Accessing Scotland and the world from the boundary of Europe-Scotland's approach

[1]Hugh Gillies. Presenting Author, [2]Stephen Cragg, Co-Author

[1]*Head of Technical Analysis, Transport Scotland*, [2]*Associate, SIAS Ltd*

Abstract

This paper will explain how national, regional and local transport policies, interventions and land-use are considered within a consistent framework to inform the decision makers on the impact they will have on providing access across the spectrum of local to global. A key element in that framework is the provision of a national model capable of providing clear and understandable outputs that are meaningful to the layperson.

Scotland's diverse geography requires an approach to national and global accessibility which covers road, rail, ferry, ship and air. Our location in regards to Great Britain, the British Isles, Europe and the World presents interesting challenges on ensuring access to employment, markets and services.

Transport Scotland is the Scottish Government's agency for the delivery of the national strategic transport infrastructure. To deliver this, Transport Scotland must provide a vision of the future of Scotland's transport infrastructure which helps toward the delivery of the government's five main objectives: a wealthier and fairer, healthier, safer and stronger, smarter, and greener Scotland.

The delivery of this vision requires both a methodology and the tools to appraise the wide variety of policies and schemes that are promoted by our stakeholders - everyone in Scotland. The methodology is provided by Transport Scotland through the Scottish Transport Appraisal Guidance (STAG). This is an objective-led approach which includes:

- An analysis of existing and potential transport problems, constraints and opportunities.
- The setting of transport planning objectives that capture the essence of the evidence based transport problems, constraints and opportunities to be addressed.
- The generation, sifting and development of options identifying those that meet the study objectives.

One of the tools developed by Transport Scotland is a multi-modal transport and land-use model which covers 95% of Scotland's population. The Transport Model for Scotland (TMfS) is used to test potential transport interactions and policies at the national level. The model is also made available to other parties to test more regional and local transport interactions, policies and land-use plans.

Transport Scotland recognise that, to allow joined-up thinking on delivering sustainable and accessible transport and land-uses, it has to work in partnership with its public and private stakeholders.

Introduction

Scotland has high aspirations. The Scottish government's core objectives are to create a wealthier and fairer, healthier, safer and stronger, smarter, and greener Scotland. Following from this, the Government's transport purpose is to focus investment on making connections across and with Scotland better, improving reliability and journey times, seeking to maximise the opportunities for employment, business, leisure and tourism. Additionally, to provide

sustainable, integrated and cost effective public transport alternatives to the private car, connecting people, places and work, across Scotland.

The realisation of the government's objectives and transport purpose will require a wealth of innovative analysis and forward thinking of which accessibility through land use planning and transport provision have a key role. Changes in land use help drive the economy and the economy drives the need for land use to change. In turn, this requires changes to the transport network to provide the accessibility required to realise the benefits accrued to society.

This paper will explain how Scotland's national, regional and local transport policies, interventions and land-uses are considered within a consistent national framework to maximise the opportunities to the economy through the change process. This framework has been developed with the aim of better informing decision makers on the impact they will have on providing access across the spectrum at the international and national scale down to the regional and local scale.

Within this framework, innovative analysis tools have been developed to assist in assessing future land use implications and the required transport provision in order to meet the needs of a growing and rapidly changing economy. One such tool, the Transport Model for Scotland (TMfS), which links the strong interaction between land use and transport needs will be discussed.

How well is Scotland connected?

Scotland lies at the north-western boundary of Europe. Within Scotland there are broadly three physical geographies: the relatively flat central belt of the mainland, mountainous regions to the north and south of the central belt, and the islands. Scotland's population is approximately 5 million, the majority of which (75%) is resident in the central belt, with 2% living on a hundred islands of which only one is connected to the mainland by a fixed link.

Internationally Connected
Scotland's only land border is at its southern edge with England. There are two major connecting points that link the two countries at Gretna, in the south-west and Berwick-upon-Tweed in the south-east. These major connections in the south-west and south-east are covered by both road and rail. By sea, Scotland is connected by regular ferry services to Northern Ireland, the Faroes and Belgium. Six international airports provide direct scheduled passenger services to about one hundred international destinations in around thirty countries. Figure 1 shows the Countries (and States for the USA and Canada) to which Scotland has direct (i.e. no interchange) passenger access by road, rail, air and ferry.

