Sefton Local Plan

Traffic Implications of the Local Plan Allocations

August 2015

Sefton Council
Sefton Local Plan

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Sefton Council
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Sefton Local Plan
Traffic Implications of the Local Plan Allocations

Executive Summary

Sefton Council has produced a Local Plan that it intends to submit for examination. The Local Plan includes a number of housing and employment allocations that will help deliver Sefton’s housing and employment needs to 2030.

Mott MacDonald has been commissioned by Sefton Council to assess the impacts of these proposals on the highway network, using the Liverpool City Region Transport Model (LCRTM) to indicate, at a strategic level, where delay and congestion are predicted to occur.

The Sefton Local Plan allocations used in this assessment are summarised in Table 1.1.

<table>
<thead>
<tr>
<th>Development Type</th>
<th>Allocation (2012 – 2030)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>9,464 Households</td>
</tr>
<tr>
<td>Employment</td>
<td>8,894 Jobs</td>
</tr>
</tbody>
</table>

Source: Sefton Council

The employment allocations include the following significant developments:
- Land East of Maghull – 2,167 jobs
- Southport Business Park – 1,419 jobs
- Dunnings Bridge Road Corridor – 2,903 jobs

The Local Plan proposals have been included within the LCRTM demand forecasts to form a 2030 assessment year scenario. The LCRTM forecast year model network has been used – this includes the A5758 Brooms Cross Road.

The impact of the travel demand generated by the model in 2030 is summarised as follows:
- Car trips in Sefton are predicted to increase by 15%
- Mode share for car travel compared to public transport is predicted to increase by 2%
- Total kilometres travelled for vehicles representing Sefton are predicted to increase by 20% during the peak time periods; and
- The average trip length for Sefton increases marginally.

Traffic flows on the network are forecast to increase across the majority of the road network in Sefton, most notably on the Strategic Road Network in the vicinity of Switch Island (i.e. M58 and M57) and on the A565 west of Thornton. Decreases in traffic flow are observed on the A5027 (Northern Perimeter and Lydiate Lane) as a result of the A5758 Brooms Cross Road.

In the base year there are already several locations where the network has become congested.
The impact of the Local Plan is to increase the number of locations where congestion is likely to occur and deterioration in journey times is likely to become a problem. The analysis indicates that these locations are mostly within the area bounded by the A5758 Brooms Cross Road, A5036 Dunnings Bridge Road and the A565 (to Ince Blundell).

Plots showing the road network in Sefton to provide context to this commentary are presented in Appendix C.
1 Introduction

1.1 Background

1.1.1 The Sefton ‘Local Plan’ was approved by Council for publication in January 2015. This document sets out a strategy for development and investment within Sefton over the plan period (2012 to 2030) to meet the needs of local communities, whilst protecting the environment.

1.1.2 A key element of the Local Plan is the identification of new development to be accommodated in Sefton. The housing and employment requirements were informed by a number of reports, including: the Strategic Housing Land Availability Assessment (SHLAA), the ‘Housing Requirement Study’ (Review of the Housing Requirement for Sefton), a Strategic Housing Market Assessment (SHMA) and an Employment Land and Premises Study.

1.2 Scope of Work

1.2.1 Mott MacDonald has been commissioned by Sefton Council to assess the impacts on the highway network of their Local Plan Housing and Employment allocations.

1.2.2 The Liverpool City Region Transport Model (LCRTM) has been used to assess the impacts, by generating a 2030 model assessment scenario including the Local Plan housing and employment requirements. The LCRTM provides an indication of where congestion and delay on the highway network is forecast to occur relative to the current situation.

1.3 Report Structure

1.3.1 This report describes the modelling work undertaken for the highway assessment.

1.3.2 Following this introduction, the report is split into three further chapters:

- Section 2 describes the model inputs, including the LCRTM and housing and employment allocations provided by Sefton Council;
- Section 3 describes the model results; and
- Section 4 presents the study conclusions.
2 Inputs to the Assessment

2.1 The Liverpool City Region Transport Model

2.1.1 LCRTM is a multi-modal model comprising a link-based highway model, a public transport model and a variable demand model. It is the primary assessment tool for testing transport intervention measures in the City Region.

2.1.2 LCRTM is a strategic model and does not include junction representation; rather it provides a representation of flow relative to theoretical capacity and an indication of where delays are likely to occur. The model cannot be used to determine junction performance.

