

# Project Appraisal Guidelines

## Unit 5.5 Link-Based Traffic Growth Forecasting

January 2011

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Version	Date	Comments
1.0	January 2011	New Guidance

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## 1. Overview

- 1.1. The Project Appraisal Guidelines provide a comprehensive guidance document to scheme promoters on the methods to be used in scheme modelling and appraisal. *PAG Unit 5.2: Construction of Transport Models* provides guidance on the development of traffic models, with specific reference to the scope and functionality of traffic models. That Unit described three classes of traffic modelling:
- Static models, which reflect traffic volumes on the basis of link flows. Such models do not attempt any route assignment, and hence are only applicable for small networks where no change in traffic flows will result from a proposed scheme;
  - Assignment Models which allocate demand matrices through traffic networks, thereby replicating route choice by vehicles for each origin-destination pair; and
  - Variable Demand Models, which replicate demand responses where they might be expected as a result of a scheme, for example in larger towns and cities with congested road networks. These demand responses considered here comprise changes in trip rates, choice of destination and travel mode.
- 1.2. Table 5.3.1 of *PAG Unit 5.3: Traffic Forecasting* described the different approaches to traffic forecasting to be used with each class of traffic model. This PAG Unit sets out the methodology for application of Link-Based growth rates for use in *Static* models. This Unit of the PAG, along with *PAG Unit 5.3: Traffic Forecasting* and *PAG Unit 5.4: Zone-Based Traffic Growth Forecasting*, replaces the NRA publication “*Future Year Traffic Forecasts: 2002 – 2040*”.
- 1.3. The Link-Based Traffic Growth Forecasts set out in this Unit should not be used to derive traffic growth in *Assignment Models* or *Variable Demand Models*. The development of future year traffic growth projections for *Assignment Models* and *Variable Demand Models* is described in *PAG Unit 5.4: Zone-Based Traffic Growth Forecasting*.

## 2. Estimation of Growth Rates

- 2.1. Link-based traffic growth forecasts are based on studies of changes in vehicle kilometres over the forecast period. This calculation can include some form of link classification to improve the accuracy of the projections.
- 2.2. The National Traffic Model (discussed further in *PAG Unit 5.2: Construction of Transport Models*) incorporates forecasts of population, employment and car ownership changes over the period from 2006 to 2040. Such projections are based high, medium and low growth expectations over the forecast period, which are consistent with published forecasts from the Department of the Environment and the Central Statistics Office. The derivation of the demographic and economic forecasts for the NTM is outlined in a Technical Paper entitled “*Demographic and Economic Forecasting for the National Traffic Model*”, presented as *PAG Unit 20.1: Demographic and Economic Forecasting for the National Traffic Model*.
- 2.3. The National Traffic Model (NTM) has been used to generate aggregate growth in vehicle kilometres over the forecast period from 2006 to 2025 and 2025 to 2040. In

preparing growth projections, it was determined that there was limited correlation between road type and anticipated growth rates. Geographical location was instead determined to be the most significant factor influencing growth in vehicle kilometres. This is in line with the National Spatial Strategy, which suggests a rebalancing of growth in defined hubs and gateways. Although traffic growth will remain higher in the Dublin Area, this will occur from a higher base and will be at a lower proportional rate than for other regions.

- 2.4. Traffic growth is also strongly determined by vehicle type, with growth in Heavy Vehicles being driven by different factors than growth in Light Vehicles. Growth rates are therefore calculated separately for different vehicle types (Light Vehicles and Heavy Vehicles).
  - 2.5. The derivation of growth rates is outlined in a Technical Paper entitled "*Derivation of National Traffic Growth Rates from the National Traffic Model*", presented as *PAG Unit 20.2: Derivation of National Traffic Growth Rates from the National Traffic Model*. The use of the National Traffic Model to determine the link-based growth rates ensures that the resulting rates are consistent at an aggregate level to the zonal growth rates outlined in *PAG Unit 5.3: Traffic Forecasting* and *PAG Unit 5.4: Zone-Based Traffic Growth Forecasting*.
- 3. National Traffic Growth Forecasts: 2006 to 2040**
- 3.1. Regional Growth Rates (RGR's) for Heavy Vehicles and Light Vehicles are outlined in Table 5.5.1. Regions are defined in Figure 5.5.1.

