

An Introduction to the Use of Transport Modelling by the NTA, and a Framework for Modelling Nationally

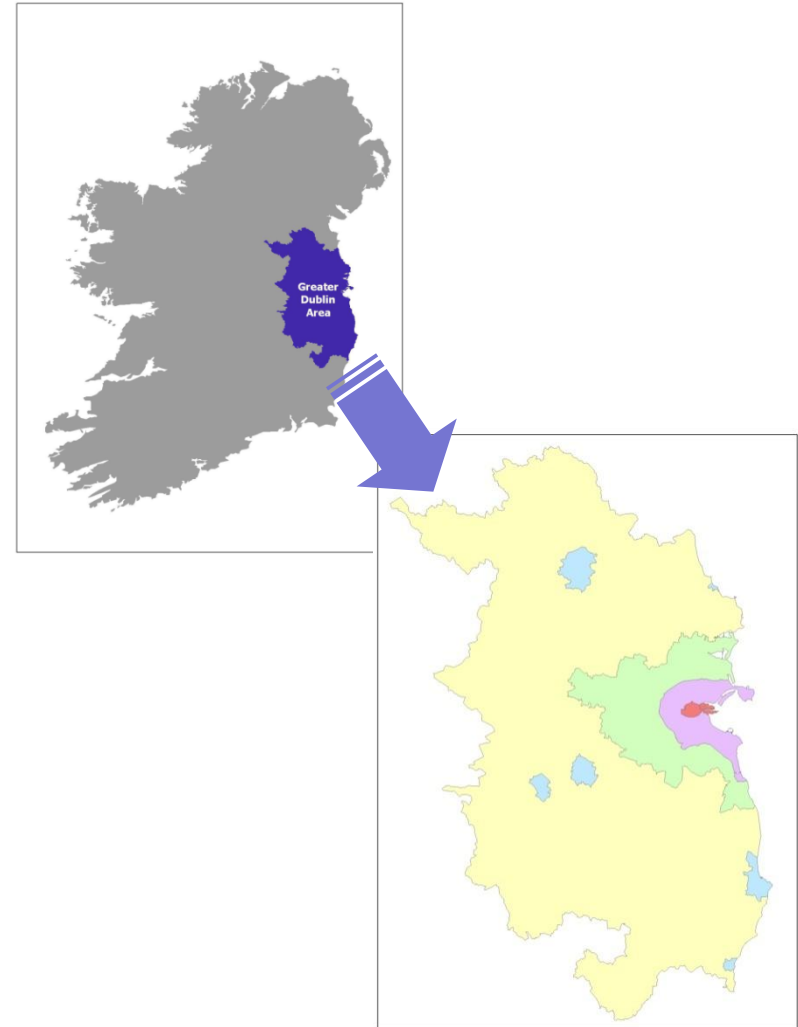
Eoin Farrell
10th July 2013

Outline of Presentation

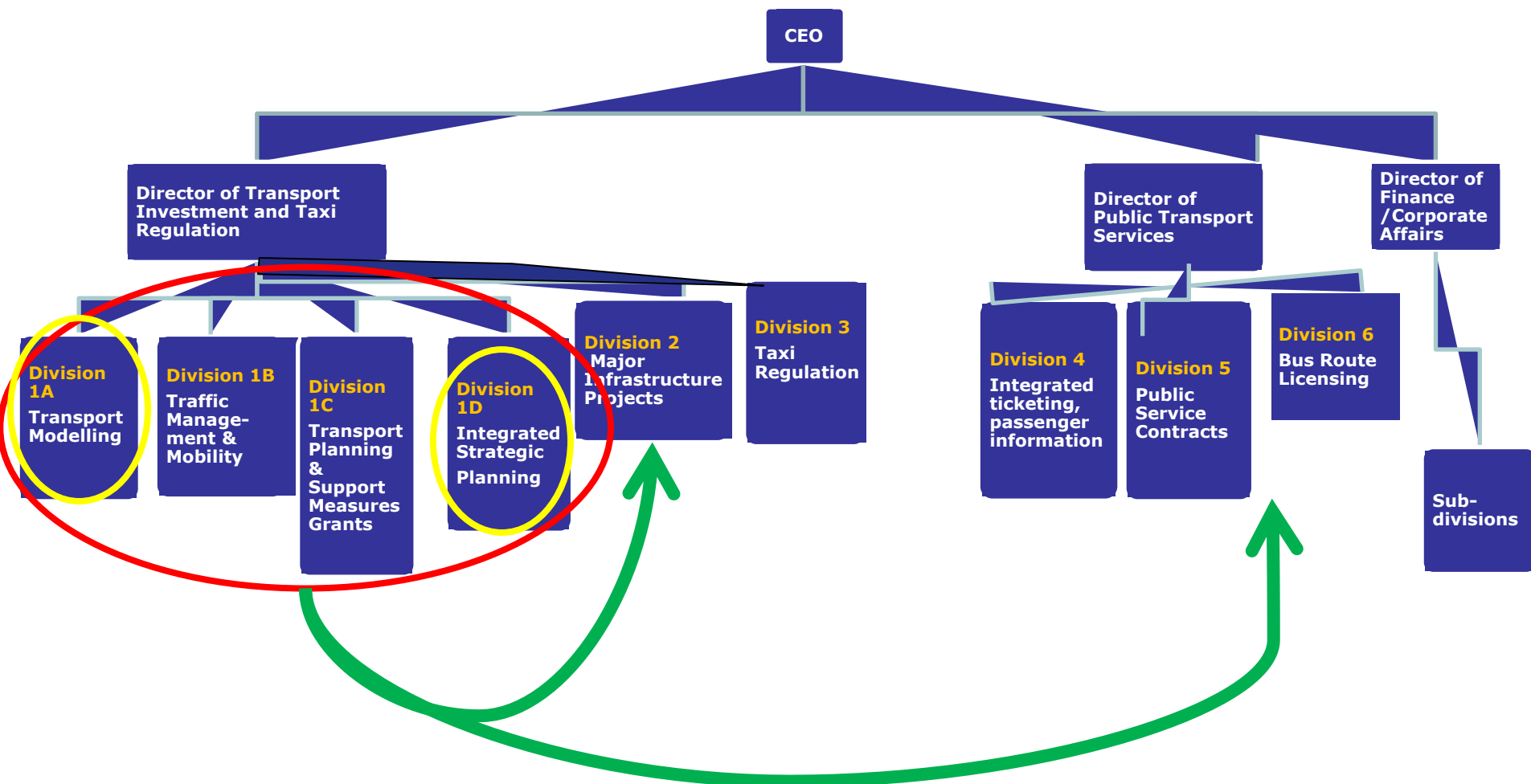
- Overview of National Transport Authority
- Modelling and Land Use Analysis in the NTA
- Overview of the current NTA Model for the Greater Dublin Area
- Moving Towards a All Island Transport Model Framework?
- Using a Model to Support Policy and Planning
- Conclusions

Who we are...