2.2 Sefton Local Plan Housing and Employment Allocations

2.2.1 Sefton Council has provided its Local Plan housing and employment allocations, which have been incorporated within the LCRTM 2030 forecast year.

2.2.2 The Local Plan housing supply includes 1,172 completions between 2012 and 2015. These are not modelled as TEMPRO indicates that within Sefton there is minimal housing growth of less than 0.05% during this period.

2.2.3 Small sites and conversions sites with planning permission were also not modelled due to their size (and limited impact).

2.2.4 The assessed sources of housing supply are shown in Table 2.1 below.

<table>
<thead>
<tr>
<th>Housing Allocations</th>
<th>Larger Housing sites with Planning Permission</th>
<th>Larger Housing sites without Planning Permission</th>
<th>Demolitions</th>
<th>Windfall Sites</th>
<th>Total Additional Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,303</td>
<td>1,756</td>
<td>857</td>
<td>514</td>
<td>1,062</td>
<td>9,464</td>
</tr>
</tbody>
</table>

Source: Sefton Council
2.2.5 The employment allocations are shown in Table 2.2 below. The information was supplied in site area (hectares); however LCRTM requires employment in total jobs as an input. To convert the site area data to an equivalent number of jobs two assumptions were agreed with Sefton Council: firstly, it was assumed that a hectare of land generates 3,900 sq. m of floor space\(^1\); secondly it was assumed that 36 sq. m of floor space generates a single job\(^2\).

Table 2.2: Sefton: Additional Employment, 2012 – 2030

<table>
<thead>
<tr>
<th>Employment Allocations (Ha)</th>
<th>Strategic Employment Allocations (Ha)</th>
<th>Total Employment Allocations (Ha)</th>
<th>Total Employment Allocations (Jobs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2</td>
<td>74.9</td>
<td>82.1</td>
<td>8,894</td>
</tr>
</tbody>
</table>

Source: Sefton Council

2.2.6 Figure 2.1 and Figure 2.2 show the Sefton housing and employment Local Plan allocations between 2012 and 2030 mapped to the LCRTM zone system, illustrating the concentration of growth across the district.

\(^1\) Source: Sefton council - ‘Employment Land and Premises Study’ consultants

\(^2\) Source: HCA ‘Employment Densities Guide’ : B2 (general industrial) land-use

Figure 2.1: Local Plan Housing Allocations per LCRTM Zone (2012 – 2030)
Figure 2.2: Local Plan Employment Allocations 2012-2030.

Based on a conversion of Local Plan site area to number of jobs per LCRTM Zone.
2.2.7 Figure 2.3 shows the location of employment sites that form the basis of the employment allocations (2012–2030). The figure shows Employment Allocations (blue) and the Strategic Employment Allocations (red).

Figure 2.3: Employment Sites (2012 – 2030)
2.2.8 The employment sites included in the allocations are shown in Table 2.3 below, together with the number of jobs predicted.

<table>
<thead>
<tr>
<th>Development Site</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch Car Site, Wakefield Road, Netherton</td>
<td>508</td>
</tr>
<tr>
<td>Linacre Bridge, Linacre Lane, Bootle</td>
<td>109</td>
</tr>
<tr>
<td>Former Lanstar Site, Hawthorne Road, Bootle</td>
<td>105</td>
</tr>
<tr>
<td>Land at Farriers Way, Netherton</td>
<td>57</td>
</tr>
<tr>
<td>Land East of Maghull</td>
<td>2,167</td>
</tr>
<tr>
<td>Southport Business Park</td>
<td>1,419</td>
</tr>
<tr>
<td>Land South of Formby Industrial Estate</td>
<td>758</td>
</tr>
<tr>
<td>Land North of Formby Industrial Estate</td>
<td>867</td>
</tr>
<tr>
<td>Dunnings Bridge Road Corridor</td>
<td>2,903</td>
</tr>
</tbody>
</table>

Source: Sefton Council

2.3 Model Assessment Scenario: Demand

2.3.1 LCRTM contains a set of growth forecasts which have formed the basis for developing the future year scenario for this assessment.

