1 Introduction

1.1 Background

1.1.1 In June 2010, MVA were commissioned to undertake a transport assessment of alternative spatial development plans for the TAYplan area using the National Models within the LATIS service. This work has been undertaken in partnership with TAYplan, TACTRAN and Transport Scotland (hereafter referred to as the Working Group).

1.1.2 Information Note 1 (MVA Consultancy, January 2010) describes baseline data for the TAYplan area, which was prepared using the National Transport and Land Use Model Do Minimum forecasts which were available in January 2010. This analysis presented a single future year scenario of predicted transport constraints. This future scenario was based on one view of future land use, demographic and economic conditions.

1.1.3 A key benefit of the LATIS modelling process is to be able to compare one or more intervention\strategy\policy option(s) versus another and note the differences between them by presenting key performance indicators (eg accessibility, flow\capacity, emissions, journey times etc).

1.1.4 The TAYplan Strategic Development Plan LATIS Assessment Final Report (MVA Consultancy, October 2010) describes the assessment and comparison of planning forecast scenarios and their impact on the strategic transport network in the TAYplan area:

1.1.5 As a consequence of the strategic nature of the National Model, the assessment has been undertaken in a phased approach as outlined in Table 1.1. This allowed for a review of work at the end of each phase to evaluate the model performance and consider the appropriateness of undertaking each subsequent phase.

Table 1.1 Phased Assessment

Scenario No.	Work Programme Phase	Land Use & Demographic Scenario	Intervention Scenario
1	1	Current LATIS **(LU0)**	Do Minimum
2	1	TAYplan population projections **(LU1)**	Do Minimum
3	1	TAYplan Spatial Plan A **(LU2)**	Do Minimum
4	2	TAYplan Spatial Plan A **(LU2)**	Do Minimum plus
5	3	TAYplan Spatial Plan B **(LU3)**	Do Minimum
6	3	TAYplan Spatial Plan B **(LU3)**	Do Minimum plus

1.1.6 Phase 1 considered the initial land-use and demographic scenarios and their impact on the Do Minimum transport intervention scenario. Phase 2 considered the impact of the 'Do Minimum Plus' transport intervention scenario. Following Phase 1 and 2, given the strong support received for Spatial Strategy A during the TAYplan MIR consultation, it was agreed with the Working Group that the specified Phase 3 detailed assessment would not be

necessary as the impact of TAYplan Spatial Plan B could be adequately estimated using information from the assessment work already undertaken.

1.2 LATIS Appraisal

1.2.1 Land-Use and Transport Integration in Scotland (LATIS) is a commission run by Transport Scotland which, among other key features, has a transport and land use modelling suite that can assist in devising and appraising policy in areas such as transport, planning, the environment, demographics, health and education.

1.2.2 The LATIS modelling suite contains the National models of;

- The Transport Model for Scotland (TMfS). The TMfS National Model is a multi-modal model that represents and forecasts the travel demand and behaviour of key motorised modes of transport such as car, bus and rail throughout Scotland; and
- The Transport, Economic and Land-Use Model of Scotland (TELMoS). TELMoS makes use of demographic, planning, economic data and transport and travel costs (from TMfS) to predict future changes in land use.

1.2.3 Both of these models (TMfS and TELMoS) are integrated with each other so that land use changes are as a consequence of changes in transport and vice versa.

LATIS Strategic Modelling

1.2.4 Within LATIS a hierarchical and proportionate approach to model development has been adopted. This recommends that appropriate modelling tools are developed and applied at National, Regional (2nd tier) and local levels (3rd tier (eg microsimulation models)).

1.2.5 While it would be appropriate to assess many aspects of the TAYplan development plan within a regional model, at present, there is no regional (and more detailed) model which covers the TAYplan area to supplement and add detail to the National Model results. Therefore, it has been agreed by the Working Group that, in the absence of any other available modelling capabilities, the National Model is used to prepare an assessment of the strategic transport and land use impacts throughout the TAYplan area and to provide a Land Use comparison of the TAYplan area in the context of the rest of Scotland. The analysis of the model forecasts focuses on the strategic transport network and, in particular, inter-urban travel. It does not aim to represent analysis of the more local transport network such as the urban areas of Dundee or Perth and within urban\suburban areas throughout TAYplan.

1.2.6 The representation of the local TAYplan transport network is relatively coarse in the National Model. Travel demand is loaded on at model zones, of which there 65 in the TAYplan area with around 6 zones in and around Perth and 20 in and around Dundee. This means the precise loading point of traffic on the modelled network may not represent the specific location of any new development. However, this is not critical in the context of the strategic network where the focus is on inter-urban travel. However, this level of detail should be borne in mind when assessing and interpreting the impact of the planning scenarios on the modelled transport network.

2 Planning Forecasts

2.1 Introduction

2.1.1 The first stage in the assessment was the preparation and review of the planning forecasts. This involved the preparation of land-use and demographic scenarios based on planning policies. Forecasts were prepared for 2022 and 2032 and each of these compared against the base year of 2007.

2.2 Description of Planning Scenarios

2.2.1 For the purpose of this assessment, three planning forecasts have been agreed with the Working Group as follows:

- **LU0** (**L**and **U**se 0)- the planning data and associated forecasts included in the current version of the National Model (using planning data from a 2007 submission to **LATIS** by the constituent planning authorities within the TAYplan area);
- **LU1** - the development plan currently included in the National Model, but with population totals for TAYplan aligned with sub national projections prepared by the General Register Office for Scotland (**GROS**); and
- **LU2** - the GROS sub national population forecasts, but with the **TAYplan** preferred spatial strategy A.

2.3 Comparison of LATIS and GROS Baseline Forecasts

2.3.1 The General Register Office for Scotland (GROS) compiles Census data for the country, they use the findings from the Census and other data to publish information about population and households. GROS population and household projections are based on analysis of past trends and assumptions about future patterns in fertility, mortality and migration.

2.3.2 The LATIS national models make use planning data collected from each Local Authority (in terms of floorspace) which is used within modelling suite alongside economic assumptions and GROS national forecasts to provide planning forecasts by individual TMfS zone, which can be aggregated to local authority, Strategic Development Plan (SDP) areas etc. Because of the different basis of the GROS and LATIS forecasts it is inevitable that there will be some variation in the overall projections of GRoS and predictions of the LATIS forecasts.

2.3.3 We have prepared a comparison of GROS (2006 based) versus LATIS population and household forecasts as shown in Figures 2.1 and 2.2.

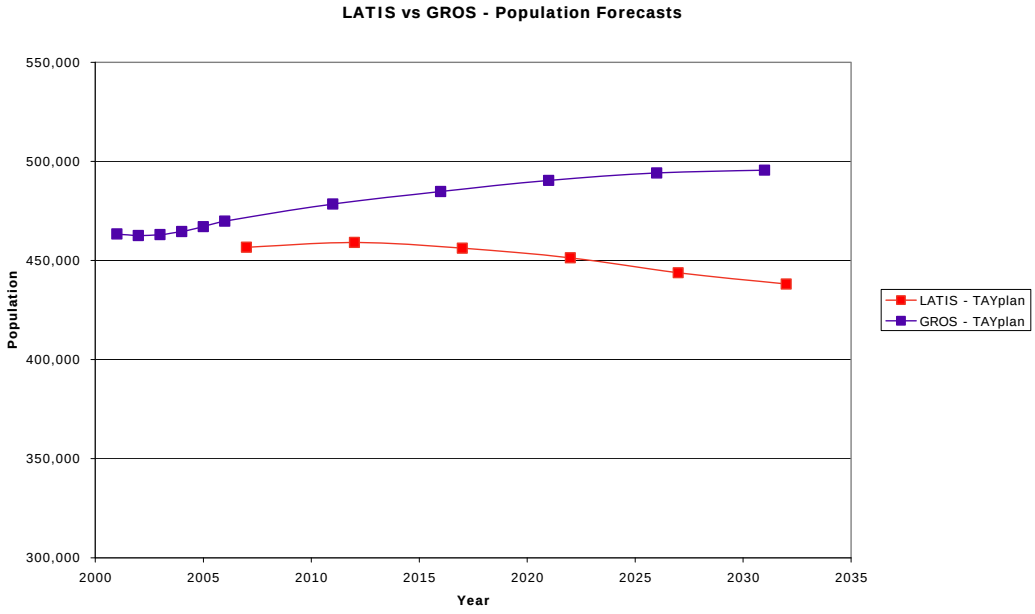

Figure 2.1 LATIS versus GROS – Population Forecasts

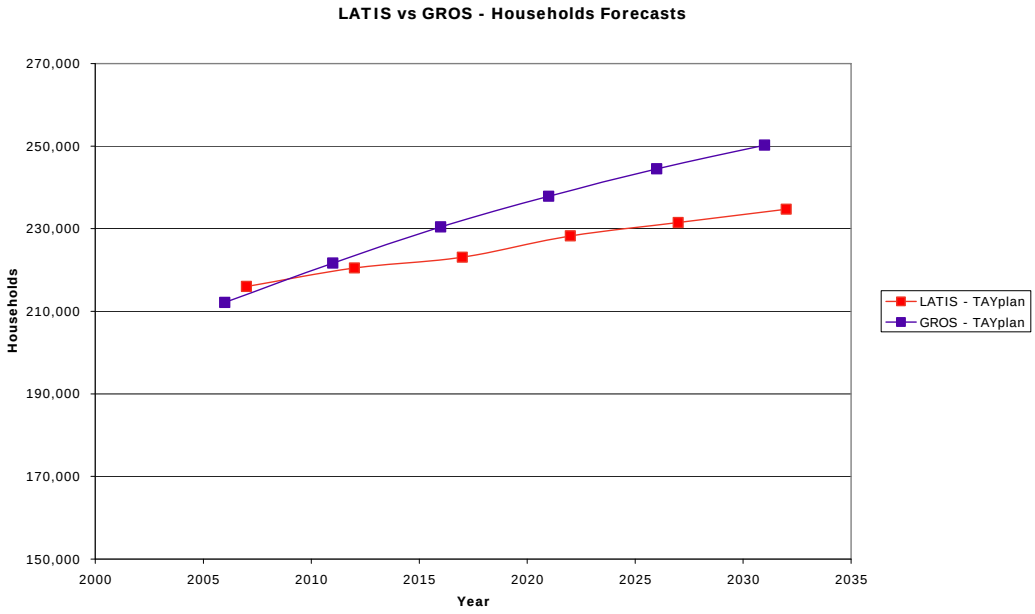

Figure 2.2 LATIS versus GROS – Households Forecasts

2.3.4 The LATIS results demonstrate a decrease in population in TAYplan whilst GROS indicates an increase. Within LATIS, this is due to decreasing household densities outstripping any forecast increase in the number of households. The household figures are more comparable between LATIS and GROS than the population. This is indicative of lower household sizes in LATIS compared with the GROS forecasts, which show a less steep decline in household size over time in the TAYplan area.

