11. ANNEX C: TECHNICAL DATA RELATED TO MAPPING WORK

Template to evaluate the accessibility of new major employment locations

An outline methodology has been developed to assess the accessibility of potential major employment sites using Accession and 2001 census data based on the template given in the Priorities and Action Programmes chapter 7. The methodology has been based on that proposed by Capita Symonds Consultancy Ltd in their paper 'Accessibility assessments for Development Control - A proposed methodology' (2003). The following gives an explanation of the concepts and data used in the template.

Base population within 20km of site (control population)

Figures giving all households and all households with no car within a 20km crow-fly buffer of each employment site have been calculated. This is based on the fact that from the 2001 census, nationally 8 out of 10 people work within this distance from their home (Capita Symonds, 2003).

Travel time thresholds - public transport

A 30 min travel time threshold using public transport has been calculated using Accession. This threshold was chosen based on the average travel time by public transport for journeys to work in the 2005 North Nottinghamshire Personal Travel Survey.

Accessibility Indexes

Calculated using the weighted Hansen measure in Accession, lamda value = -0.015.

Accessibility ratios

- Road : PT. Total accessibility index for each site calculated for road access and PT access using Accession.
- PT total households within 30 mins travel time : ALL households within 20km straight line distance of destination. As defined in Capita Symonds paper and calculated using Accession.
- PT all households : households with no car. Total public transport accessibility index calculated using ALL households and then divided by total households base population. Total public transport accessibility index calculated using households with no car and then divided by total households no car in base population.
- Average % of 'equivalent jobs' accessed. Total number of equivalent jobs based on total number of people employed at each site calculated for each O/D pair using Hansen Index. Then expressed as % of total employed at site. Average % then calculated for base population.

Notts PMF score

Based on score of service in Notts Performance Management Framework for supported services. Contracts are scored against the following criteria :

- subsidy per passenger
- passengers per trip
- journey purpose of contract
- car ownership levels of settlements served
- availability of alternative public transport (commercial services) in settlements served
- Index of Multiple Deprivation of settlements served

The score is then compared against the scores and a ranked list of all other funding commitments in the revenue budget for supported services to establish a likelihood of funding. Low score = contract 'at risk/under review'.

Evaluation of PT measures - accessibility benefit to cost ratio

- Weighted Hansen index transformed to allow accessibility to be measured in terms of generalised cost/time. Generalised time calculated for each O/D pair and total output for base population of each site. The formula used to transform the weighted Hansen Index is given below.

$$A_i = \frac{1}{\lambda} \ln \frac{\sum \left[\exp(\lambda t_{ij}) O_j \right]}{\sum O_j}$$

where A(i) = generalised time/cost for O(i) to Destination (i), lamda parameter = -0.015, t(i,j) is travel time by public transport between origin (i) and destination (j) as output by Accession, O(j) is sum of job opportunities at destination O.

Total generalised time per site then divided by base population to give generalised time per person.

- This figure is then multiplied by an appropriate Value of Time (6p per minute) and then applied to the existing annual patronage/forecast annual patronage of services.
- This figure is then divided by the total net cost to give the benefit to cost ratio.
- It should be noted that this methodology has yet to be developed. It is based on the assumption that accessibility benefits are valued purely as conventional travel time savings, and no research has yet been done to establish the true monetary value of accessibility benefits. Its use here is purely to demonstrate how funding could be prioritised between supporting a service with a relatively low subsidy per passenger and with low accessibility benefits, as opposed to supporting a service with high subsidy levels but offering potentially high accessibility benefits.

ANNEX C: TECHNICAL DATA RELATED TO MAPPING WORK (continued)

The table below gives details of the calculation methods and processes together with the data sources used to inform the mapping work in the Area Overview and Accessibility Needs and Challenges chapters. It should be noted that Accession has been used to calculate accessibility levels throughout, and details of the parameters used in the calculations are given in the final column of the table.