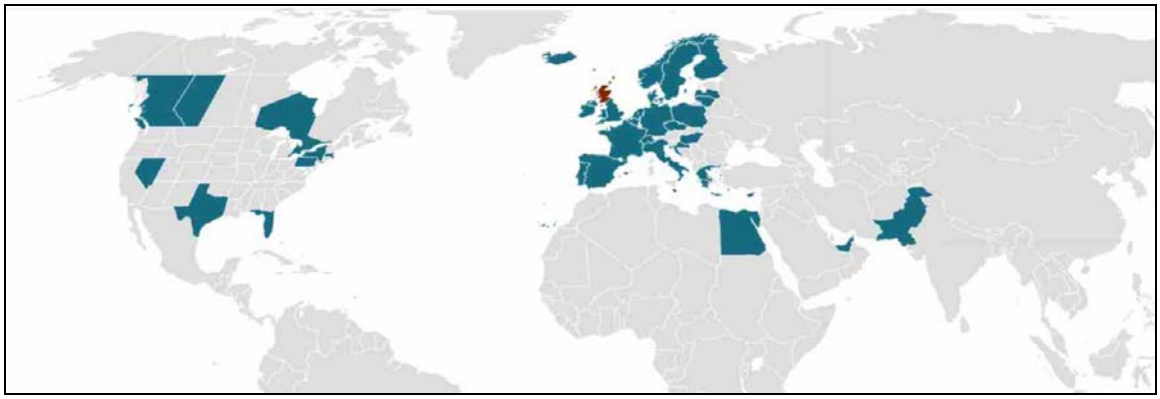

Figure 1: Countries / States with direct passenger access from Scotland

Nationally Connected

Within Scotland, there is a National Strategic Transport Network covering land, sea and air modes which is illustrated in Figure 2. The strategic transport network links all major Scottish cities by road and rail. Air travel is available between a number of the major cities along with links to some of the larger islands. Ferry services exist from the mainland to the majority of the one hundred islands.