2.3.2 The Sefton Local Plan housing and employment allocations have been included - replacing the default data.

2.3.3 LCRTM requires employment to be input for three types of employment:
   - Total Employment (used for trips to work)
   - Other Employment (used for leisure trips)
   - Retail Employment (used for shopping trips)

2.3.4 The data provided by Sefton Council were for office, manufacturing and distribution. Therefore for Other and Retail employment, the total employment growth for the district (12%) was applied to the base year employment for these employment types.

2.4 Model Assessment Scenario: Supply

2.4.1 The forecast LCRTM networks have been created based on the calibrated 2012 base year networks plus the following developments that are under construction:
   - A5758 Brooms Cross Road; and
   - Mersey Gateway Bridge
3 Results

3.1 Introduction

3.1.1 This section presents the results from the modelling. The results are presented for the AM peak hour (0800 – 0900) and PM peak hour (1700 – 1800), comparing the 2012 Base Year with the 2030 Assessment Scenario.

3.2 Demand Results

3.2.1 The LCRTM model system is described in Appendix A. The LCRTM demand model is run prior to trip assignment on the model network. The demand model includes the following steps:
- Generation;
- Mode choice;
- Time period choice;
- Distribution; and
- Departure time choice.

3.2.2 Table 3.1 to Table 3.3 below show the demand matrix totals by mode over 24 hours for the Sefton District. The values have been rounded to the nearest thousand.

Table 3.1: 2012 Base Year Demand, 24 Hour Trips for Sefton District

<table>
<thead>
<tr>
<th>Mode</th>
<th>Demand (Trips)</th>
<th>Mode Split</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>396,000</td>
<td>79%</td>
</tr>
<tr>
<td>PT</td>
<td>107,000</td>
<td>21%</td>
</tr>
<tr>
<td>Total</td>
<td>503,000</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: LCRTM

Table 3.2: 2030 Base Year Demand, 24 Hour Trips for Sefton District

<table>
<thead>
<tr>
<th>Mode</th>
<th>Demand (Trips)</th>
<th>Mode Split</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>454,000</td>
<td>81%</td>
</tr>
<tr>
<td>PT</td>
<td>109,000</td>
<td>19%</td>
</tr>
<tr>
<td>Total</td>
<td>562,000</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: LCRTM

Table 3.3: 2030 Assessment Year Scenario – 2012 Base Year Demand, 24 Hour Trips for Sefton District

<table>
<thead>
<tr>
<th>Mode</th>
<th>2030 – 2012 Demand (Trips (%))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>+58,000 (+15%)</td>
</tr>
<tr>
<td>PT</td>
<td>+2,000 (+2%)</td>
</tr>
<tr>
<td>Total</td>
<td>+59,000 (+12%)</td>
</tr>
</tbody>
</table>

Source: LCRTM
3.2.3 As a result of the Local Plan proposals, car demand increases by 15% between 2012 and 2030 whilst PT demand increases by 2%.

3.3 Assignment Results

3.3.1 The trips generated by the LCRTM demand model are assigned to the highway and public transport networks as the last stage of the modelling process. The highway assignment results are presented within this section as a series of tables and network plots.

3.3.2 A plot is provided in Appendix C to illustrate key road names to aid in the interpretation of the figures.

3.3.3 Table 3.4 shows the total distance travelled in vehicle km in the AM and PM peak hours for Sefton. The values have been rounded to the nearest thousand km.

Table 3.4: Total Vehicle Distance in km for Sefton District (,000)

<table>
<thead>
<tr>
<th>Peak</th>
<th>2012 Base Year</th>
<th>2030 Assessment Year</th>
<th>2030 – 2012 Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>815,000</td>
<td>961,000</td>
<td>+146,000 (+18%)</td>
</tr>
<tr>
<td>PM</td>
<td>783,000</td>
<td>946,000</td>
<td>+163,000 (+21%)</td>
</tr>
</tbody>
</table>

Source: LCRTM

3.3.4 The total vehicle distance travelled increases by 18% in the AM and 21% in the PM between the 2012 and 2030.

3.3.5 Table 3.5 shows the average vehicle trip length in km for Sefton District, for the AM and PM peaks respectively.

Table 3.5: Average Trip Length in km for Sefton District (to the nearest km)

<table>
<thead>
<tr>
<th>Mode</th>
<th>2012 Base Year</th>
<th>2030 Assessment Year</th>
<th>2030 – 2012 Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>19</td>
<td>20</td>
<td>+1 (+5%)</td>
</tr>
<tr>
<td>PM</td>
<td>19</td>
<td>20</td>
<td>+1 (+5%)</td>
</tr>
</tbody>
</table>

Source: LCRTM

3.3.6 This shows that the average trip length for Sefton increases slightly by 1 km per trip (+5%).
Traffic Flows

3.3.7 Figure 3.1 to Figure 3.6 below show the AM and PM assigned traffic flows on the network for the 2012 Base Year and 2030 Assessment Scenario, and the flow differences in pcu (passenger car units) /hour.