Section	Map	Main data source	Level of Geography of map	Origin data used	Destination data used	Public Transport data used	Comments
Area overview	% of total households with no car	2001 census	Census Output Area (COA)				Map drawn using interpolated grid function, cell size = 500m, search radius = 10km
	% of total households with 1 car but with 2 or more people aged over 17 in household	2001 census	Census Output Area (COA)				Map drawn using interpolated grid function, cell size = 500m, search radius = 10km
	Overall IMD score : 2004 Index of Multiple Deprivation	2004 Indices of Deprivation (ODPM)	Lower Super Output Area (LSOA)				Based on % ranking of each LSOA in Nottinghamshire in relation to the national ranking of the most deprived LSOA in Nottinghamshire
	Levels of overall deprivation and access to housing and essential services	2004 Indices of Deprivation (ODPM)	Lower Super Output Area (LSOA)				Overall IMD based on % ranking of each LSOA in Nottinghamshire in relation to the national ranking of the most deprived LSOA in Nottinghamshire. Barriers to Housing and Essential Services Domain based on above but only top 20% of Notts LSOAs shown on map

	% of total population with a limiting long term illness	2001 census	Census Output Area (COA)				Map drawn using interpolated grid function, cell size = 500m, search radius = 10km
	Demand for Public Transport	2001 census and 2004 Indices of Deprivation (ODPM)	Lower Super Output Area (LSOA)				Score calculated for each LSOA based on IMD data (% ranking of each LSOA in Nottinghamshire in relation to the national ranking of the most deprived LSOA in Nottinghamshire), and car ownership data
	Access to the public transport network on weekdays	Notts 2005 Post Office Addresspoint file	Lower Super Output Area (LSOA)	Notts 2005 Post Office Addresspoint file with Business addresses deleted	Bus stops with an hourly or better service on weekdays (0600-1800 hrs), minimum of 10 total calls at each bus stop	ATCO CIF file generated January 2006	Maximum straight line distance between households and bus stops = 800m. Calculated for each household in each LSOA to its nearest bus stop using Pythagoras' theorem and adjusted for curvature of road network. Average minimum distance then calculated for each LSOA
	Access to the public transport network on weekdays assuming funding for all county-supported services is withdrawn	Notts 2005 Post Office Addresspoint file	Lower Super Output Area (LSOA)	Notts 2005 Post Office Addresspoint file with Business addresses deleted	Bus stops with an hourly or better commercial service on weekdays (0600-1800 hrs), minimum of 10 total calls at each bus stop	ATCO CIF file generated January 2006	Maximum straight line distance between households and bus stops = 800m. Calculated for each household in each LSOA to its nearest bus stop using Pythagoras' theorem and adjusted for curvature of road network. Average minimum distance then calculated for each LSOA

	Access to the public transport network on weekdays assuming a 5 min walk to bus stops	Notts 2005 Post Office Addresspoint file	Lower Super Output Area (LSOA)	Notts 2005 Post Office Addresspoint file with Business addresses deleted	Bus stops with an hourly or better commercial service on weekdays (0600-1800 hrs), minimum of 10 total calls at each bus stop	ATCO CIF file generated January 2006	Maximum straight line distance between households and bus stops = 400m. Calculated for each household in each LSOA to its nearest bus stop using Pythagoras' theorem and adjusted for curvature of road network. Average minimum distance then calculated for each LSOA
	Access to the public transport network on weekdays assuming a 5 min walk to bus stops and funding for county supported services is withdrawn	Notts 2005 Post Office Addresspoint file	Lower Super Output Area (LSOA)	Notts 2005 Post Office Addresspoint file with Business addresses deleted	Bus stops with an hourly or better commercial service on weekdays (0600-1800 hrs), minimum of 10 total calls at each bus stop	ATCO CIF file generated January 2006	Maximum straight line distance between households and bus stops = 400m. Calculated for each household in each LSOA to its nearest bus stop using Pythagoras' theorem and adjusted for curvature of road network. Average minimum distance then calculated for each LSOA
Accessibility Needs and Challenges	% of total households in each LSOA within 30 mins travel time of a further education college by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Location of FE Colleges	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of total households in each LSOA within 60 mins travel time of a further education college by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Location of FE Colleges	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005

