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## SNAPTA – CONTROLLING CLIMATE CHANGE THROUGH SUSTAINABLE TRANSPORT

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### SNAPTA

Spatial Network Analysis of Public Transport Accessibility (SNAPTA) is a GIS-based accessibility instrument that relies on a package of different measures to quantify spatial accessibility to urban services and activity opportunities by public transport modes. The instrument, therefore, takes into account the land use and transport characteristics of urban interactions and the availability of opportunities that can be accessed by public transport. It focuses on groups of people, and their social and economic activity needs to be met at different destinations. It assumes that travel demand will be determined by the attractiveness of these locations and the quality of the transport infrastructure linking these places.

The instrument adopts a robust theoretical basis using a sufficient data approach based on a high level of data disaggregation. It provides an adequate representation of accessibility aspects, without making it very difficult to operate, interpret and, consequently, apply in practice. However, the instrument does not claim to provide the complete picture of actual travel behaviour and transport accessibility. It merely attempts to achieve a balance between the ease of interpretation and operationalisation, and the complexity of the theoretical basis and data disaggregation.

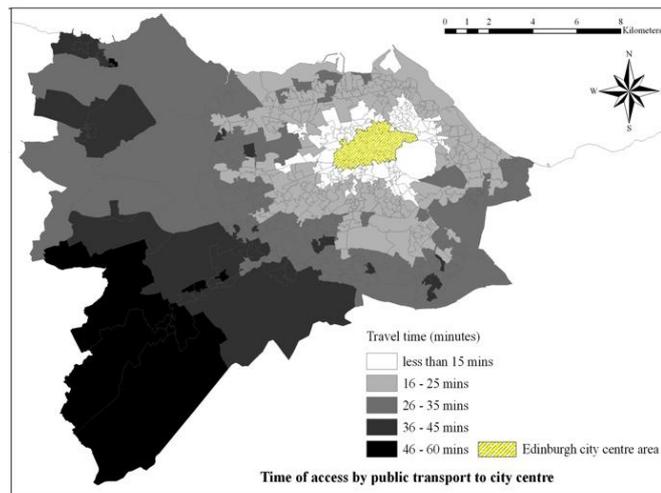


Figure 3.34: Screenshot of SNAPTA

SNAPTA is intended to assist discussion and support decision-making within the fields of transport and land use planning, particularly where government contexts call for more sustainable transport options to be developed. The development of SNAPTA has been closely linked to the policy needs arising from the Edinburgh Local Transport Strategy (2007–2012) and subsequent

revisions. Since such strategies present key sustainable transport ideas, such as plans to boost transport and land use integration and increase reliance on public transport, SNAPTA provides an opportunity to deliver key elements of this strategy so that policy decisions are based on evidence of the impacts on accessibility. Issues concerning the spatial equity of public facilities; accessibility to workplaces, shops, education facilities, health and medical services, and leisure activities by public transport; as well as the changes to accessibility brought about by new transport infrastructure or the relocation of public facilities can all be interrogated through the instrument. Therefore, SNAPTA shows how transport and land use integration can be clearly and visually communicated, and how the instrument's outputs can be used to influence City of Edinburgh Council's transport and land use decisions.

### **Setting the scene**

The City of Edinburgh Council were initially very keen to participate in this workshop, with the Transport Planning and Policy Manager providing a list of seven land use planners and six transport planners. However, the agreed workshop date in June 2013, unfortunately, proved to be inconvenient for many potential participants. In the end the participants included one land use planner from the Development Planning Department in the City of Edinburgh Council; one private transport consultant with experience in planning practical approaches to improve access to essential services; one model developer (from academia) and the moderator. All the participants had thorough knowledge of the concept of accessibility in transport and land use planning and were familiar with a number of commonly used accessibility measures.

### **Describing the workshop**

#### *Step 1*

In the initial discussions held with the Transport Planning and Policy Manager he suggested that the workshops should focus on a specific public transport problem. The problem or policy issue current at the time was the perceived comfort and convenience of public transport provision to two areas of the city populated by low income inhabitants. The pre-workshop questionnaires which were returned were mainly in agreement that the workshop should look at more general transport issues and that the accessibility instrument should be used to analyse these questions.

The following planning problem and indicators were agreed: controlling climate change through sustainable transport, with the indicators of mode share of

sustainable travel modes; ensuring that development is located in accessible locations; and ensuring access to all key services.