3.3.8 The traffic flows are represented by the following bandwidth and colour intervals:

Bandwidth: two line thicknesses are used to represent flows in the following ranges:
- 0 – 2,500 pcu/ hour
- 2,500 – 5,000 pcu/ hour

Colour: the bandwidths are coloured to give further information on the level of traffic flow:
- 0 – 500 pcu/ hour
- 500 – 1,000 pcu/ hour
- 1,000 – 2,500 pcu/ hour
- 2,500 – 5,000 pcu/ hour
- 5,000 – 10,000 pcu/ hour
- >10,000 pcu/ hour

3.3.9 The same approach is used to show the change in traffic flow:

Bandwidth: two line thicknesses are used to represent changes in traffic flow in the following ranges:
- 0 – 1,000 pcu/ hour
- 1,000 – 2,000 pcu/ hour

Colour: the bandwidths are coloured to give further information on the level of change in traffic flow:
- 0 – 500 pcu/ hour
- 500 – 2,000 pcu/ hour
- >2,000 pcu/ hour

3.3.10 The plot legends use the following terminology:
- BASEYRFLOW = Traffic flows in the model base year of 2012
- FORECASTYRFLOW = Traffic flows in the model forecast year of 2030
- FLOWDIFFPOS = Increases in traffic flows between 2012 and 2030 as a result of the Local Plan allocations
- FLOWDIFFNEG = Decreases in traffic flows between 2012 and 2030 as a result of the Local Plan allocations
Figure 3.1: Traffic Flows in pcu – 2012 Base Year, AM
Figure 3.2: Traffic Flows in pcu – 2030 Assessment Scenario, AM
Figure 3.3: Traffic Flow Differences in pcu (2030 Assessment Scenario – 2012 Base Year), AM
Figure 3.4: Traffic Flows in pcu – 2012 Base Year, PM
Figure 3.5: Traffic Flows in pcu – 2030 Assessment Scenario, PM
Figure 3.6: Traffic Flow Differences in pcu (2030 Assessment Scenario – 2012 Base Year), PM
3.3.11 Locations where there are significant traffic flow increases (compared to the 2012 base) are concentrated on the Strategic Road Network in the vicinity of Switch Island (i.e. the M57 and M58) and A565 west of Thornton. Decreases in traffic flow are observed on the A5027 (Northern Perimeter Road and Lydiate Lane) and are a result of A5758 Brooms Cross Road.

**Volume over Capacity Ratio**

3.3.12 Figure 3.7 to Figure 3.10 shows links where the Volume/Capacity (V/C) ratio is forecast to be greater than 85% in the 2012 Base Year and 2030 Assessment Scenario, for the AM and PM peaks. A V/C ratio of greater than 0.85 (or 85%) is deemed to indicate a congested road where the traffic volume is approaching the road’s design capacity.

3.3.13 The V/C values are represented by the following bandwidth and colour intervals:

- **Bandwidth:** two line thicknesses are used to show the V/C value:
  - V/C: 0 – 1
  - V/C: > 1

- **Colour:** four colours are then used to separate the V/C ratio into the following ranges:
  - V/C: 0 – 0.85
  - V/C: 0.85 – 1.5
  - V/C: 1.5 – 2
  - V/C: > 2

3.3.14 The plot legends use the following terminology:

- **BASEYRVC** = Volume/Capacity in the model base year of 2012
- **FORECASTYRVC** = Volume/Capacity in the model forecast year of 2030
Figure 3.7: V/C Ratio – 2012 Base Year, AM Peak
Figure 3.8: V/C Ratio – 2030 Assessment Scenario, AM Peak
Figure 3.9: V/C Ratio – 2012 Base Year, PM Peak
Figure 3.10: V/C Ratio – 2030 Assessment Scenario, PM Peak
3.3.15 The pattern of V/C values is relatively consistent across the AM and PM time periods. It is notable that in 2012 that there are already areas of the network with V/C greater than 0.85. The impact of the Local Plan allocations is to increase the number of locations where congestion is likely to occur, including the A5758 Brooms Cross Road.