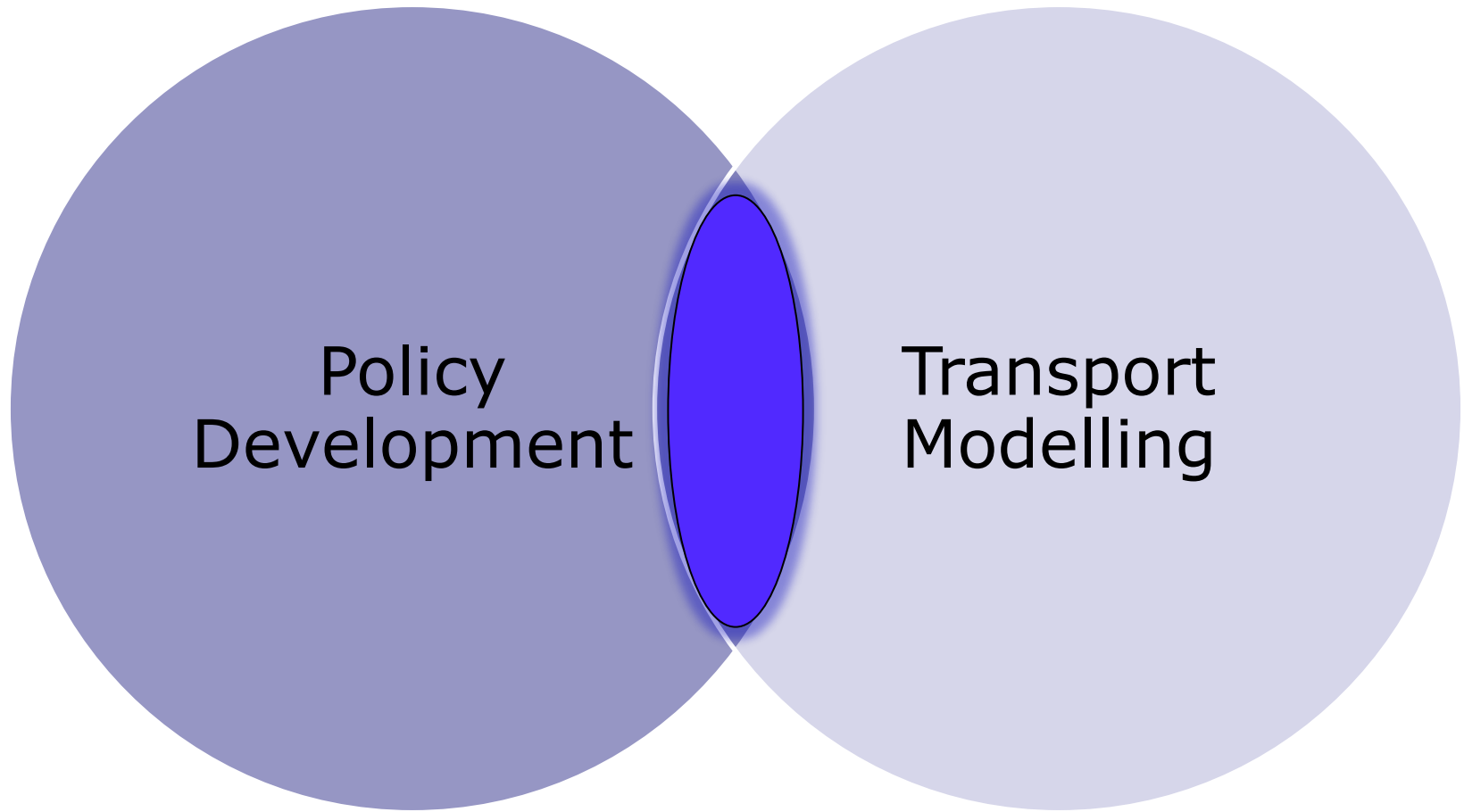
- National Transport Authority established on 1st December 2009
- Responsible for a range of functions including:
 - transport planning and investment in Greater Dublin Area
 - delivery of PT nationally
 - bus regulation nationally
 - taxi regulation nationally
- We manage for the Department of Transport
 - The *Regional Cities Grants* for traffic management
 - *Smarter Workplaces* travel programme
 - *Green Schools* programme



