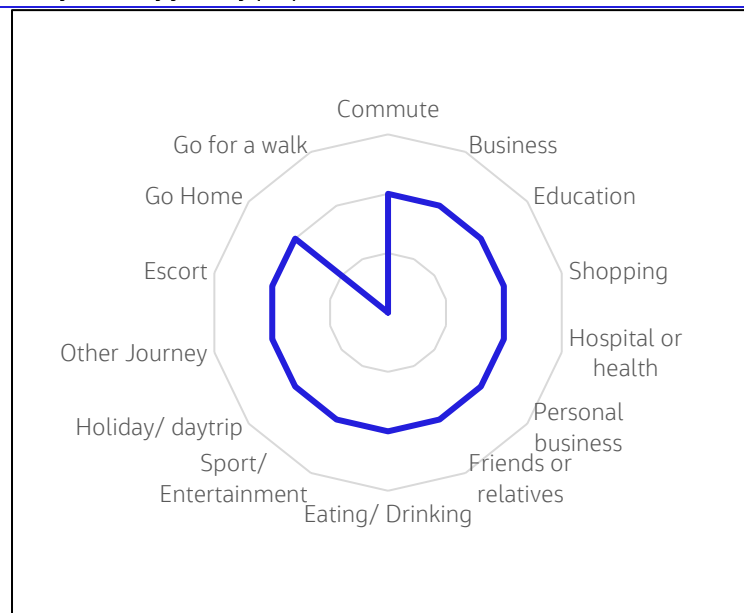
This option would increase VED payable by car owners.

Given the charge is unrelated to mileage driven, it is assumed that any increase would affect only car ownership levels, not the use of any cars that remain on the fleet. The effect on car ownership would depend on the charge levied but, unless the charge was very high only a small effect on regional car-km is anticipated.

#### Likely effect by journey length



#### Likely effect by journey purpose



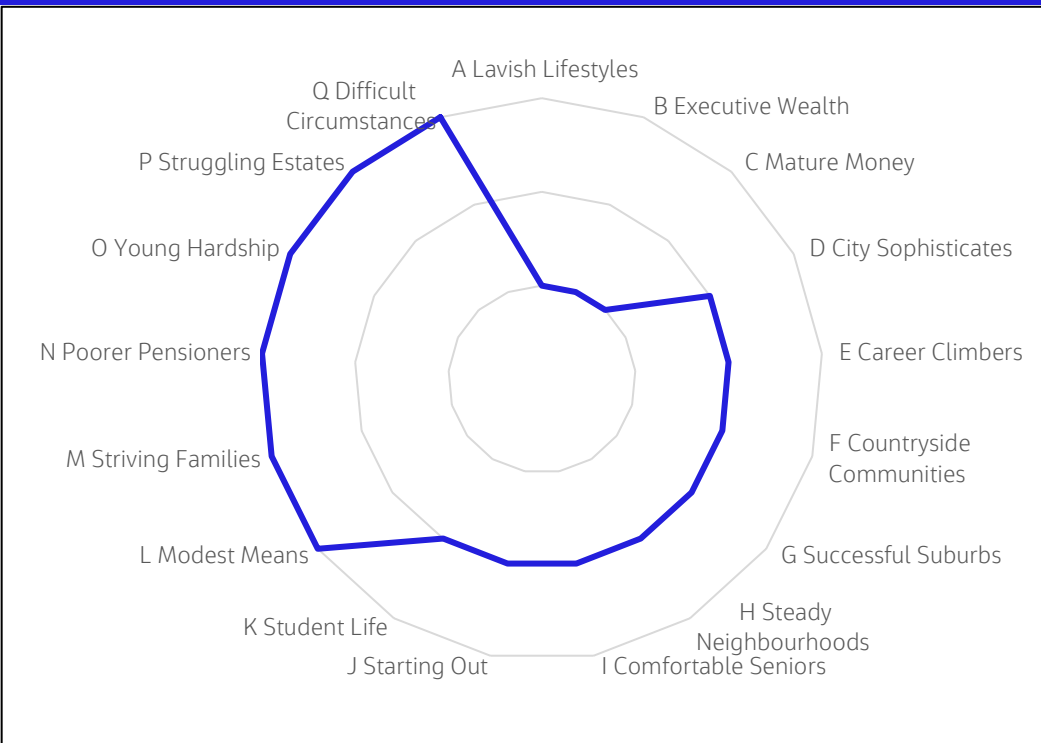
Effect by urban-rural class		To						
		Large urban	Other urban	Acc small towns	Remote small towns	Acc rural	Remote rural	
From	Large urban	2	2	2	2	2	2	2
	Other urban	2	2	2	2	2	2	2
	Acc small towns	2	2	2	2	2	2	2
	Remote small towns	2	2	2	2	2	2	2
	Acc rural	2	2	2	2	2	2	2
	Remote rural	2	2	2	2	2	2	2