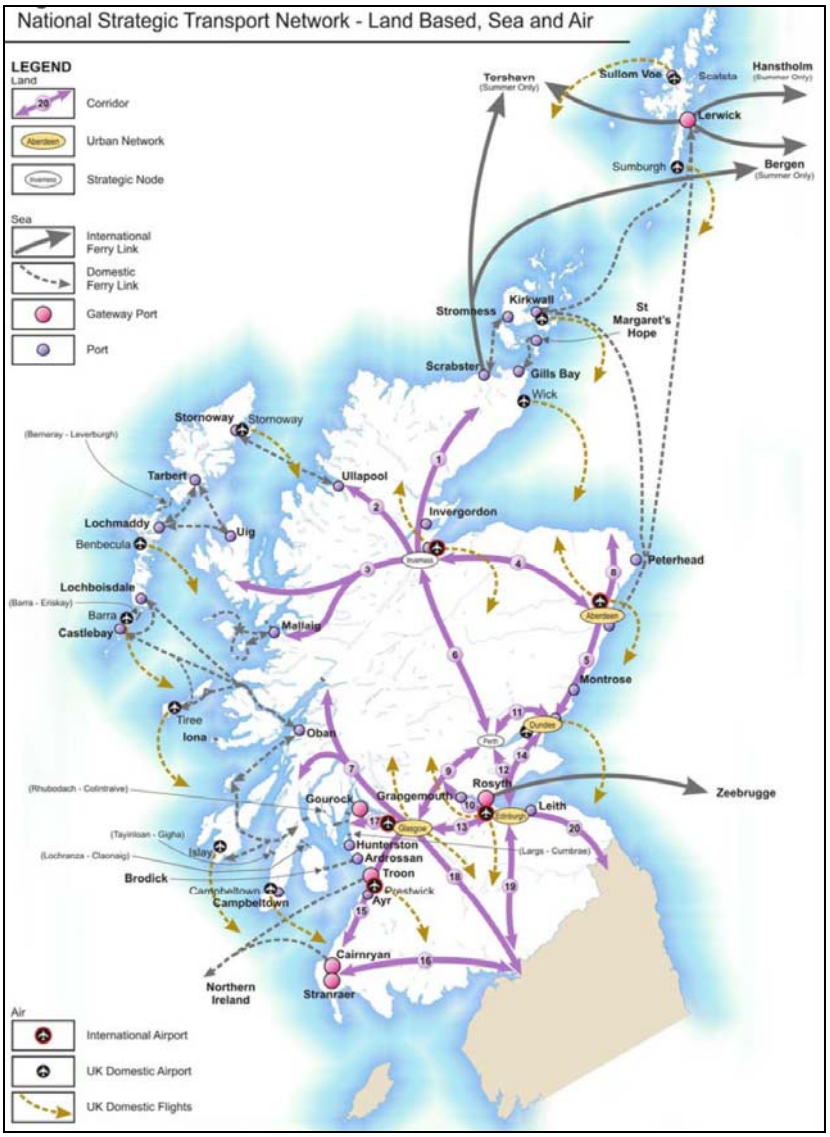

Figure 2: National Strategic Transport Network – Land, Sea and Air

What are Scotland's Transport Challenges? – Meeting the challenge of change

The only constant in life is change. The important issue is to, as best as we can, predict how these changes will affect the future and provide for it.

Changes to transport infrastructure take place both reactively and proactively. Reactive changes take place when an unforeseen problem develops. Proactive change is the real challenge. This requires a vision of the future along with the tools to translate what this vision means in reality.

Scotland has a wealth of resources both physical and human. Using these resources to their full potential is a challenge. Transport is a derived demand; we don't travel for the sake of travelling. We travel because either we or the goods we want are not where they are needed. It is important that people can get to jobs; goods can get to market; tourists can

tour; etc. To achieve this requires the delivery of an efficient and sustainable transport infrastructure to support appropriate land-use development.

Scotland's economy has an annual average growth rate of just under 2%. In conjunction with an increasing population, the ability, desire and distances travelled by the Scottish population is growing. Pressure on the transport infrastructure is continually increasing.

The main factors driving the change to how we travel are:

- Land use (where we locate housing, retail, business, industrial, leisure, etc.)
- Economy (how far we can travel by what mode, what goods we can afford, etc.)

These factors are inextricably joined and a common theme between them is accessibility. Houses are located such that their occupants can access jobs and amenities. Businesses and amenities are developed in locations that people can get to. The growth of the economy is dependant on access to the right people and products at a competitive price.

Changes in land use come through national, regional and local policy decisions made to help drive the economy. The economy in turn drives the need for land use to change. In turn, this requires changes to the transport network to provide the accessibility required to realise the benefits to the economy.

One example of this challenge is the how labour market catchment areas will change. For Scotland's four largest cities, the labour market within a one hour commute is forecast to decline as levels of congestion rise (see Table 1) based on existing and committed changes to transport infrastructure.

City	Labour Catchment within 1 hour commute (people)		
	2005	2022	Change
Aberdeen	260,000	253,000	-2.7%
Dundee	450,000	448,000	-0.4%
Edinburgh	800,000	568,000	-27.0%
Glasgow	1,600,000	1,573,000	-1.7%

Table 1: Change in Labour Catchment 2005 to 2022

Through an understanding of how land use and transport infrastructure combine to inform such predictions, Scotland is able to take a proactive approach to managing this change. This will enable an acceptable level of economic growth to be sustained and to meet the country's key objectives.

How are these challenges realised and opportunities delivered?

There is a strong cohesion between land use planning, which is one of the primary drivers for changing the demand to travel, and transport planning. This must be understood and analysed in order to provide an accessible Scotland. Within Scotland, national, regional and local bodies exist for both land use planning and transport planning. The structure of these and how they work together is explained below.

Transport Planning Delivery

There are three tiers to the maintenance and delivery of transport infrastructure in Scotland: the Scottish Government, Regional Transport Partnerships and Local Authorities. Together

they seek to meet the challenges and deliver a continually evolving transport network to meet the needs of the population.

Nationally
The Scottish Government is directly responsible for the Trunk Roads through its agency Transport Scotland. This responsibility covers the maintenance of the current network, analysis of what is required in the future and the effective and efficient delivery of the identified requirements. Transport Scotland responsibilities also cover planning future rail services and targeting future rail investment, although rail services are operated by private companies.

The Scottish Government also co-ordinates the National Transport Strategy and liaises with the Regional Transport Partnerships (to be discussed). It also sets local road, aviation, bus, freight and taxi policy, and is responsible for ferries, ports and harbours.