2.4 TAYplan Spatial Strategy Scenario

2.4.1 The emerging TAYplan Strategic Development Plan (SDP) provides two forecasts of population growth by 2032:

- Option 1 would see development across the region follow the past trends 2006-based GROS population and household projections; and
- Option 2 is similar to Option 1 but with an increase in population in the Dundee City.

2.4.2 Following discussions with TAYplan, the GROS based planning forecast (Scenario LU1) includes the greater increase in population in Dundee (Option 2, above).

2.4.3 The emerging TAYplan development plans have resulted in the derivation of two key development plan strategies. The preferred strategy at present is known as Strategy A which would see 'most of the new development in Dundee and Perth with the remainder largely concentrated in principal settlements'. Strategy B is similar, but would see 'a more dispersed pattern of housing development around Perth and into the Carse of Gowrie'.

2.4.4 Phases 1 and 2 of this LATIS assessment have considered Strategy A (Scenario LU2) and this is described throughout this Summary Report. Following Phase 1 and 2, given the strong support received for Spatial Strategy A during the TAYplan MIR consultation, it was agreed with the Working Group that the specified Phase 3 detailed assessment would not be necessary as the impact of TAYplan Spatial Plan B could be adequately estimated using information from the assessment work already undertaken. Section 3.7 outlines the initial estimation of the impact of Strategy B.

2.5 Socio-economic Forecasts

2.5.1 Figures 2.1 to 2.3 compare the socio-economic forecasts between scenarios LU0 and LU1 (as described above) for each of the Local Authority areas which make up the TAYplan area. It should be noted that Scenarios LU1 and LU2 have the same totals are the same at local authority level, but the population and household forecasts will vary between scenarios at TMfS zone level as LU2 has been adjusted to reflect TAYplan Spatial Strategy A.

2.5.2 It should be noted that Fife is split between the TAYplan and SESplan Strategic Development Plan areas and only the Fife data relevant to the TAYplan area is included in the figures presented.

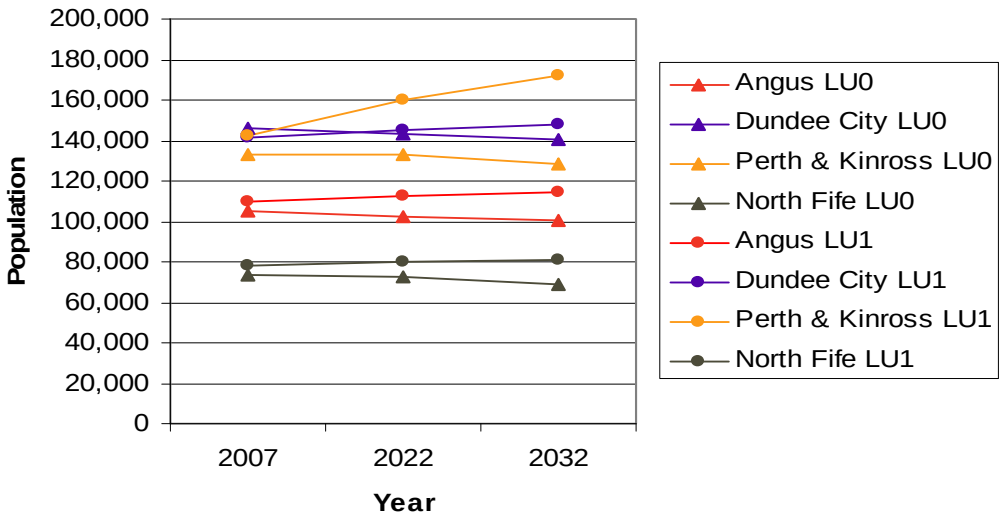

Figure 2.1 LU0 vs LU1 – Population Forecasts

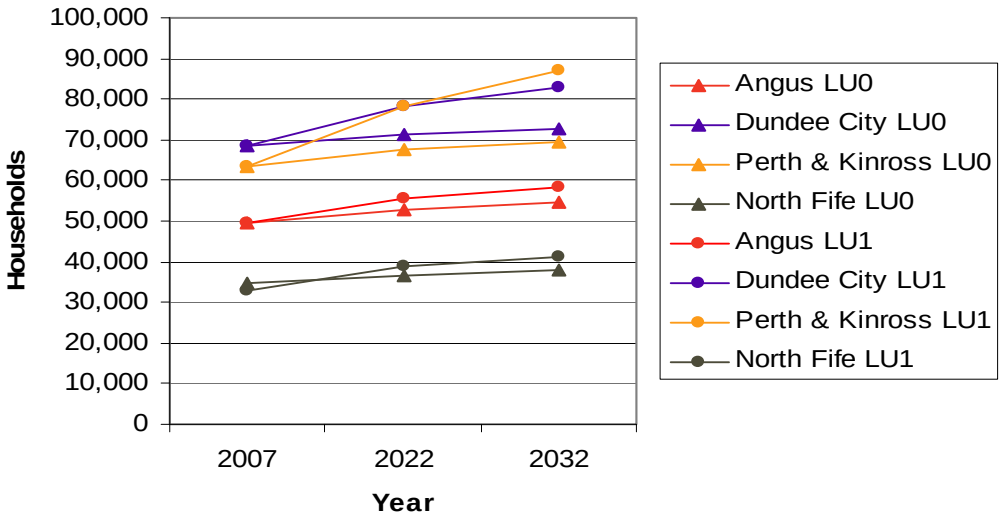

Figure 2.2 LU0 vs LU1 – Household Forecasts

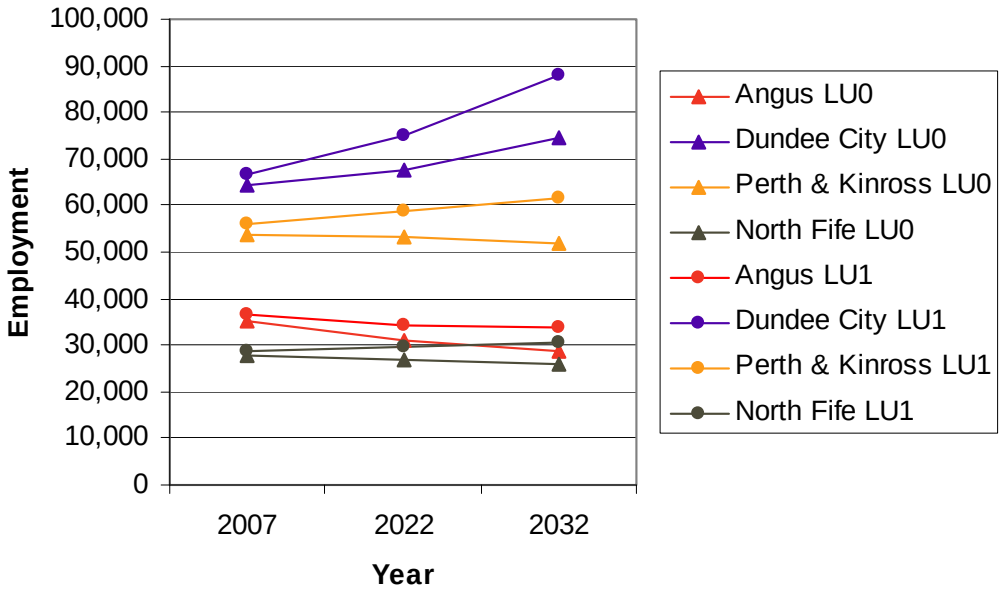

Figure 2.3 LU0 vs LU1 – Employment Forecasts

2.5.3 The above figures reveal the greater forecast increase in population, households and employment comparing Scenario LU1 (constrained to the GRoS **sub national** population projections) with LU0 (constrained to the GRoS **national** population projections).

2.5.4 The Final Report includes comparisons of the forecast population, households and employment in 2032 for Scenarios LU0 and LU1, which reveals the following key points:

- there is an increase in population, households and employments in all sectors in LU1 from LU0;
- the change in population and households is, as expected, broadly consistent in spatial terms;
- the greatest difference in population is in the sectors in Perth and Kinross; and
- the percentage change in employment is the same across all the sectors, ie the extra employment in Scenario LU1 compared with LU0 has been distributed as per the underlying LATIS forecasts.

2.5.5 The Final Report includes comparisons of the forecast population and households in 2032 for Scenarios LU1 and LU2, which reveals the following key points:

- the change in population and households is, as expected, broadly consistent in spatial terms;
- the greatest difference in population is in the west of Perth, where significant development is indicated in the TAYplan spatial strategy, and this is offset with reduced population forecasts in Perth; and
- there is more population in Forfar and the A90 corridor which is offset with reductions in Arbroath and Montrose.

2.5.6 For the purposes of this assessment there is no change in the employment forecasts between scenarios LU1 and LU2.

3 Travel Demand Forecasts

3.1 Introduction

3.1.1 Within the LATIS framework, changes in land use (described in Chapter Two) are input to the transport model to predict potential changes in the level of car and public transport trip making over time. The total number of forecast year car and public transport trips are input to the transport model to predict changes in travel patterns over time.

3.1.2 The data presented in this Report is based on analysis of a range of forecast scenarios. No great emphasis should be placed on absolute values, instead the differences between forecast scenarios should be considered.

3.2 Description of Transport Intervention Scenarios

3.2.1 The National Model Do Minimum runs have been prepared for the forecast years of; 2012, 2017, 2022, 2027 and 2032. For the purpose of this assessment the main focus of analysis is the 2032 horizon forecast year.

3.2.2 Two transport scenarios have been considered when assessing the impact of the spatial development plans, viz:

- LATIS Do Minimum; and
- Do Minimum Plus.