Organisational Structure



Planning and Modelling Integration



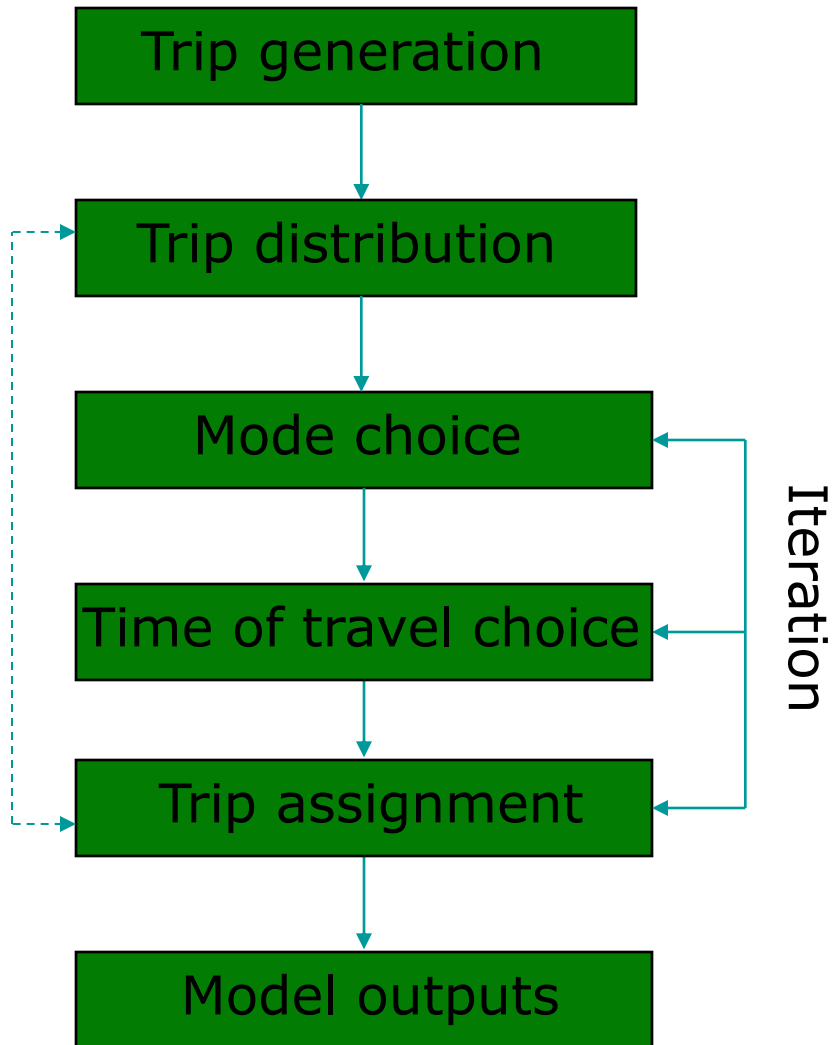
Current Work Programme

- Undertake update of GDA model to incorporate 2011 Census data – began in Autumn 2012.
- Provide technical advise and fund updates of models in 4 other regional cities (Cork, Galway, Limerick and Waterford – 2013 and 2014).
- Commence development of a National Trip End Model to inform transport policy nationally - 2014.
- Ongoing use of the model as an assessment tool to influence integrated land use and transport policy.