#### Likely effect by persona

Propensity to reduce car use as a result of this option

Potential effects

## Achieving a 20% Reduction in Car-km: Options for the Tactran Region

Option D-ext4		Increased Vehicle Excise Duty	
		<p>This option could have a substantial effect on those people, largely those on lower incomes, who as a result would be unable to afford to keep running a car. This could affect their ability to access employment and essential services if they rely on a car to do so. Households on higher incomes will be unaffected by fiscal controls.</p>	
Potential cost			
Capital		Revenue	
N/A		N/A (increased revenue to Government from licence cost rise, but would pass to UK Government)	
Deliverability			
Technical feasibility	Public acceptability	Deliverable by regional partners?	Deliverable by Scottish Government?
Technically feasible	Likely to face significant public opposition if increased to a level which would significantly affect car ownership, and especially if introduced in the region but not elsewhere	No (reserved to UK Government)	No (reserved to UK Government)

## C. 20% Route Map interventions not included in assessment

Not all the measures listed in the 20% Route Map have been included for assessment in this report. Those Route Map measures that have not been referenced in Table 11 are, in every instance, not anticipated to have a material effect on car-km in the Tactran region. These excluded measures are listed below, along with the reference numbers assigned to them in the Route Map and a summary of the rationale for their exclusion:

- Intervention 1c - Mapping digital connectivity alongside transport connectivity: mapping work will not directly have any impact on regional car-km; only if actions arise as a result could an effect be generated, and the likely actions are covered by other options considered in this report;
- Intervention 1d - Issuing a refreshed Fair Work First Action Plan in Spring 2022: issuing an action plan will not directly have any impact on regional car-km; only if actions arise as a result could an effect be generated, and the likely actions are covered by other options considered in this report;
- Intervention 1e - Progressing the Work Local Challenge Programme: progressing the programme is not anticipated to have a significant effect on net car-km, but relevant elements related to it, including broadband improvements and sustainable travel marketing are considered within this assessment;
- Intervention 2c - Continuing to embed the Place Principle, and promote the use of the Place Standard Tool: embedding principles or promoting use of tools will not directly have any impact on regional car-km; only if actions arise as a result could an effect be generated, and potential actions are captured as part of Option Q5 within this assessment;
- Intervention 3f - Introducing Low Emission Zones (LEZs) in Aberdeen, Dundee, Edinburgh and Glasgow in Spring 2022: modelling work undertaken for the Dundee LEZ has shown only a minimal effect on traffic even within the city, so no significant effect on regional car-km would result. LEZs in other cities are assumed to have no significant impact within the Tactran region;
- Intervention 3g - Continuing our work on review of transport governance: continuing a review will not directly have any impact on regional car-km; only if actions arise as a result could an effect be generated;
- Intervention 3h - Commissioning a Fair Fares Review: commissioning a review will not directly have any impact on regional car-km; only if actions arise as a result could an effect be generated, and the likely actions are covered by other options considered in this report;
- Intervention 3k - Introducing a Community Bus Fund: introducing a fund will not directly have any impact on regional car-km; only if improvements to services result could an effect be generated, and this is considered within Option Q1 within this assessment;
- Intervention 3l - Establishing a National Smart Ticketing Advisory Board: establishing a board will not directly have any impact on regional car-km; only if actions arise as a result could an effect be generated, and the likely actions are covered by other options considered in this report;
- Intervention 3n - Supporting integrated journeys at ferry terminals: this is not considered to result in any significant change in car-km, as there are no ferry terminals in the Tactran region.

## **D. Relative attractiveness of public transport and car**

The figure below provides an indication of the relative attractiveness of public transport and car for journeys parts of the Tactran region. Using data from TCRTM (which does not cover the whole region), it shows the relative generalised journey time of public transport journeys with that of car journeys from each modelled origin zone to a weighted average of all destinations that the model predicts are travelled to from that origin.

It shows that, in most parts of the region, generalised journey times by public transport are several times greater than those by car.

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