3.2.3 The specification of the transport schemes included in the Do Minimum can be found at the following web link:

http://www.latis.org.uk/services/modelling/library/download_reports/TMfS07_DoMinSchemesAssumptions_13012010.pdf

3.3 Trip Productions

3.3.1 Trip productions refer to the number of journeys (or 'trips') originating from a defined area (for example a zone or collection of zones). The Final Report includes comparisons of the forecast trip productions in 2032 for Scenarios LU0, LU1 and LU2. Figures 3.1 to 3.3 show the total trip productions for the local authorities in the TAYplan area for each modelled year and scenario split by car and public transport (PT).

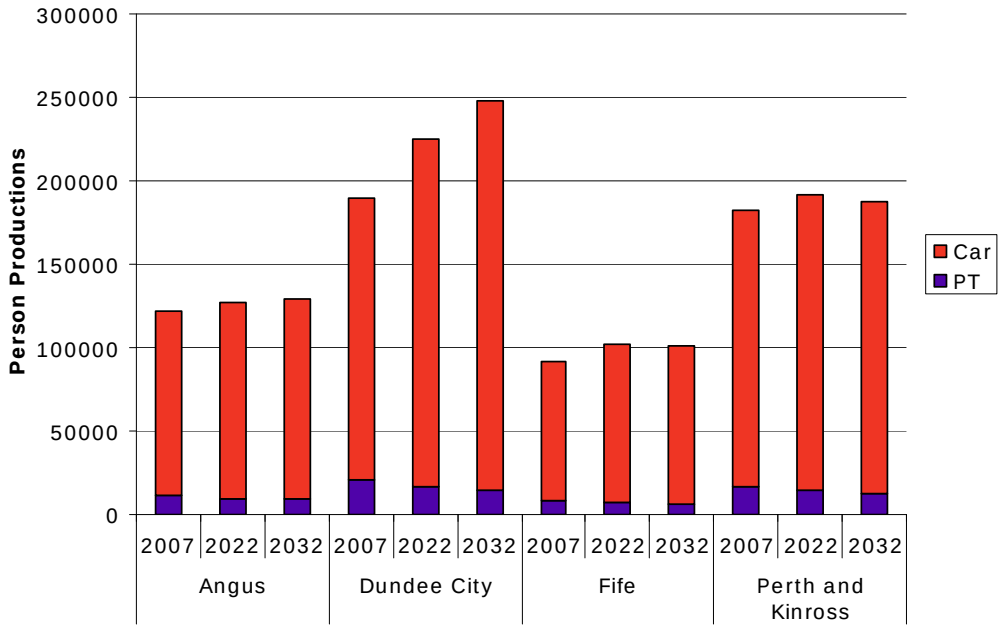

Figure 3.1 Forecast Change in Trip Productions by Mode – LU0

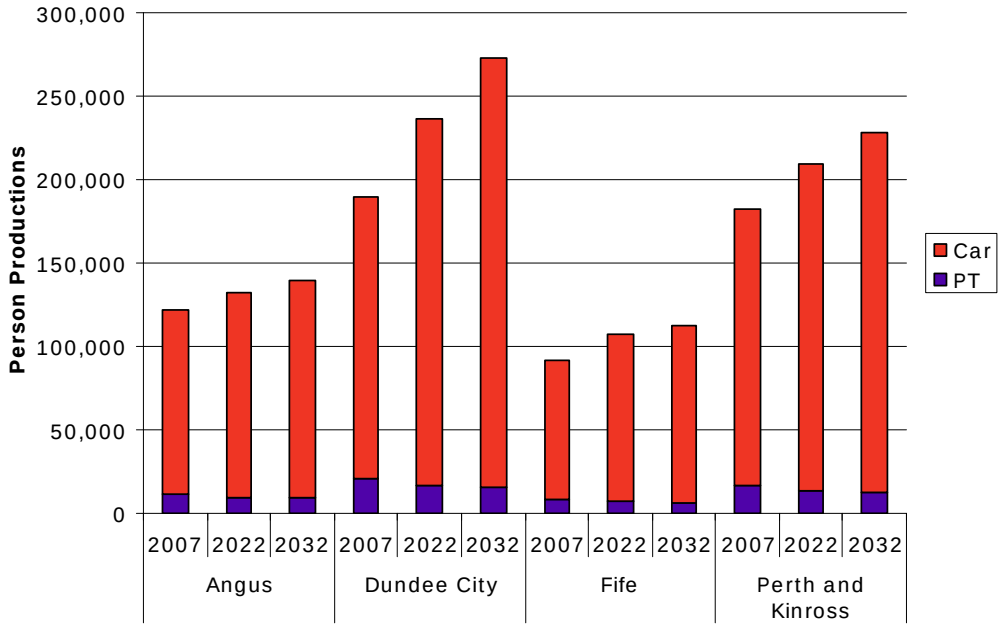

Figure 3.2 Forecast Change in Trip Productions by Mode – LU1

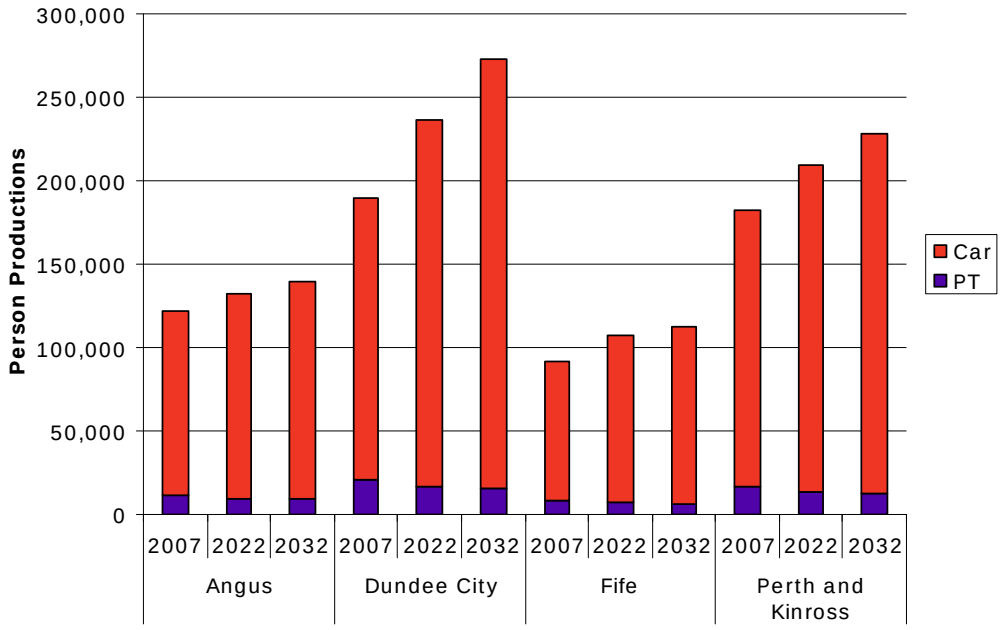

Figure 3.3 Forecast Change in Trip Productions by Mode – LU2

3.3.2 Inspection of the detailed comparisons in the Final Report and the above summary figures shows the additional travel demand across the TAYplan area associated with increase in population, households and employment in Scenario LU0 compared with LU1. There is marginal difference in the total travel demand across TAYplan between Scenarios LU1 and LU2. However, there is a difference at local area level that reflects the redistribution of the population in the TAYplan spatial strategy. There is a reduction in the overall public transport journey productions as well as the percentage of journeys made by public transport in all scenarios.

Car Availability

3.3.3 The Final Report includes predictions on the level of car availability by household size for each modelled scenario over time. This indicates a significant increase in car and public transport use by one car - one adult households in all scenarios over time. This can be attributed to a shift towards a greater volume of people living alone in future years. In general, car use is predicted to increase in all scenarios, with public transport use declining. Therefore, overall the proportion of journeys made by public transport is also predicted to decrease in all scenarios. There is a reduction, however, in the number of one car – two adult households. As noted previously, it should be borne in mind that the national model focuses on strategic inter-urban travel movements (and not intra-urban) and this is reflected in the forecast changes in demand by mode.

3.4 Travel Demand on the Network

3.4.1 Travel demand on the network refers to vehicles or passengers travelling on the transport network in or through an area, though not necessarily having an origin or destination there. This is measures in terms of total number of vehicles or passengers and is aggregated in terms of the distance travelled in a defined group of links (for example a corridor or area).

The Final Report includes comparisons of the forecast vehicle and passenger kilometres in 2032 for Scenarios LU0, LU1 and LU2. Figures 3.4 to 3.7 show the vehicle and passenger kilometres for the local authorities in the TAYplan area and the defined corridors for each modelled year and scenario.