Regionally
Regional Transport Partnerships were established in 2005 to strengthen the planning and delivery of regional transport to better serve the needs of people and businesses. There are seven partnerships each covering a number of local districts (see in Figure 3) and their role is to bring together local authorities and other key stakeholders to take a strategic approach to transport in their region. This approach is delivered through a Regional Transport Strategy developed individually by each region to meet the region's specific needs. Some of these partnerships are also responsible for the delivery of transport services.

Locally
Local authorities are responsible for the delivery and maintenance of the local road infrastructure. In densely populated areas the local authority remit may be just one city. In more sparely populated areas such as the Highlands in the North of Scotland, the local authority region may cover a much larger geographical area. Dependent on their size and structure, the local authorities have wide ranging and differing challenges to meet in providing for their individual transport needs.

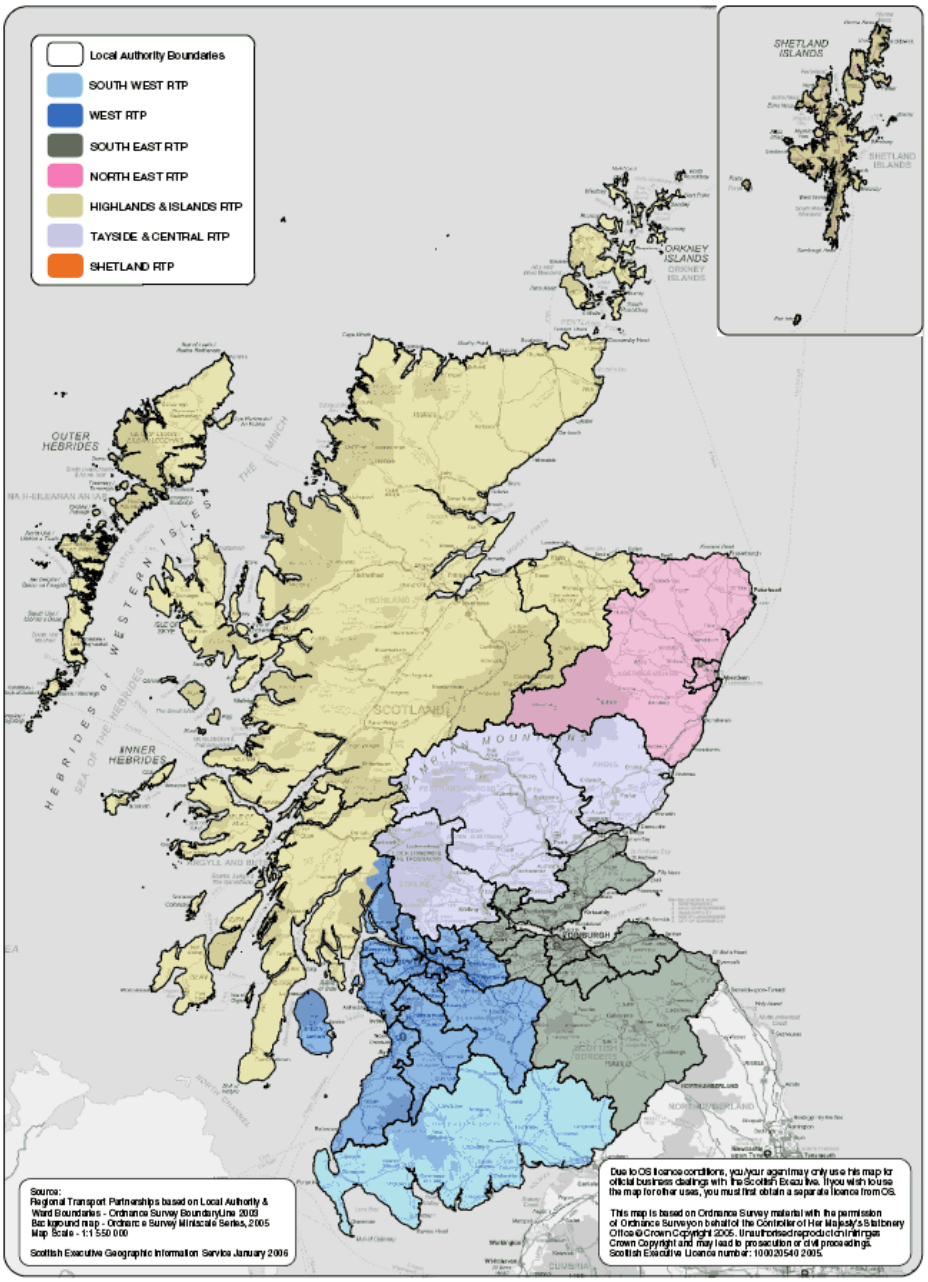

Figure 3: Scottish Regional Transport Partnerships

Land Use Planning Delivery