Travel Times

3.3.16 Figure 3.11 and Figure 3.12 show links where travel times increase by more than 10% between 2012 and 2030, for the AM and PM.

3.3.17 A travel time increase of 10% can be considered significant and likely to indicate a notable increase in congestion and, although not included in the LCRTM, delays at junctions on that part of the network.

3.3.18 The travel time differences are represented as follows. Negative differences have been converted to absolute values for presentation but are coloured differently to the positive values:

Bandwidth: two line thicknesses are used to show changes in travel time in the ranges:
- Time difference: 0 – 100 %
- Time difference: 100 – 200 %

Colour: the bandwidths are coloured to provide further information on the scale of the time difference:
- Time difference: 0 – 20 %
- Time difference: 20 – 50 %
- Time difference: > 50 %

3.3.19 The plot legends use the following terminology:
- TIMEDIFFPERCPOS = Percentage increase in travel times between 2012 and 2030
- TIMEDIFFPERCNEG = Percentage decrease in travel times between 2012 and 2030
Figure 3.11: Change in Travel Time, 2030 Assessment Scenario – 2012 Base Year (>10%), AM Peak
Figure 3.12: Change in Travel Time, 2030 Assessment Scenario – 2012 Base Year (>10%), PM peak
3.3.20 As would be expected, the location of the major changes in travel time follows the pattern shown in the volume to capacity ratios.
4 Conclusions

4.1.1 The purpose of this work was to undertake a highway assessment of the road network in Sefton using the LCRTM, based on housing and employment allocations provided by Sefton Council as part of their Local Plan.

4.1.2 The scope of the modelling work was to include the housing and employment allocations for Sefton District, without making any changes to the inputs for the rest of the model. The allocations have not been controlled to the wider forecasts for the Liverpool City Region, which is normally applied.

4.1.3 Traffic impacts have been assessed by comparison against modelled outputs for the 2012 base year.

4.1.4 As a direct consequence of the Local Plan allocations, the model forecasts that car trips will increase by 15% between 2012 and 2030 in Sefton. The mode share for car increases marginally. Total vehicle kilometres travelled increases by 20% between 2012 and 2030. The average trip length for Sefton increases marginally.

4.1.5 Traffic flows on the network are forecast to increase across the majority of the road network in Sefton; most notably on the Strategic Road Network in the vicinity of Switch Island (M57 and M58), and on the A565 west of Thornton. Decreases in traffic flows on the A5207 (Northern Perimeter Road and Lydiate Lane) are observed as a result of the A5758 Brooms Cross Road.

4.1.6 In the base year there are already several locations where the volume to capacity ratio suggests that the network has already become congested.

4.1.7 The impact of the Local Plan is to increase the number of locations where congestion is likely to occur and deterioration in journey times is likely to become a problem. The analysis indicates that these locations are mostly within the area bounded by the A5758 Brooms Cross Road, A5036 Dunnings Bridge Road and the A565 (to Ince Blundell).

4.1.8 It is recommended that further detailed analysis is undertaken as a next step at these locations to provide a more comprehensive indication of the impact on highway network and junction operation.
Appendices

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Appendix A. LCTRM Process

A.1 Liverpool City Region Transport Model

A.1.1 The Liverpool City Region Transport Model (LCRTM) is a multi-model transport model. It is the primary assessment tool for testing various transport intervention measures in the City Region.

A.1.2 The geographical scope for the model includes the Liverpool City Region as the main study area together with West Lancashire and Warrington, and a buffer area beyond extending further into Lancashire, Greater Manchester, North Cheshire and North Wales.
A.1.3 LCRTM has recently been updated to a base year of 2012 – that is it is representative of travel demand and conditions in 2012.

A.2 Objectives

A.2.1 The Liverpool City Region Transport Model (LCRTM) is a LCRTM has been designed to address the following objectives:

- to produce a long term forecast of growth in demand for travel in the region, which will reflect changes to land use, demographics, employment and the economy;
- to forecast the impacts of growth and changes in demand for travel on the existing highways and public transport networks;
to forecast the impacts of specific major regeneration projects and major land use developments on the transport system in the Liverpool City Region;

- to forecast the impacts of increased congestion on the local economy and quality of life; and

- to examine an array of measures and interventions that could be deployed to mitigate traffic/travel growth impacts.