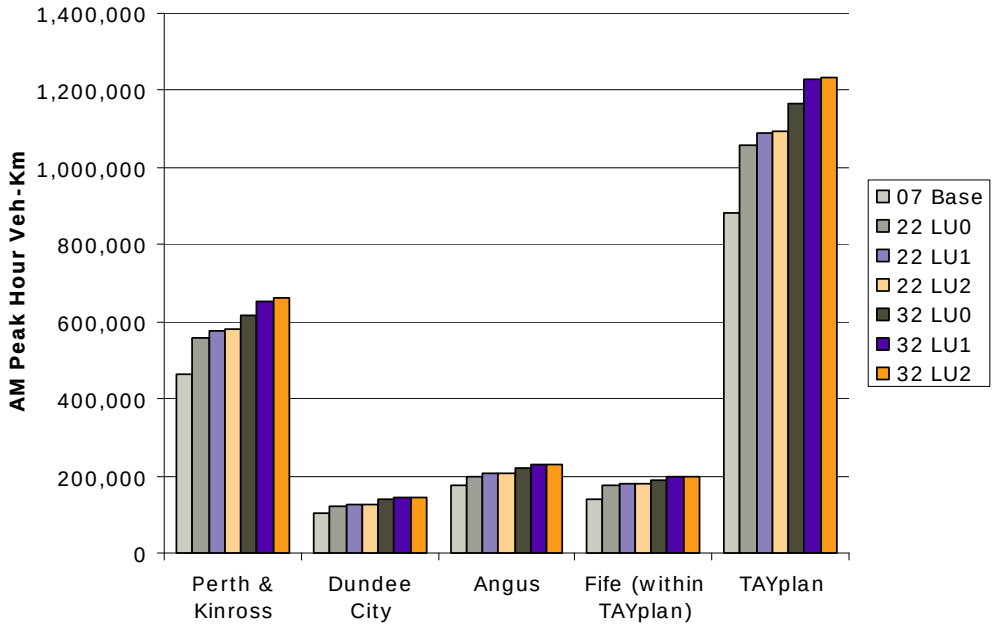

Figure 3.4 Forecast AM Peak Hour Vehicle Kilometres by Local Authority

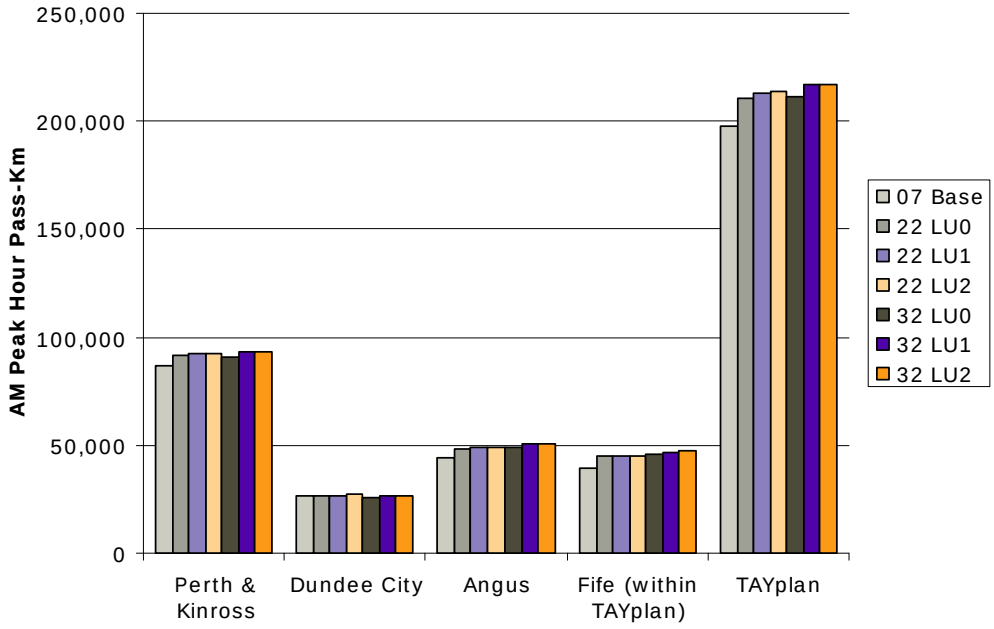

Figure 3.5 Forecast AM Peak Hour Passenger Kilometres by Local Authority

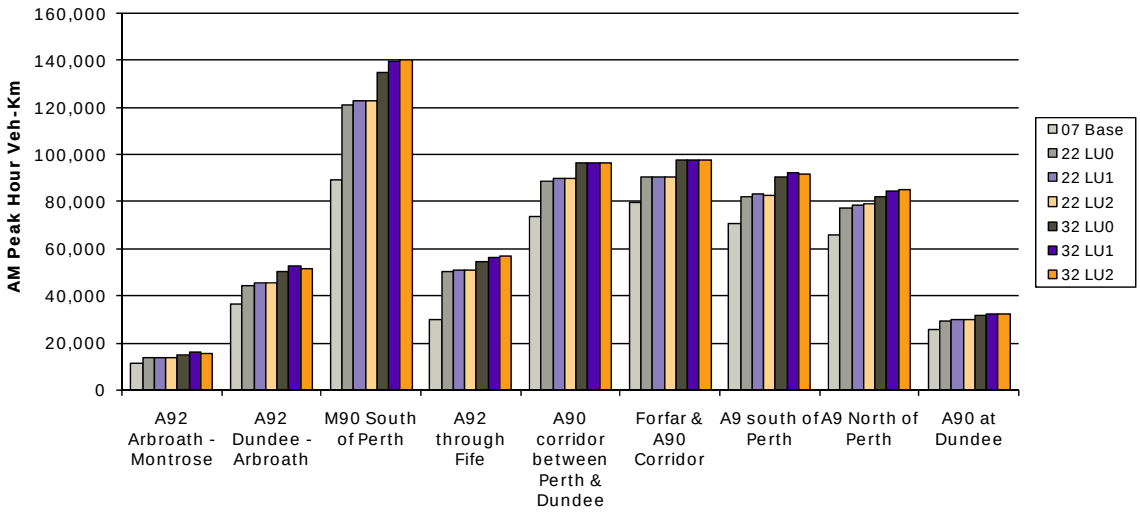

Figure 3.6 Forecast AM Peak Hour Vehicle Kilometres by Corridor

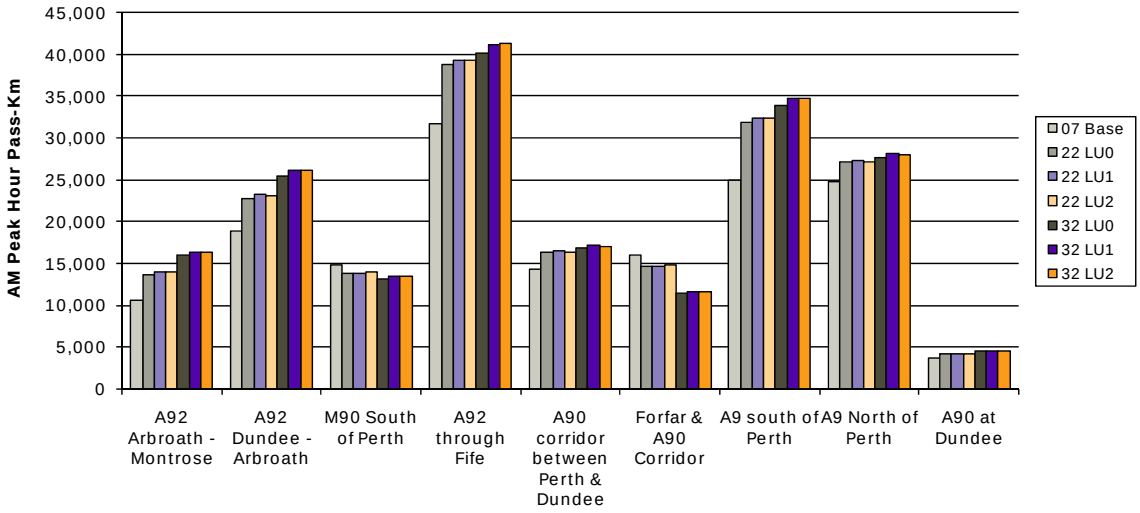

Figure 3.7 Forecast AM Peak Hour Passenger Kilometres by Corridor

3.4.2 Inspection of the detailed comparisons in the Final Report and the above summary figures reveals the following key points:

- there is an overall increase in vehicle kilometres across the TAYplan area and in all of the individual local authority areas in 2022 and 2032 in all scenarios compared with the 2007 base;
- there is an increase in vehicle kilometres in Scenarios LU1 and LU2 compared with Scenario LU0 in 2022 and 2032 which correlates with the associated increase in travel demand resulting from the greater population, household and employment forecasts;
- there is an overall increase in passenger kilometres in the TAYplan area in 2022 and 2032 in all scenarios compared with the 2007 base and in all of the individual local authority areas except Dundee City where there is a marginal decrease in Scenario LU0 in 2022 and all scenarios in 2032, noting that local bus travel is not fully represented in the model;
- the increase in passenger kilometres on the public transport network over time is despite a reduction in public transport trips indicating longer journeys are being made;
- there is an increase in passenger kilometres in Scenarios LU1 and LU2 compared with Scenario LU0 in 2022 and 2032 which correlates with the associated increase in travel demand resulting from the greater population, household and employment forecasts; and
- there is marginal change in the vehicle or passenger kilometres between Scenarios LU1 and LU2 at the local authority level and on the majority of the defined corridors.

Park and Ride Site Occupancies

3.4.3 The transport model includes forecasts of the park and ride travel demand and Table 3.1 shows the predicted occupancy of park and ride sites for each of the modelled years and scenarios.

Table 3.1 Park and Ride Site Occupancies (AM peak period)

2007 Base	2022 LU0	2022 LU1	2022 LU2	2032 LU0	2032 LU1	2032 LU2
467	376	387	387	409	413	428

3.4.4 The table shows there is a small decrease in park and ride site use within the TAYplan area predicted over time with a reduction in 2032 compared with 2007 (-58, -12%) with a greater dip in 2022 (-80, -18%). This reduction is likely to stem from a combination of factors including a change in the location of travel patterns over time and a transfer of park of ride trips to sites outwith the TAYplan area. There is a relatively marginal change in park and ride site use between scenarios. It should be noted that the national model provides a strategic representation of the demand for park and ride with less focus on detailed demand forecasts at local area level. Within the TAYplan area it is considered that the predicted P&R demand is at the lower end of anticipated forecasts.

Strategic Travel Movements

3.4.5 Analysis of the modelled traffic routing has been undertaken at key locations on the TAYplan boundary to identify the proportion of trips that have an origin and/or destination within TAYplan and which are strategic through trips (ie an origin and destination outwith the TAYplan area). This analysis has been undertaken for Scenario LU2 in the year 2032 for the AM peak hour. Figures 3.8 to 3.10 provide a summary of the level strategic traffic entering and exiting the TAYplan area.