Nationally

The Scottish Government is responsible for the National Planning Framework and providing policy and advice at a national level on planning issues. The National Planning Framework guides the spatial development of Scotland for the next 20 years. It sets out a vision of Scotland in which other plans and programmes can share and to which they can contribute.

Regionally

Regionally, there are seventeen Structure Plan areas (see Figure 4) of which six cover more than one local authority. With the exception of one, the seventeen Structure Plan areas each fall into one of the Regional Transport Partnerships areas in their entirety.

The Structure Plans takes a long-term view of development within their region, considering the general scale of development and broadly where it should be located. Each Structure Plan is submitted to the Scottish Government for approval at the national level.

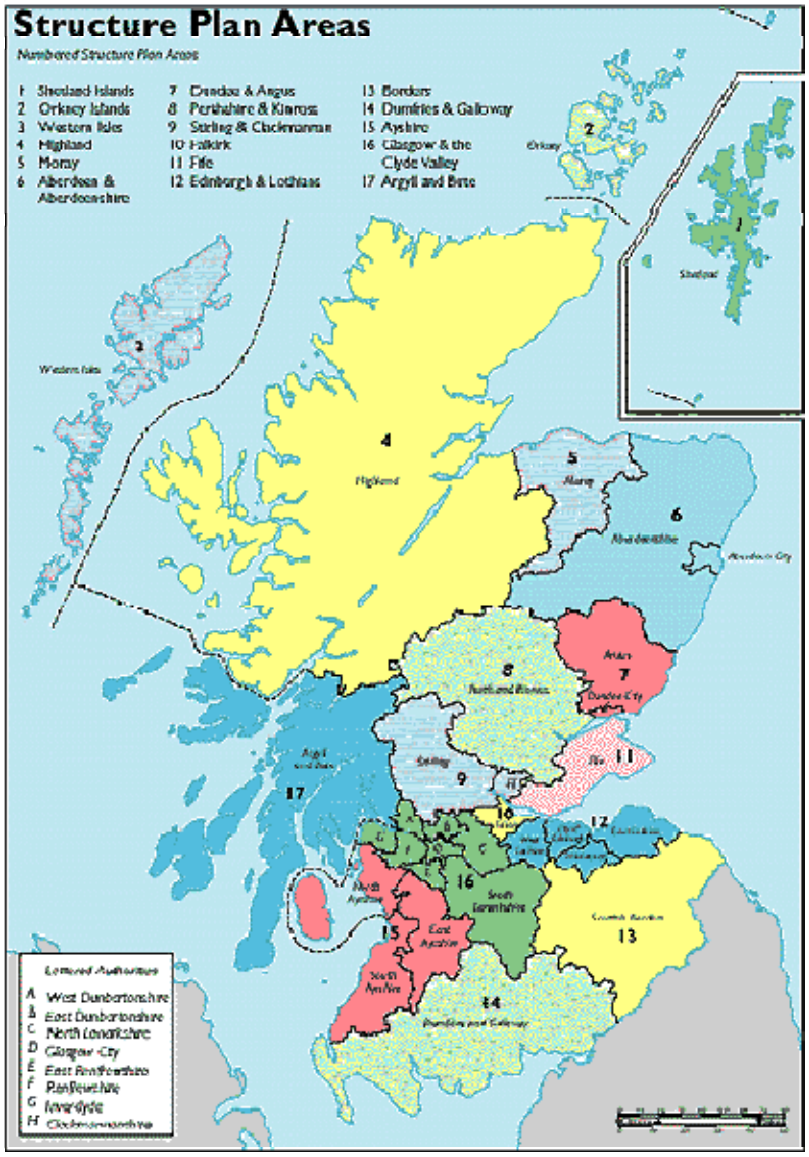

Figure 4: Scottish Structure Plan Areas

2008 sees a change in the regional planning system with the introduction of Strategic Development Plans for the four major city regions of Scotland; Aberdeen, Dundee, Edinburgh and Glasgow. The geographical area these new Strategic Plans will cover is shown in Figure 5.