	% of pupils aged 5-10 in each LSOA within 15 mins travel time of a Primary School by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Location of Primary Schools provided by Notts CC Education Dept	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of pupils aged 5-10 in each LSOA within 30 mins travel time of a Primary School by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Location of Primary Schools provided by Notts CC Education Dept	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of pupils aged 11-15 in each LSOA within 20 mins travel time of a Secondary School by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Location of Secondary Schools provided by Notts CC Education Dept	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of pupils aged 11-15 in each LSOA within 40 mins travel time of a Secondary School by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Location of Secondary Schools provided by Notts CC Education Dept	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of all people aged 16-74 in each LSOA within 20 mins travel time of a major work destination by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Census Workplace Population Statistics (LSOAs with a total of more than 500 workplace population)	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of all people aged 16-74 in each LSOA within 40 mins travel time of a major work destination by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Census workplace population statistics (LSOAs with a total of more than 500 workplace	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005

					population)		
	Accessibility to ALL jobs in Nottinghamshire by ALL working population aged 16-74 in each LSOA	2001 census	Lower Super Output Area (LSOA)	Lower Super Output Area (LSOA), all resident population economically active	Census workplace population statistics, total workplace population 10% most deprived LSOAs in England and Wales from 2004 Indices of Deprivation	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005. Includes all destination workplace population within 15km of Notts County boundary. Lamda parameter used in Hansen calculations = -0.015.
	Accessibility to ALL jobs in Nottinghamshire requiring lower level skills by ALL working population with lower level skills in each LSOA	2001 census	Lower Super Output Area (LSOA)	Lower Super Output Area (LSOA), all resident population in households socio-economic groups D and E	Census workplace population statistics, workplace population in households socio-economic groups D and E 10% most deprived LSOAs in England and Wales from 2004 Indices of Deprivation	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005. Includes all destination workplace population within 15km of Notts County boundary. Lamda parameter used in Hansen calculations = -0.015
	% of total households in each LSOA within 15 mins travel time of a major retail centre by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Retail destinations as agreed by District Councils in Notts as part of LDF Monitoring work	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005

	% of total households in each LSOA within 30 mins travel time of a major retail centre by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Retail destinations as agreed by District Councils in Notts as part of LDF Monitoring work	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of total households in each LSOA within 15 mins travel time of a supermarket by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Supermarket location data as provided by DfT October 2005	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of total households in each LSOA within 30 mins travel time of a supermarket by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Supermarket location data as provided by DfT October 2005	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of total households in each LSOA within 15 mins travel time of a GP surgery by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	GP surgery location data provided by Notts PCTs	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of total households in each LSOA within 30 mins travel time of a GP surgery by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	GP surgery location data provided by Notts PCTs	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of total households in each LSOA within 30 mins travel time of a Hospital with an Outpatients Facility by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Hospital location data as provided by Notts PCTs	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005

	% of total households in each LSOA within 45 mins travel time of a Hospital with an Outpatients Facility by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Hospital location data as provided by Notts PCTs	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of total households in each LSOA within 60 mins travel time of a Hospital with an Outpatients Facility by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Hospital location data as provided by Notts PCTs	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of total households in each LSOA within 30 mins travel time of a Managed Country Park by PT	2001 census	Census Ward	Census Output Area (COA)	Location Managed County Parks from Notts District Councils' websites	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005
	% of total households in each LSOA within 30 mins travel time of a footpath of 1.5km – 3km length on Sundays by PT	2001 census	Lower Super Output Area (LSOA)	Census Output Area (COA)	Footpath locations from Notts Definitive ROW dataset as modified by Notts CC for use in Accession	ATCO CIF file generated January 2006	Settings in Accession as used in calculation of DfT Core Indicators October 2005, except Sundays 1000-1600 travel time assumed
	Take-up of Notts Concessionary fare passes for the elderly and disabled	2001 census	Census ward				Extract from Notts Concessionary pass holders database March 2006