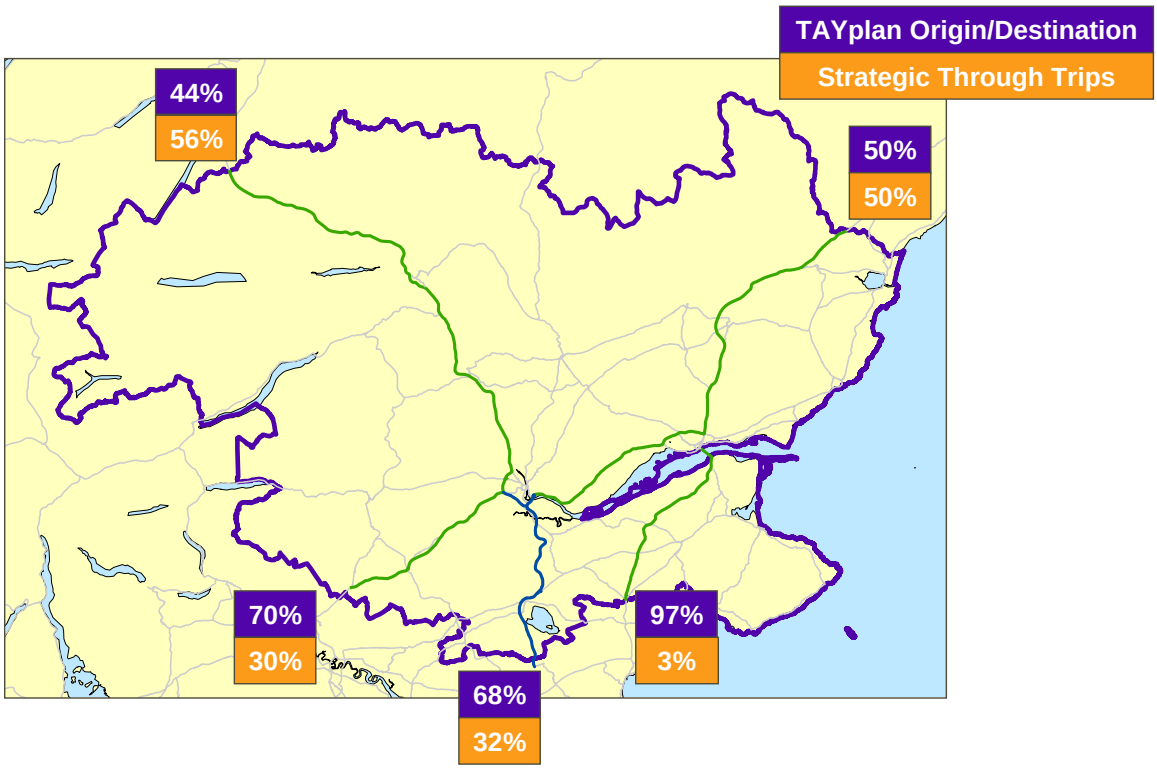

Figure 3.8 Strategic Travel Movements – LU2 Inbound (AM Peak Hour)

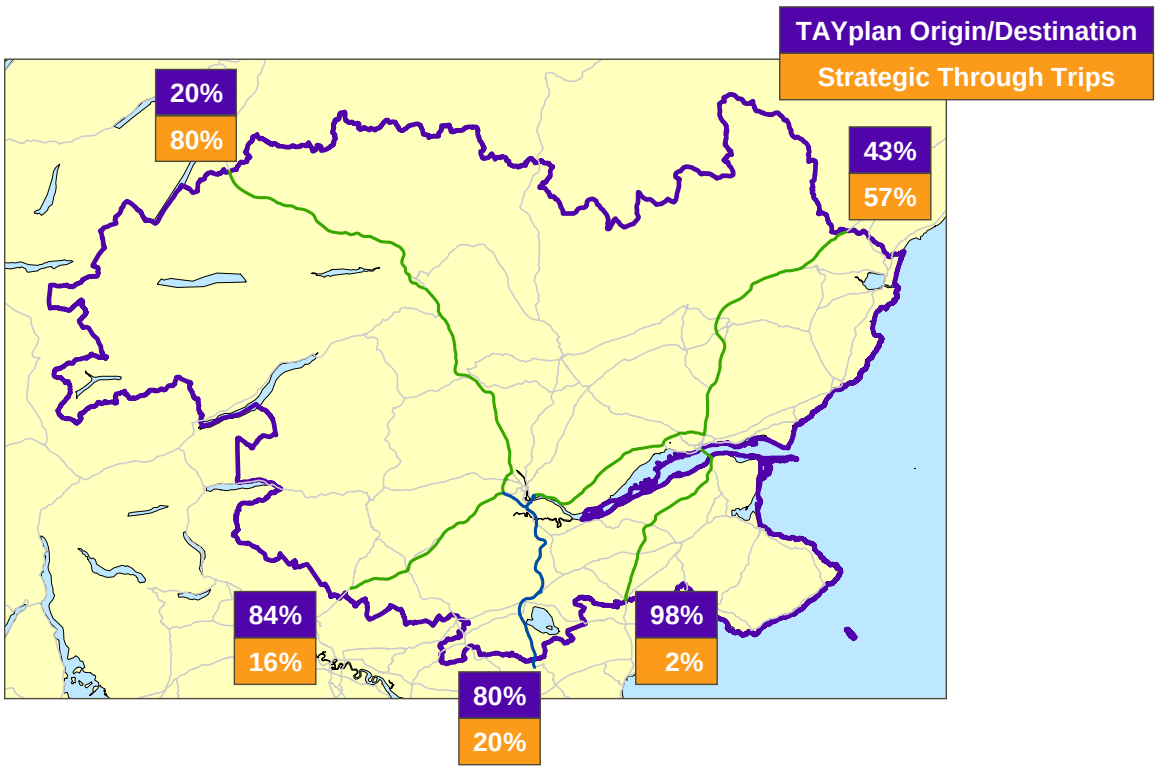

Figure 3.9 Strategic Travel Movements – LU2 Outbound (AM Peak Hour)

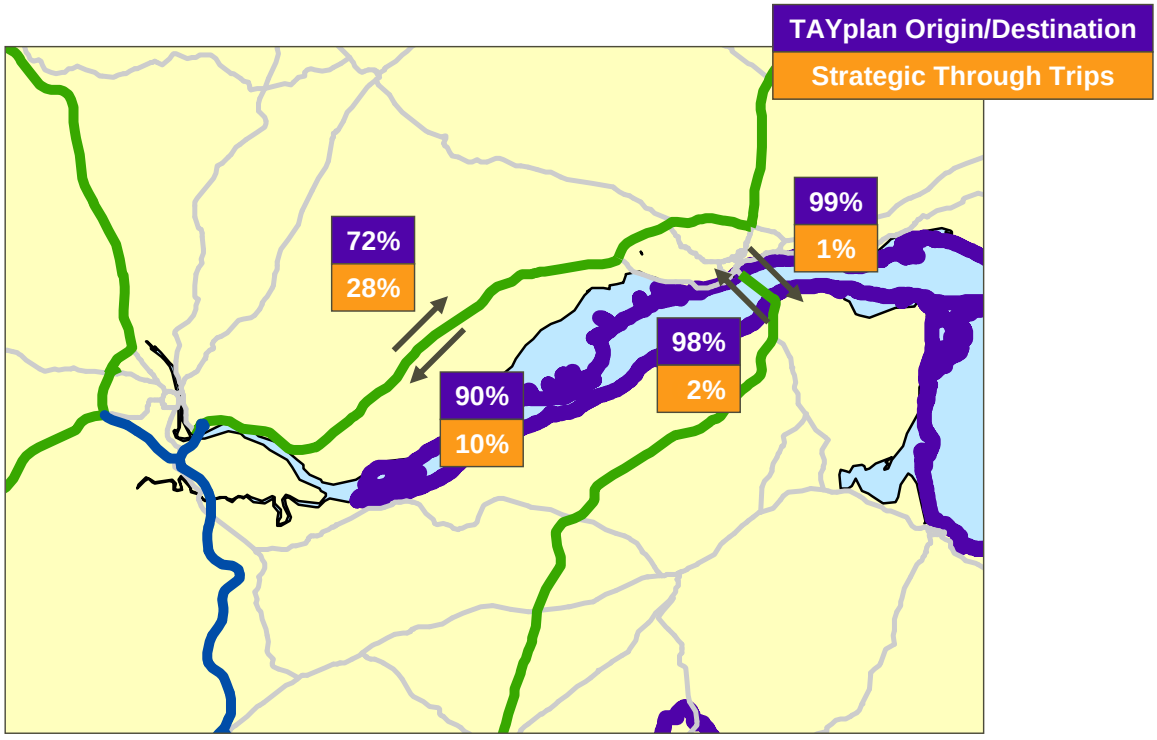

Figure 3.10 Strategic Travel Movements – LU2 Internal (AM Peak Hour)

3.4.6 Examination of the above figures indicates that a significant proportion of traffic on key TAYplan corridors are predicted to be strategic through-trips, particularly on the M90, A9 and A90. These trips do not originate or destinate in the TAYplan area and, therefore, the TAYplan spatial strategy will have minimal influence on the demand for such trips. The level of strategic through-trips on the A92 at Glenrothes and the TAY bridge is much smaller, which is reflective of these routes that primarily provide connections between Fife and Dundee. Therefore, it is anticipated that the impact of the SDP is more local within TAYplan than on strategic travel movements.

3.5 Operational Impact on Transport Network

3.5.1 The use of the National Transport model can indicate how changes in future traffic levels (as reported above) may impact on the strategic road network. These operational measures include changes in congestion, average car speeds and travel times.

3.5.2 The operational changes between scenarios include the combined impact of changes in the level of trip making (ie growth in car trips) and the effects associated with any transport infrastructure schemes. As noted previously, the analysis of the model forecasts focuses on the strategic transport network and does not aim to represent analysis of the more local transport network such as the urban areas of Dundee or Perth and within urban\suburban areas throughout TAYplan.

Average Vehicle Speed

3.5.3 The Final Report includes comparisons of the modelled average vehicle speeds in 2032 for each modelled year and scenario by local authority and defined corridors. Figure 3.11 provides a summary of the average peak hour speeds (kilometres/hr) on each defined TAYplan corridor.