The intention is that Strategic Development Plans will improve on the current Structure Plans by:

- Concentrating on an overview of genuinely strategic issues which cross local authority boundaries
- Being briefer, clearer and more focussed than Structure Plans
- Exercising their function with the objective of contributing to sustainable development.

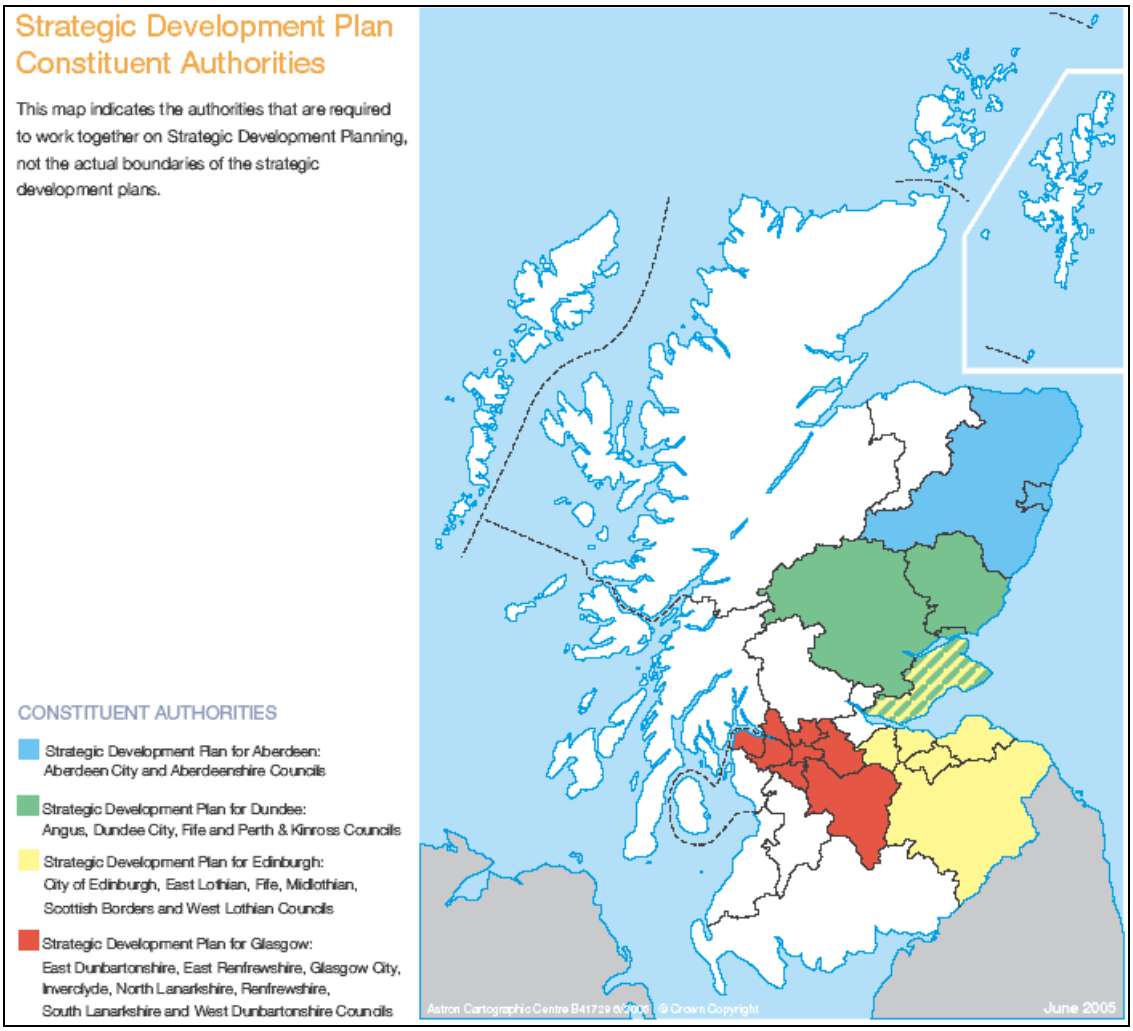

Figure 5: Scottish City Strategic Development Plan Areas

Locally
At the Local level, Local Plans for which the local authorities are responsible set out more detailed policies and proposals covering smaller areas to guide development in line with the approved relevant regional Structure Plan or Strategic Development Plan.