Table 5.5.1: National Traffic Growth Forecasts: Annual Growth Factors

Region	Name	Low Growth				Medium Growth				High Growth			
		2006-2025		2026-2040		2006-2025		2026-2040		2006-2025		2026-2040	
		LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
1	Dublin City	1.000	1.000	1.000	1.000	1.002	1.003	1.002	1.000	1.011	1.014	1.008	1.005
2	Dublin County <i>Fingal</i> <i>South Dublin</i> <i>Dun Laoghaire Rathdown</i>	1.002	1.001	1.002	1.000	1.005	1.004	1.004	1.000	1.016	1.014	1.012	1.005
3	East <i>Wicklow</i> <i>Meath</i> <i>Kildare</i> <i>Louth</i> <i>Carlow</i> <i>Monaghan</i>	1.009	1.005	1.008	1.001	1.011	1.008	1.009	1.001	1.020	1.017	1.015	1.006
4	Central East <i>Kilkenny</i> <i>Laois</i> <i>Longford</i> <i>Offaly</i> <i>Westmeath</i> <i>Wexford</i> <i>Cavan</i>	1.012	1.008	1.012	1.001	1.015	1.010	1.013	1.001	1.025	1.021	1.019	1.007
5	Central West <i>Tipperary</i> <i>Waterford City/County</i> <i>Leitrim</i> <i>Roscommon</i> <i>Donegal</i>	1.012	1.007	1.011	1.001	1.014	1.009	1.012	1.001	1.024	1.019	1.018	1.007
6	West <i>Galway City/County</i> <i>Mayo</i> <i>Sligo</i>	1.010	1.004	1.009	1.001	1.012	1.007	1.010	1.001	1.022	1.017	1.017	1.006
7	Southwest <i>Clare</i> <i>Cork City/County</i> <i>Kerry</i> <i>Limerick City/County</i>	1.011	1.006	1.010	1.001	1.013	1.009	1.011	1.001	1.022	1.019	1.017	1.006