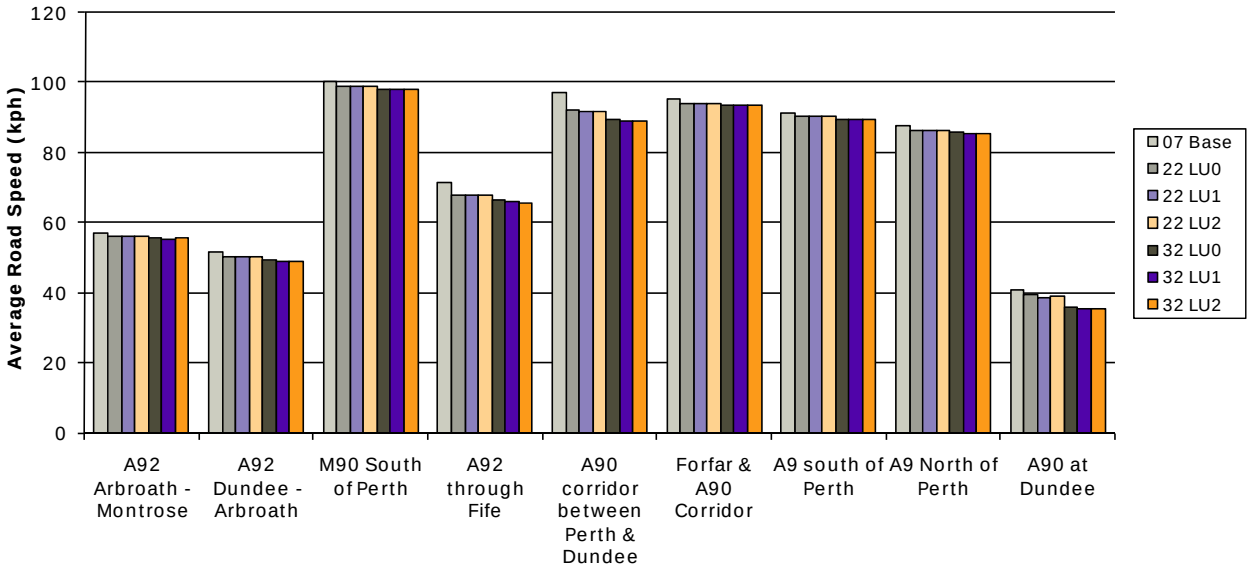

Figure 3.11 Average Vehicle Speeds by TAYplan Corridor

3.5.4 Inspection of the above figure and detailed comparisons in the Final Report indicates the following key points:

- there is total overall decrease in vehicle speed across the TAYplan area and within each of the Local Authority areas over time;
- Dundee City experiences the greatest reduction, which is indicative of increased congestion in the Dundee area associated with forecast increase in vehicle flows;
- in other local authorities the reductions are relatively marginal and there is negligible difference between the Scenarios;
- there is a reduction in average vehicle speeds on all of the TAYplan corridors over time in all scenarios, the greatest being the A90 at Dundee, this is indicative of a general increase in modelled congestion associated with the increase in vehicle flows;
- there is slight reduction in the average speed on some corridors associated with the additional traffic in Scenarios LU1 and LU2 compared with LU0, however, this is relatively subtle; and
- there are some minor differences between Scenarios LU1 and LU2 across the corridors, however, at some pinchpoints locations the reduction in average vehicle speeds is likely to be greater than the values shown and these will contribute to the lower average speeds in the relevant corridor.

Journey Times to Dundee and Perth

3.5.5 The Final Report includes comparisons of journey times to and from Dundee city centre and Perth for each scenario in 2032. Examination of the comparisons indicated the following key points:

- there is a slight increase in travel times to Dundee and Perth in Scenarios LU1 and LU2 compared with Scenario LU0, which is a result of the increased traffic in the network, which corresponds with the greater socio-economic forecasts and predicted travel demand; and
- there is a marginal difference between Scenarios LU1 and LU2 with a small increase in travel times in Scenario LU2 due to more concentrated pockets of congestion, particularly to the west of Perth, arising from the change in traffic flows associated with redistribution of households and population in the TAYplan spatial strategy.

Road Congestion

3.5.6 The Final Report includes comparisons of the ratio of flow / capacity for each modelled link for each scenario, which provides an indication of where congestion could form. Ratio of flow to capacity (RFC) is typically used to asses the performance of a link when modelling transport. Generally a design with an RFC of above 85%, in any stream of traffic, tends to lead to disproportionate increased in delays (ie congestion which is reflective of time spent below freeflow conditions).

3.5.7 Inspection of the figures reveals the following key changes over time and between scenarios:

- increased congestion in 2032 compared with 2022 in all scenarios, primarily at locations in and around Dundee, to the south-west of Perth and on the A914 north of Leuchars due to increased traffic flows;
- increased congestion in Scenarios LU1 and LU2 compared with LU0 at locations in Perth and Dundee, which is a result of the increased traffic in the network, which corresponds with the greater socio-economic forecasts and predicted travel demand;
- change in congestion in Perth in Scenario LU2 compared with LU1 arising from the from the change in traffic flows associated with redistribution of households and population in the TAYplan spatial strategy, with a reduction in congestion in central and south-west Perth and an increase west of Perth; and
- in general the change in modelled congestion in the national model is relatively subtle, whereas greater impacts would be anticipated on the local road network where more significant changes in traffic flow are expected.

Carbon Emissions

3.5.8 Annual vehicle carbon emissions for each of the local authorities in the TAYplan area have been estimated using the model forecasts for each year and scenario and this data is summarised in Figure 3.11. It should be noted that the emissions figures are for road based use only (ie car, LGV and OGV) and do not include bus, rail or motorbike.

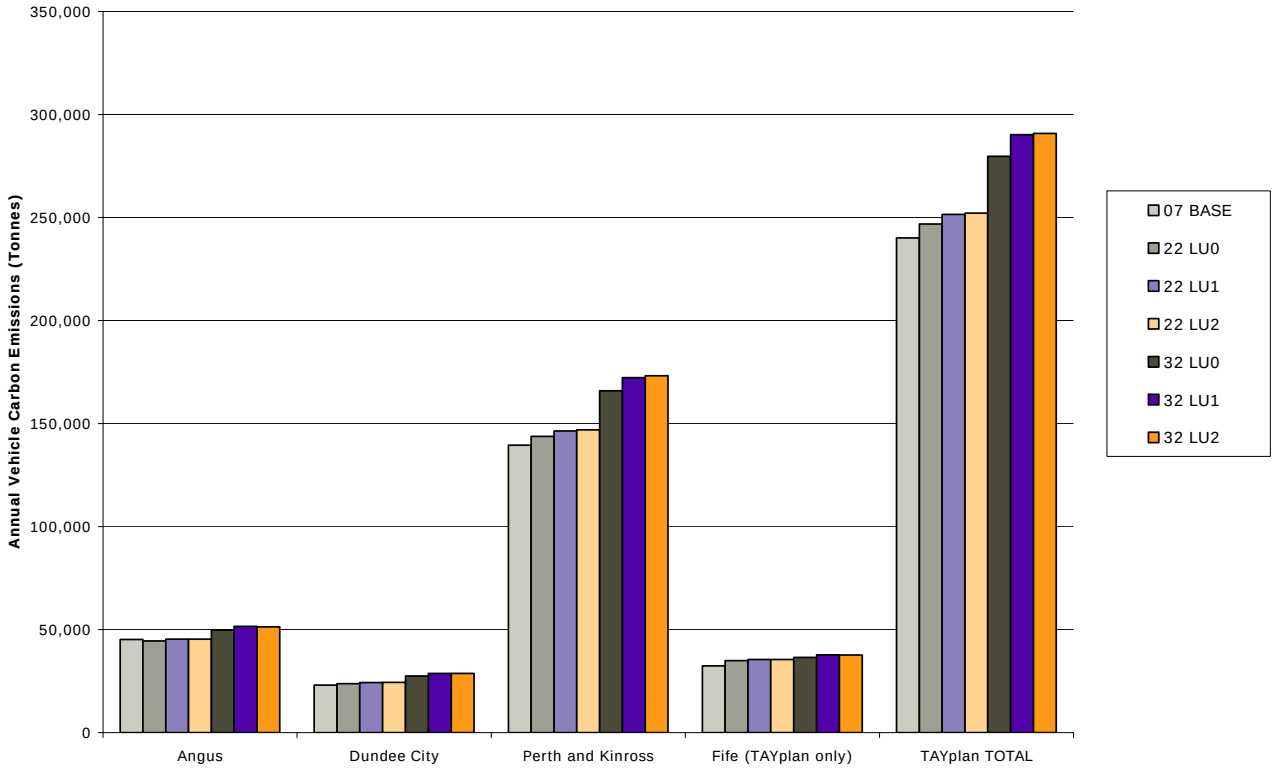

Figure 3.12 Annual Vehicle Carbon Emissions (Tonnes)

3.5.9 Examination of the above figure shows that carbon emissions are predicted to increase across each of the local authority areas as a consequence of greater levels of travel movements, leading to an increase across all scenarios in 2022 and 2032. There is an increase in carbon emissions associated with the additional traffic in Scenarios LU1 and LU2 compared with LU0. To a lesser extent, there are some differences between Scenarios LU1 and LU2, however, these are considered negligible in the context of the strategic modelling.

3.5.10 It should be noted that carbon emissions are based on, and therefore closely related to, the vehicle kilometre data. So, for example, carbon emissions are greatest in Perth and Kinross because the total vehicle kilometres are the highest there.

3.6 Impact of 'Do Minimum Plus' Transport Network

3.6.1 Following the assessment of the planning scenarios on the Do Minimum transport network as part of Phase 1, further assessment was undertaken to consider the impact of the 'Do Minimum Plus' transport intervention scenario (described above).

3.6.2 The Do Minimum Plus comprises the LATIS Do Minimum network with the addition of the following interventions:

- Upgrading of the A90 through Dundee along the Kingsway, which is representative of the STPR Project 29;
- The A9 to A94 link road, north of Perth; and
- The Tactran Park and Ride strategy.

3.6.3 Further details of these modelled interventions are provided in the Final Report.

3.6.4 The Do Minimum Plus intervention scenario was combined with the TAYplan Spatial Plan A (LU2) demographic scenario and a model run undertaken for the 2032 visionary year. The model forecast data was compared with the equivalent Do Minimum LU2 model run and this is presented in the Final Report. The following sections of this Note describe the comparison of the two transport scenarios in terms of the impact on travel demand and the operation of the road network.

Trip Productions

3.6.5 The Final Report includes comparisons of the forecast trip productions in 2032 for the Do Minimum and Do Minimum Plus scenarios. Figure 3.13 shows the total trip productions for the local authorities in the TAYplan area split by car and public transport (PT).