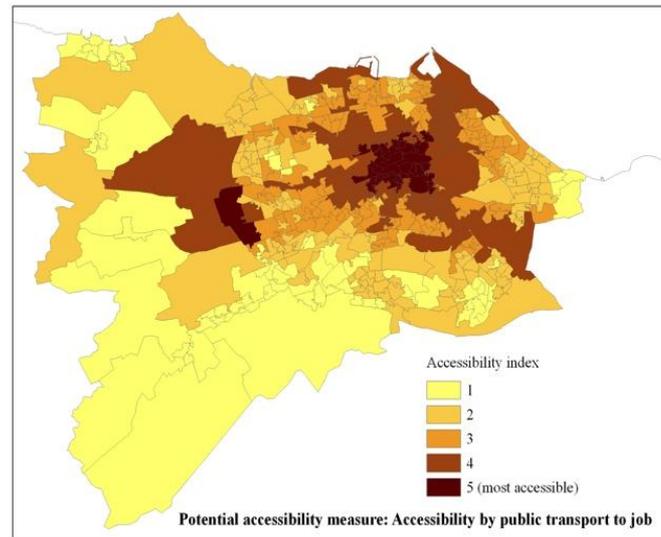


Figure 3.35: Screenshot of SNAPTA

### Step 2

Following the introductions, the workshops continued by discussing how the participants used accessibility in their daily practice and introducing different measures of accessibility. The example of the accessibility of households in Edinburgh to grocery stores was taken using the indicator of 400 m to the stores. A map was generated using the ACCALC instrument to show the output for Edinburgh to inform the discussion and improve the usefulness of accessibility indicators.

### Step 3

A number of maps regarding the application of the SNAPTA instrument to Edinburgh's network were distributed on the table. The maps show the current status of accessibility by public transport to jobs and retail services across the 549 zones of the council area. They were produced using three different accessibility measures: travel time (i.e. total travel time of the shortest public transport journeys that people in each zone require to travel to all other zones), contour measure and potential accessibility measure (gravity-based measure). Therefore, the difference in the spatial distribution of accessibility between these measures' outputs was interpreted as a consequence of the different

consideration and estimation of accessibility features (e.g. cut-off travel time, distance decay and land use attractiveness).

Another map was presented to show the accessibility by local bus services to the new large Sainsbury's food store (in Longstone), focusing on its catchment area by identifying the zones where people can reach the store site within 30 minutes travel time.

In addition, some maps produced by SNAPTA were used to demonstrate the change in accessibility to jobs and retail services that will be brought about by the full construction of the infrastructure improvements of the tram system and Edinburgh South Suburban Railway (ESSR). The maps assisted the discussion about whether the planned transport infrastructures for Edinburgh will lead to better accessibility and reduce the spatial inequity across the city.



Figure 3.36: The maps used during Edinburgh workshop

#### Step 4

Specific policy interventions were not discussed; rather emphasis was put on the usefulness of accessibility instruments as well as SNAPTA's usefulness and potential for improvement. The planning team in City of Edinburgh Council already use PTALS to assess the accessibility of new housing proposals as part of development management and as input for the land use development plan.

#### Lessons on usability

In order for the workshop to meet its target, it is important to give sufficient explanation of the instrument and generated maps, in order to make sure that every participant is aware of the analysis method and the type of data used.

It is useful to engage participants who have prior experience with accessibility instruments. This will enrich the discussion and give an opportunity to the

workshop participants to compare the different instruments and identify the strengths and weaknesses of the instrument in question.

The role of the moderator is crucial for leading the discussion in the right direction and preventing that it deviates from its main focus.

The SNAPTA instrument is good for visualising spatial accessibility as well as the impact of changes in transport infrastructure and land use and activity systems on accessibility. The resulting maps are clear and easy to understand. They can be used as an appropriate foundation for a discussion between experts and practitioners from different disciplines. The accessibility maps can help practitioners to analyse the situation and define planning problems. Also planners can use them throughout the decision-making process to assess different alternatives and develop transport/land use actions and strategies.

Not solely relying on contour measure and using different accessibility measures—particularly the gravity-based measure that is not familiar to the City of Edinburgh Council—was described as a useful method for providing a different perspective on accessibility patterns.

It can be observed that the consideration of a high disaggregation level, using the Scottish Census Data Zones (the key small-area statistical geographical units in Scotland), is a suitable choice to assess accessibility at the city level. However, this disaggregation system has the disadvantage of featuring a large range in the size of zones according to population density. For example, the areas of some zones in the west and southwest of Edinburgh are very large compared with the rest because of their low population density.

The instrument has no accompanying programme that automatically updates the data in real time. The transport and land use data can only be updated manually within the GIS environment, which is straightforward and can be done quickly when a relatively small number of changes is required. However, the instrument is capable of generating results and visualising them in maps rapidly based on ad hoc enquiries.

Improvement is recommended towards a more efficient and time-saving method for updating data (e.g. for updating data in real time). Moreover, SNAPTA has been developed with a focus on public transport modes only, which is considered as a potentially serious limitation for some purposes. However, the tool has the potential to also include car-based modes by offering the ability to build the road network taking into account driving directions and travel time estimates based on the mandated speed limits.