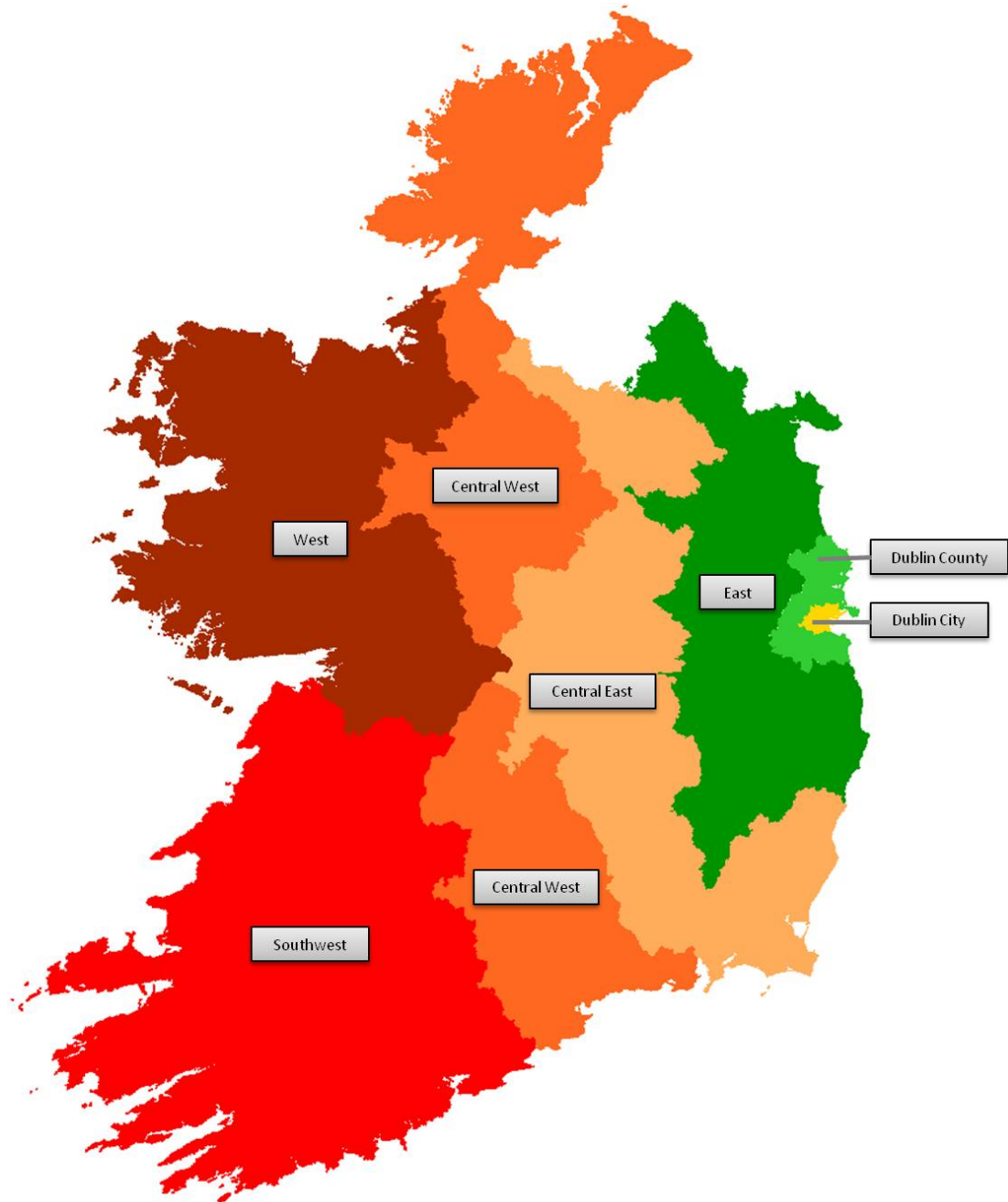


Figure 5.5.1: Traffic Growth Regions

#### 4. The Application of Growth Forecasts

- 4.1. The application of National Traffic Growth Rates in static models shall follow the process outlined in Figure 5.5.2.

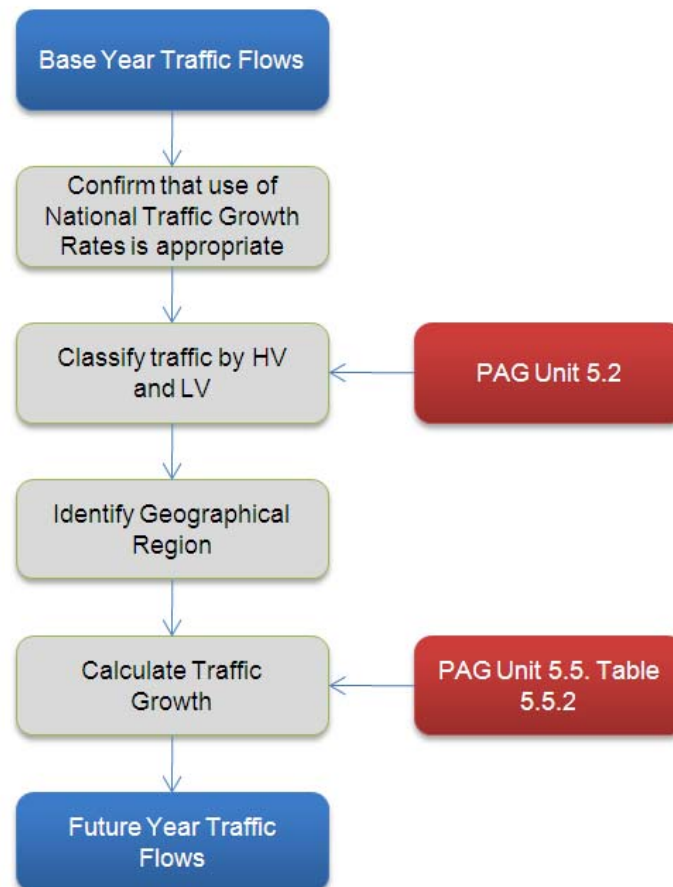


Figure 5.5.2: Application of National Traffic Growth Forecasts

- 4.2. For larger networks which straddle those regions defined, it is acknowledged that the application of different growth rates to different elements of the network may lead to an imbalance in flows on the network. Where such an imbalance leads to difficulties with appraisal, consideration should be given to preparing an assignment model using zonal growth rates.
- 4.3. No traffic growth beyond 2040 should be assumed in scheme appraisal.
- 4.4. Where there is any ambiguity on the use of alternative categories for a particular road, sensitivity testing should be undertaken to understand the impact of the selection on the final result.