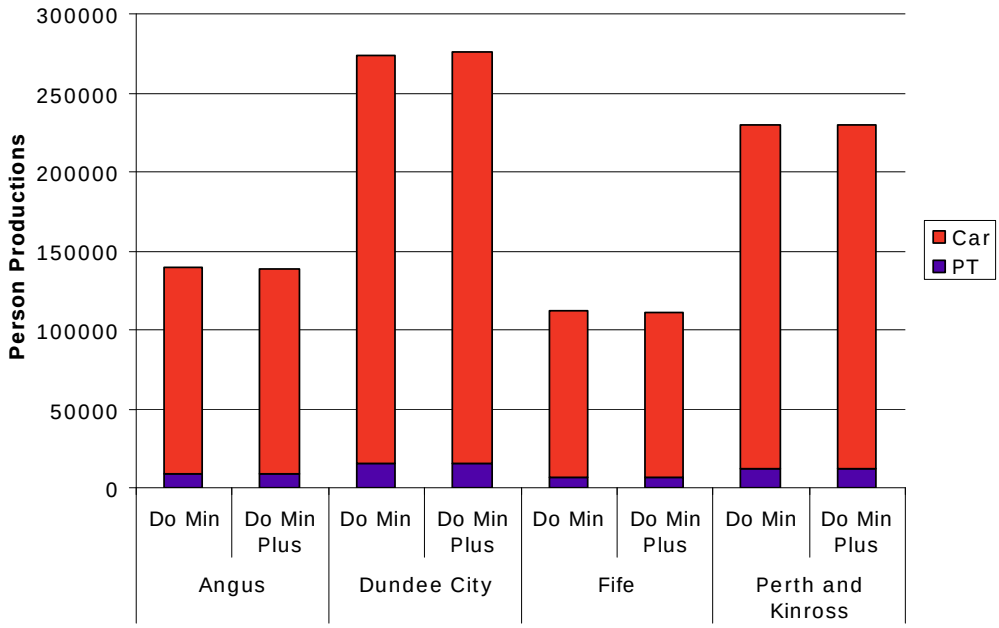

Figure 3.1 Forecast Trip Productions by Mode – LU2 Do Minimum vs Do Minimum Plus

3.6.6 Inspection of the detailed comparisons in the Final Report and the above figure shows there is a slight increase in travel demand in Dundee and Perth and across the TAYplan area as a result of the transport interventions included in the Do Minimum Plus scenario. There is also some redistribution of travel demand within Demand with more travel production in Dundee and Perth with a decrease in outlying areas. This is a result of a reduction in congestion in Dundee and Perth, which reduces travel costs and makes them a more attractive destination.

3.6.7 There is a marginal reduction in the overall public transport journey productions as well as the percentage of journeys made by public transport in the Do Minimum Plus scenario compared with the Do Minimum. This is considered negligible in the context of the strategic modelling, bearing in mind that the national model focuses on strategic inter-urban travel movements and not intra-urban (ie the model does not include local bus services), which is reflected in the forecast changes in demand by mode.

Travel Demand on Network

3.6.8 The Final Report includes comparisons of the forecast vehicle and passenger kilometres in 2032 for the Do Minimum and Do Minimum Plus scenarios. Figures 3.14 and 3.15 show the vehicle and passenger kilometres for the defined corridors in the TAYplan area.

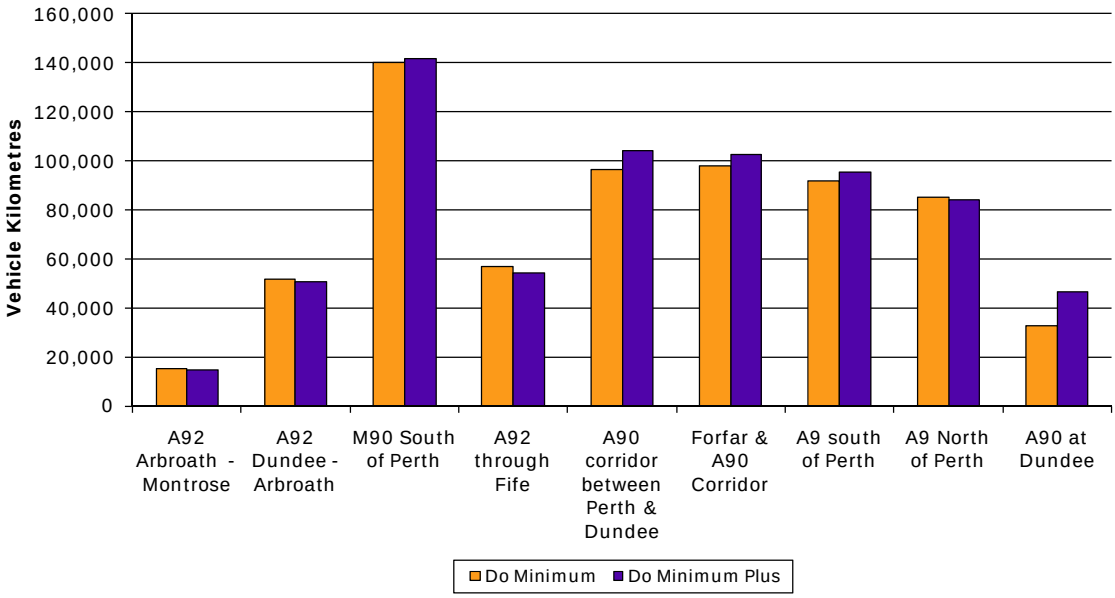

Figure 3.14 AM Peak Hour Vehicle Kilometres by Corridor – Do Minimum Plus

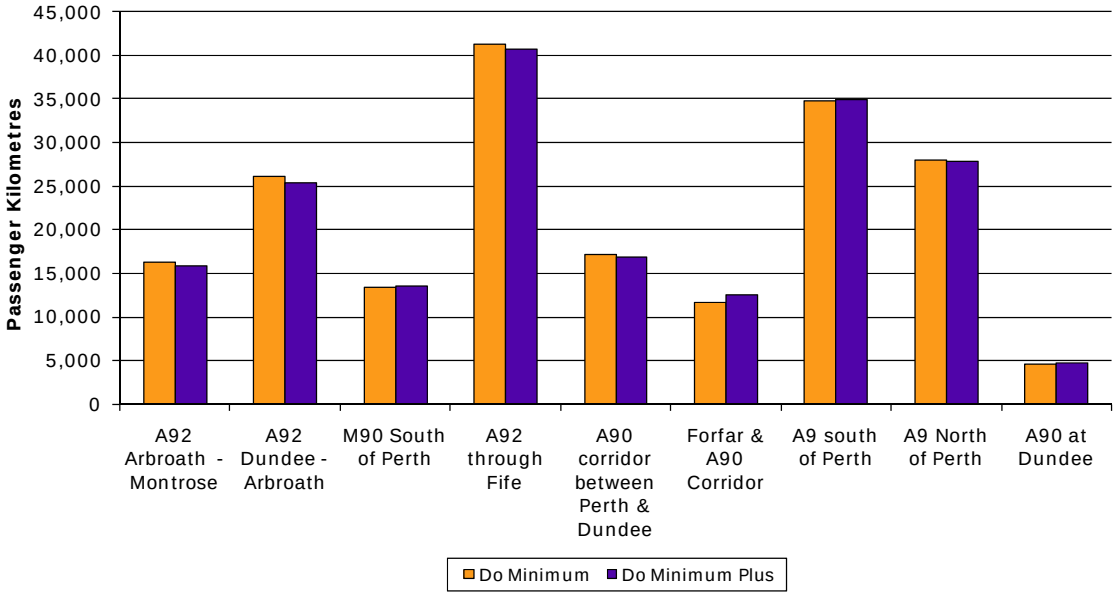

Figure 3.15 AM Peak Hour Passenger Kilometres by Corridor – Do Minimum Plus

3.6.9 Inspection of the detailed comparisons in the Final Report and the above figure reveals the following key points:

- an overall increase in vehicle kilometres across the TAYplan area in the Do Minimum Plus scenario compared with the Do Minimum, which is slightly greater than the associated increase in car travel demand indicating some longer trips are being made;
- an increase in vehicle kilometres in Dundee City, which is greater than the increase in trip productions indicating that longer journeys are being made, which is a result of a reduction in congestion arising from the A90 upgrade;
- slight increase in vehicle kilometres in Perth and Kinross and Angus and a slight decrease in Fife;
- a significant increase in vehicle kilometres on the A90 at Dundee, which results from the additional capacity associated with the upgrade included in the Do Minimum Plus;
- a change in vehicle kilometres is evident on the A90 between Perth and Dundee and onwards to Forfar with a reduction in vehicle kilometres on the A92 through Fife and Angus, which is due to increased capacity on the A90 at Dundee;
- a reassignment of traffic away from Dundee city centre and Perth city centre due to the A90 upgrade and the A9-A94 link respectively;
- a reassignment of traffic from the A92 through Fife onto the M90/A90 via Perth and the Kingsway at Dundee, which is a result of a reduction in congestion arising from the A90 upgrade;
- a reassignment of traffic from the B947/A984/B9099/A9 between Perth and Blairgowrie onto the A93, which is a result of addition of the A9-A94 link enabling vehicles to travel via the A93 and this new link providing a faster route between Blairgowrie and west of Perth and the A9;
- a reassignment of traffic onto the B953, which is a result of vehicles choosing to travel via the new A9-A94 providing an alternative route between the north-west of Perth and Dundee and beyond, local knowledge of this route however indicates that such reassignment would be unlikely given the restrictive geometry of this road that is not fully represented in the national model;
- an overall slight reduction in passenger kilometres in the TAYplan area in the Do Minimum Plus scenario compared with the Do Minimum, which correlates with the associated decrease in PT travel demand and is considered negligible in the context of the strategic modelling; and
- there is, however, a slight increase in passenger kilometres on the A90 Forfar corridor despite a reduction in trip productions indicating some longer journeys are being made because of the reduction in road congestion and, hence, bus journey times.

3.6.10 Technical Note 1 (MVA Consultancy, October 2010) provides further information on the modelled traffic routing impacts of the Do Minimum Plus transport intervention scenario. This indicates that there is a relatively minor change in the volume and proportion of strategic through traffic as a result of the schemes included in the Do Minimum Plus scenario. There is, however, a more significant reassignment of traffic onto the A90 at Dundee resulting from the capacity relief on the A90 in the Do Minimum Plus, which reduces journey times and makes it a more attractive route. As a consequence, the A90 would attract traffic from alternative (Riverside) routes across the city for either all or part of their

journey from the Do Minimum Scenario. It should be noted that the design of an A90 improvement at Dundee will have critical impact on the actual change in traffic routing. The provision of a bypass would have significantly different traffic volume and composition (i.e. local/strategic traffic) than the provision of an on-line upgrade solution for the A90 at Dundee. Neither option has been tested through this current work and the figures presented are indicative for 'theoretical' upgrade representation of STPR Project 29.