How do the national, regional and local bodies respond to change?

Changes in land use come through the National Planning Framework, Structure Plans and Local Plans.

The national, regional and local bodies respond to this change by developing the tools required to assess the impact of the changes they are driving and in doing so establishing the best way forward in which to provide for this change and deliver a positive impact on the economy and Scotland as a whole.

Changes to the transport network come through Transport Scotland, the Regional Transport Partnerships and Local Authorities.

Transport Scotland is undertaking a Strategic Transport Projects Review (STPR). This will set out the future for the strategic transport network between 2012 and 2022. The Scottish strategic transport network (Figure 2) provides connections for remote areas to the cities; between cities; and to the rest of the world through its ports (sea and air) and its land connections to England.

How can future change assessed?

Change to the Scottish transport infrastructure requires money. This money comes from taxpayers and the Scottish Government therefore has a responsibility to ensure that the change is value for money and achieves its objectives. In order to predict what future transport provision may be required, information on land use planning must be known and then solutions sought to meet the transport requirements of the identified land use whilst taking cognisance of what is already in place in both land use and transport terms.

The appraisal of Land-use change comes through the Scottish Planning Policy system.

The appraisal of Transport change is provided by Transport Scotland through the Scottish Transport Appraisal Guidance (STAG). This is an objective-led approach which includes:

- An analysis of existing and potential transport problems.
- The setting of transport planning objectives that capture the essence of transport problems.
- The generation, sifting and development of options identifying those that meet the study objectives.

How can the future be predicted?

Change is happening as a result of land use and the economy. Within the context of the provision of transport infrastructure, the impact of interventions to this must be assessed in order to efficiently help the change process.

Transport Scotland has developed the Transport Model for Scotland (TMfS) as a tool linking land use and transport provision to provide this functionality and create a 'vision of the future'.

TMfS is a multi-modal demand and assignment model, which incorporates an interactive land-use model. The modelled area covers the whole of the Scottish mainland with connections to the islands. The interaction between land use and demand creates a model suitable for assessing future development and for the testing and investigation of various proposed options in order to deliver the most efficient and economically viable solutions.

The modelling process has the following capabilities and features:

a) An interactive land use model
b) A capacity restraint Road Assignment Model which includes junction modelling.
c) A capacity restrained Public Transport Assignment Model. Modelled modes include Urban Bus, Inter Urban Bus & Rail with scope for additional new modes.
d) A Park and Ride module
e) A Demand Model dealing with; mode choice, destination choice, trip frequency and macro time of day choice with various traveller purposes modelled.
f) An interactive land-use model that takes into consideration local authority planning permissions as well as economic forecasts and national population and household constraints as well as forecast changes in transport costs from the future year assignment models.
g) Various secondary analysis modules to undertake:
    i) Economic analysis
    ii) Emissions analysis
    iii) Congestion analysis
    iv) Operational analysis
    v) Accessibility analysis

As with the majority of transport and land use models, TMfS has been developed to meet a specific set of objectives. The key objectives that have shaped the development of the model thus far are:

- to provide robust traffic forecasts on all Trunk Roads within the model area over a twenty year horizon.
- to enable traffic, economic and land-use assessments of proposed major interurban road.
- to test the effects of and/or interaction between major inter-urban road and public transport schemes and major transport policy options.
- to provide consistent information and a framework for local scheme models, as a basis for the development of Local Transport Strategies or with a view to testing potential strategies.

TMfS is not just a Scottish Government initiative. Consultation with a wide range of practitioners working within both public and private organisations continues to shape the models capability with all parties able to acquire the model for their own projects is required.

Transport Scotland is committed to the long term future of TMfS and as the requirements of the model evolve, so too will the objectives. These objectives will change as the future plays out and Scotland adapts to the new needs of its growing economy.

Can Scotland meet its Objectives?

The ongoing development of a dedicated and integrated land use and transport planning model will strive to ensure Scotland's objectives will be met. With the integration of land use and transport planning modelling data, the issues of changing land use can be predicted and provided for with accessibility at the heart of ensuring people and goods can get to where they are needed when they are needed. If people and goods can be accessed as and when required then Scotland will be well placed to meets it objectives of a wealthier and fairer, healthier, safer and stronger, smarter, and greener Scotland.