### A.3 Structure

#### A.3.1
The LCRTM follows the Department for Transport (DfT) guidance WebTAG in respect of its components and structure. The model system operates within CUBE Voyager software, using applications and bespoke scripting of processes such as the assignment methodology and the variable demand model.

#### A.3.2
The general structure of LCRTM is explained in Figure A.2 illustrating the hierarchy of travel choices that fall between trip generation and assignment. At each level in the hierarchy the travel choice is dependent upon the change in cost of travel from the base year to the forecast year. The highway and public transport models, which are the final stage in the model are concerned with the assignment (routing) of vehicles and passengers throughout the transport system, whilst the demand model deals with the traveller choices in terms of mode choice (how to travel), time period choice (when to travel) and distribution (where to travel).

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3 CUBE Voyager is the name of a commercially available software package produced by Citilabs for use in transport modelling.
Figure A.2: Overall LCRTM 5-Stage Model Structure
**Stage 1: Trip Generation**

A.3.3 Trip Generation is a measure of the total demand for travel across all destinations, time periods and modes. It is split by journey purpose, for example journeys to work (commuting), journeys in the course of work (employers business) and other (such as shopping, education and leisure related trips).

**Stage 2: Mode Choice**

A.3.4 Subsequent to trip generation the total travel demand is then split across three travel modes: public transport (comprising of bus and rail), car, and slow modes (which are also known as active modes and comprise of walk and cycle).

**Stage 3: Time Period Choice (Macro)**

A.3.5 The model has four discrete time periods: the morning peak period (07:00-10:00); interpeak (10:00-16:00), evening peak period (16:00-19:00) and the off peak (19:00-07:00).

**Stage 4: Distribution**

A.3.6 Trips by purpose, mode and time period are then distributed to destinations within the model.

**Stage 5: Departure Time Choice**

A.3.7 Within the morning peak period, the model splits the number of trips in the three hour AM peak period into three one-hour periods, comprising of a pre-peak (07:00-08:00), peak (08:00-09:00), and post-peak hour (09:00-10:00).

**A.4 Assignment**

A.4.1 This concerns the routing of passengers on the public transport network, that is which bus and rail services they use to connect their trip origin and destination. For car users, it is the choice of roads that connect each end of their journey. In both cases, route choice is based on travellers using the cheapest cost route, based on factors such as fares, waiting times, travel times and fuel costs.

A.4.2 In terms of the highway model, three vehicle classes are assigned: cars, light goods vehicles (LGV) and other goods vehicles (OGV). The car vehicle class is further sub-divided into three journey purposes: commuting, employers business and other. Only the peak hours (08:00-09:00 and 17:00-18:00) and the average interpeak (between 10:00-16:00) are subject to assignment.
A.5 Base Year Travel Demand

A.5.1 As stated LCRTM currently has a base year of 2012. The total demand for travel in 2012, and the respective origin and destination of trips in the City Region has been developed using a number of sources including:
- roadside interview data collected across the region;
- information derived from the Merseyside Travel Survey (HTS) on household trip rates; and
- land-use indicators, such as statistics on total employment, retail employment and educational places.

A.6 LCRTM Highway Network

A.6.1 LCRTM comprises of 467 model zones. The zoning system has been developed based on Census Output Area boundaries, which have then been aggregated.

A.6.2 All motorways, A-roads, B-roads and significant C-roads are included, thus providing a good coverage of the major routes between trip origins and destinations in the district. The LCRTM highway network is link based and the representation of delay to highway vehicles is undertaken by the use of speed flow curves. There is no explicit junction modelling in the current version of LCRTM, hence the analysis of impacts on junctions cannot be assessed.

A.7 Forecast Travel Demand

A.7.1 Changes in travel demand arise from:
- population growth, through:
  - Housing development
  - Changes in the occupancies of households;
- location and volume of employment, including strategic development sites
  - Regeneration and economic activity; and
- changes in car ownership.

A.7.2 These features are all represented in LCRTM’s approach to forecasting future travel demand.