Park and Ride Site Occupancies

3.6.11 The predicted occupancy of park and ride sites for each Local Authority in the TAYplan area was reported for the Do Minimum Plus scenario. This indicated an increase in park and ride site use across the TAYplan area with the addition of the TACTRAN park and ride strategy in the Do Minimum Plus scenario. As noted previously, the national model provides a strategic representation of the demand for park and ride with less focus on detailed demand forecasts at local area level. The modelled under-prediction is likely to be a consequence that the national model under-predicts the reduction in travel cost associated with new P&R sites and, therefore, the majority of demand at new sites is derived from existing P&R sites. Therefore, it can be considered that modelled demand associated with the P&R strategy in the Do Minimum Plus scenario is at the lower end of anticipated forecasts.

Average Speeds and Congestion

3.6.12 Figures 3.16 and 3.17 provide a summary of the modelled change in average AM peak hour vehicle speeds (kilometres per hour (kph)) between the LU2 Do Minimum and Do Minimum Plus scenarios for each local authority and by TAYplan corridor.

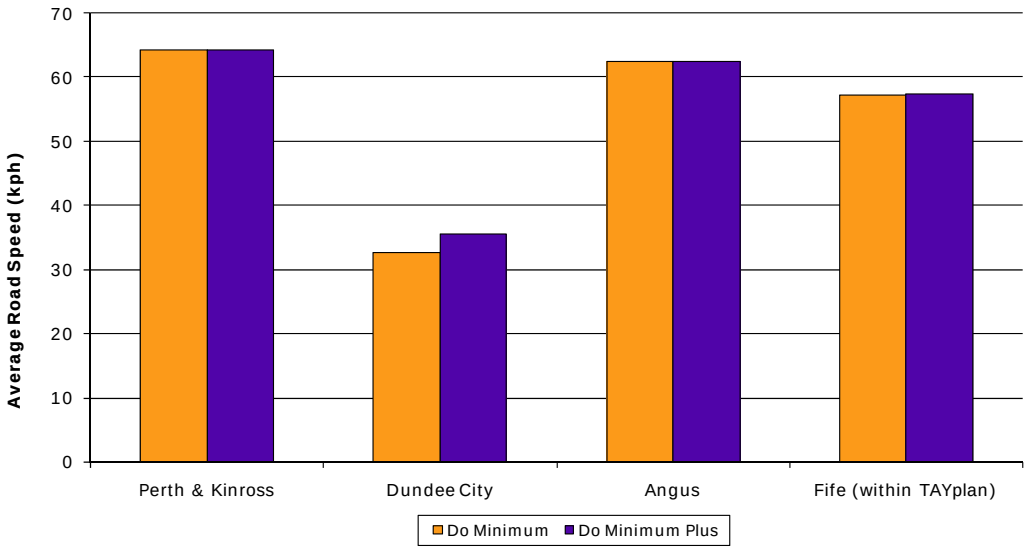

Figure 3.16 Average Vehicle Speeds by TAYplan Local Authority- Do Minimum Plus

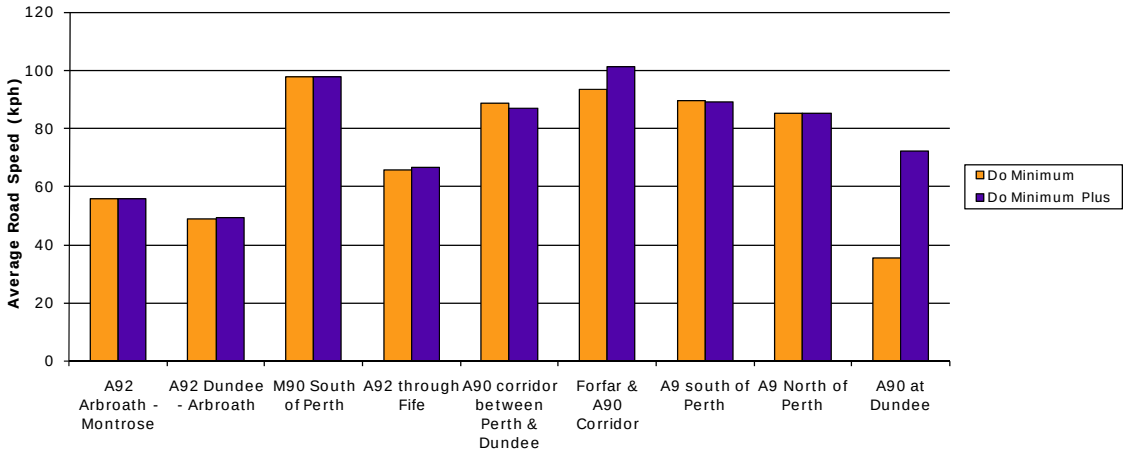

Figure 3.16 Average Vehicle Speeds by TAYplan Corridor - Do Minimum Plus

3.6.13 Inspection of the above figures shows that Dundee City local authority experiences the greatest increase in average speed (noting that local traffic is not represented in the national model). In other local authorities the changes in average speed are negligible. The A90 corridor at Dundee experiences the greatest increase in average speed, more than doubling to 72.5 kilometres per hour which is reflective of the desired representation of the A90 upgrade which is to provide freeflow travel. The A90 Forfar corridor also experiences an increase in speed that is associated with the A90 upgrade included in the Do Minimum Plus scenario. The other corridors experience more marginal changes, which are largely due to changes in traffic assignment

3.6.14 The Final Report includes comparisons of the ratio of flow / capacity for each modelled link for the LU2 Do Minimum and Do Minimum Plus scenarios, which provides an indication of where congestion could form. This reveals the following key changes between the LU2 Do Minimum and Do Minimum Plus scenarios:

- reduction in congestion within Dundee due to the re-assignment of traffic onto the upgraded A90, which now experience greater levels of congestion;
- reduction in congestion within Perth, due to the re-assignment of traffic onto the new A9-A94 link road thus avoiding the city centre;
- slight increase in congestion on the A9 to the west of Perth due to changes in traffic distribution and assignment; and
- elsewhere there is .relatively little difference in congestion between the Do Minimum and Do Minimum Plus scenarios.

Carbon Emissions

3.6.15 Annual vehicle carbon emissions for each of the local authorities in the TAYplan area have been estimated for the Do Minimum Plus scenario and compared with the Do Minimum. This has indicated that carbon emissions are predicted to increase across each of the local authority areas, with the exception of Fife, which correlates with the increase in vehicle kilometres.

3.7 Estimated Impact of TAYplan Spatial Strategy B

3.7.1 Phases 1 and 2 of the LATIS assessment considered Strategy A (Scenario LU2) which would see 'most of the new development in Dundee and Perth with the remainder largely concentrated in principal settlements' and this is described throughout this Report.

3.7.2 Following Phase 1 and 2, given the strong support received for Spatial Strategy A during the TAYplan MIR consultation, it was agreed with the Working Group that the specified Phase 3 detailed assessment would not be necessary as the impact of TAYplan Spatial Plan B could be adequately estimated using information from the assessment work already undertaken.

3.7.3 Strategy B is similar to Strategy A, but would see 'a more dispersed pattern of housing development around Perth and into the Carse of Gowrie'. This is the relocation of approximately 7000 new households by 2032 from the west of Perth in Strategy A to the east of Perth in Strategy B. In traffic terms this would probably result in an increase in traffic (approximately 500 vehicles in the peak hour) destined for Dundee in Strategy B compared with Strategy A and a corresponding reduction in traffic destined for Perth. It should be noted that these figures are estimates based on the work undertaken during Phase 1. Given the preferred status of Strategy A, these estimates are considered sufficient for the current appraisal requirements of the Working Group but a more detailed transport assessment would be required if Strategy B were to be considered further.

4 Summary and Conclusions

4.1.1 The Final Report has described the assessment and comparison of the following planning forecast scenarios and their impact on the strategic road network in TAYplan:

- LU0: the planning data and associated forecasts included in the current version of the National Model;
- LU1: the development plan currently included in the National Model, but with population totals for the TAYplan area constrained to GRoS sub national projections; and
- LU2: LU1 above, but with the preferred TAYplan spatial strategy A.

4.1.2 In the absence of any other available modelling capabilities, the National Model has been used to prepare an assessment of the strategic transport and land use impacts throughout the TAYplan area and to provide a Land Use comparison of the TAYplan area in the context of the rest of Scotland. The analysis of the model forecasts focuses on the strategic transport network and, in particular, inter-urban travel. It does not aim to represent analysis of the more local transport network such as the urban areas of Dundee or Perth and within urban\suburban areas throughout TAYplan.

4.1.3 Comparisons of the socio-economic forecasts for each scenario have been presented, which indicate the increase in population, households and employments in Scenarios LU1 and LU2 compared with LU0. There is a significant change between LU1 and LU0 in terms of additional population and households in the TAYplan area. Scenario LU2 shows a change in the location of population and households arising from TAYplan spatial strategy in the wider Perth area.

4.1.4 The changes in planning forecasts results in a corresponding change in travel generators, which have been modelled using the LATIS national transport model. The increase in population, households and employment in Scenarios LU1 and LU2 results in the prediction of a greater travel demand with increased traffic levels and associated congestion.

4.1.5 The redistribution of the population in wider Perth and, hence, travel demand, in Scenario LU2 compared with LU1 indicates there will be some traffic impacts, however, these are relatively subtle in the context of the strategic transport network. Greater impacts are predicted on the local road network where more significant changes in traffic flow are expected. However additional, more detailed assessment would be required to identify the specific locations and determine the level of impact, which is outwith the scope of this work and the remit of the national transport model. This type of analysis would be more appropriately undertaken with more detailed modelling.

4.1.6 A significant proportion of traffic on key TAYplan corridors are strategic through-trips, particularly on the M90, A9 and A90. These trips do not originate or destinate in the TAYplan area and, therefore, the TAYplan spatial strategy will have minimal influence on the demand for such trips. Therefore, it is anticipated that the impact of the SDP is more local within TAYplan than on strategic travel movements. However, there are points on the transport network where there may be conflict between local and strategic movements, especially where there is focussed development.

4.1.7 The impact of the ‘Do Minimum Plus’ intervention scenario has been considered in terms of the change in travel demand and network operation compared with the LU2 Do Minimum scenario. This has revealed that the there is a slight increase in travel demand in Dundee and Perth and across the TAYplan area as a result of the transport interventions in Dundee and Perth, which reduce congestion and travel costs and makes them more attractive destinations.