Forecast Years

A.7.3 The default forecast years for LCRTM are 2020 and 2030. For the purpose of the current study the latter forecast year has been used as a proxy for the end of the plan period (2028).

Trip Production Forecasts

A.7.4 Forecasts of trip productions are split into three broad categories:
- The number of home based trips: The quantum of home based trips are based on the changes in the number of households taking into account Government forecasts in terms
of compositions of households and car ownership, which are then combined with the trip
generation rates derived from the Merseyside Household Travel Survey (HTS).

- **Non-home based trips**: Non home based trips, for example a trip made from a place of
  work on business, are estimated based on information in the HTS on the propensity for
  making a non-home based trip, which is then applied to the non-home end of a home
  based trip.
- **Freight**: The growth in freight is based on the growth in total employment.

### Trip Attraction Forecasts

**A.7.5** Within LCRTM, attraction forecasts are based on future year estimates of:

- total employment;
- retail employment;
- ‘other’ employment; and
- pupils;

**A.7.6** These estimates are undertaken at zonal level and then used to distribute the trip productions
prior to the demand model being run. For example, home based commuting trips are
distributed according to the location and scale of total employment, whilst trips associated with
education and shopping are distributed according to Government forecasts on pupil numbers
and retail employment respectively.

### Constraint to Trip Productions

**A.7.7** It is important to note that forecasting within LCRTM is primarily a home-based forecast,
recognising the fundamental building block of trip generation is the household unit. Whilst
databases such as TRICS are often used to develop estimates of the trips into and out of
development sites, the default approach taken in LCRTM is to **estimate the total number of
trips generated by the household unit, which is then distributed across the various trip
attractions**. Hence, the number of journeys to work in the model, for example, is governed not
by the number of employment places, but by the number of journey to work trips created by all
the households. In general terms, the number of employment places is only used as a weight
to distribute the commuting trips across the modelled zones.

### Outputs

**A.7.8** The forecasting of trips is undertaken in a separate LCRTM module, contained within an Access
Database: the External Forecasting Model (EFM). The outputs from EFM are future year trip
matrices that are based on travel costs remaining unchanged from those in the base year –
these are termed reference case matrices.
Appendix B. Glossary

B.1.1 This Appendix provides a glossary of key terms.

**LEP/Oxford Econometrics Forecasts** – Demographic forecasts produced for the Liverpool City Region

**LGV** – Light Goods Vehicle

**Liverpool City Region Transport Model (LCRTM)** – Regional transport model covering Merseyside, Halton, West Lancashire and Warrington in detail

**Network** – The road network that the traffic model represents

**PCU** – Passenger Carrying Unit – used to represent the space that different types of vehicles take up. Car/LGV has a PCU factor of 1, whilst HGV has a PCU factor of 2.4.

**Scenario** – A term used to describe the inputs to a model run

**Strategic Housing Land Availability Assessment (SHLAA)** – An assessment of where future housing development will occur

**Trip Generation** – The number of trips predicted to go to/from each zone

**Volume/Capacity** – A measure of the congestion on a road comparing the volume of traffic to its theoretical capacity

**Zone** – A way of defining areas from which trips go to/from in the model
C.1.1 Figure C.1 and Figure C.2 show a selection of road names in relation to LCRTM representation of the road network.

Figure C.1: Key to Figures – North Sefton

<table>
<thead>
<tr>
<th>KEY</th>
<th>Road Name</th>
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<tbody>
<tr>
<td>1</td>
<td>Marine Drive</td>
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<tr>
<td>2</td>
<td>Fylde Road</td>
</tr>
<tr>
<td>3</td>
<td>A565 Preston New Road</td>
</tr>
<tr>
<td>4</td>
<td>B5244 Bankfield Lane</td>
</tr>
<tr>
<td>5</td>
<td>A5267 Roe Lane</td>
</tr>
<tr>
<td>6</td>
<td>Winnington Road</td>
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<tr>
<td>7</td>
<td>A570 Scarisbrick New Road</td>
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<tr>
<td>8</td>
<td>Town Lane Kew</td>
</tr>
<tr>
<td>9</td>
<td>Guildford Road</td>
</tr>
<tr>
<td>10</td>
<td>A5267 Liverpool Road</td>
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</table>
Figure C.2: Key to Figures – South Sefton

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<td>23</td>
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