Overview of the existing Transport Model for the Greater Dublin Area



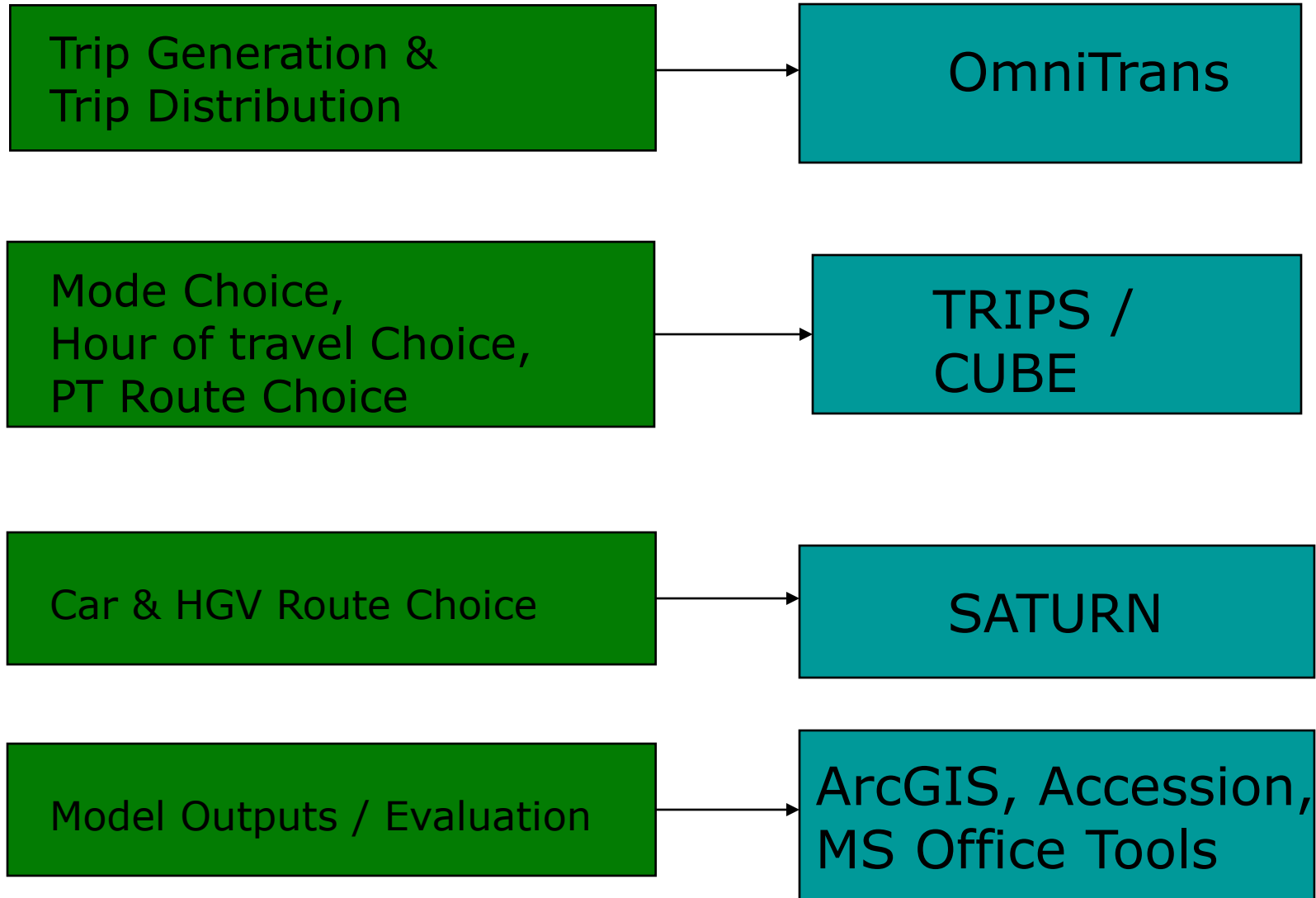
Structure of Current GDA Model



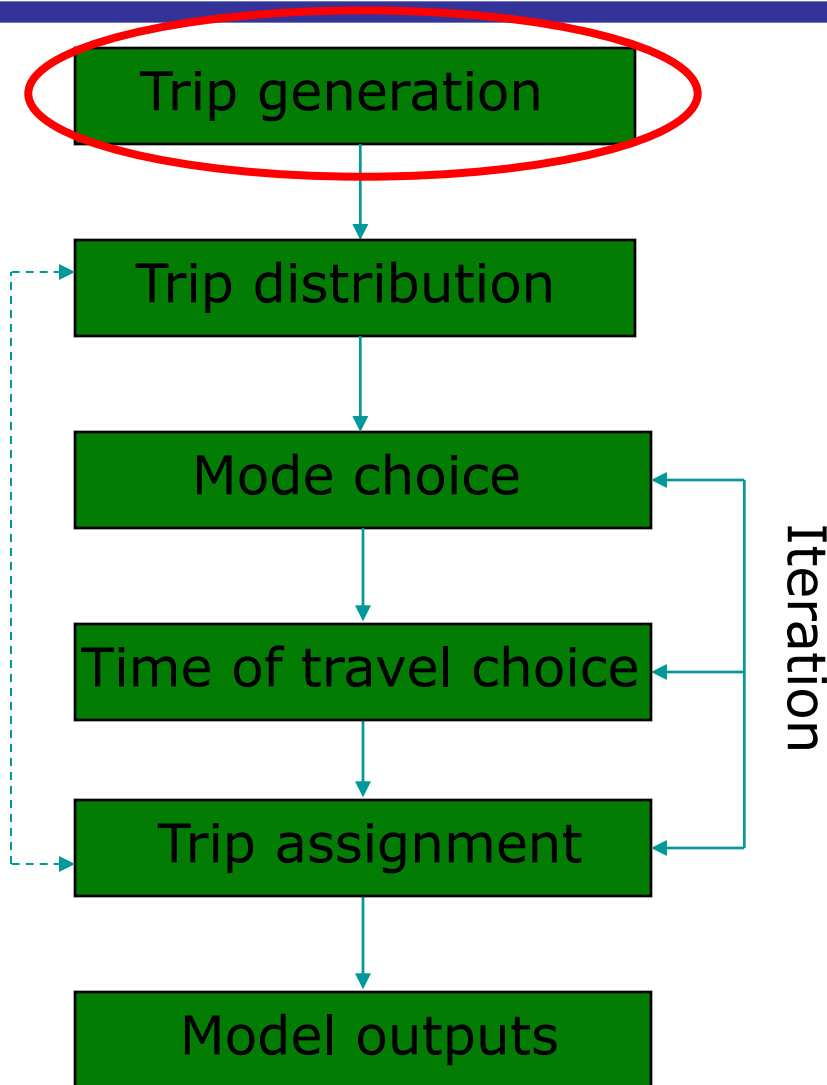
The GDA model continuously iterates between the mode choice, time of travel choice and trip assignment stages of the model – until an equilibrium of travel costs across travel modes, time periods and travel routes is achieved.

Travel costs derived from the trip assignment stage can also impact on trip distribution.

GDA Model – Software Used



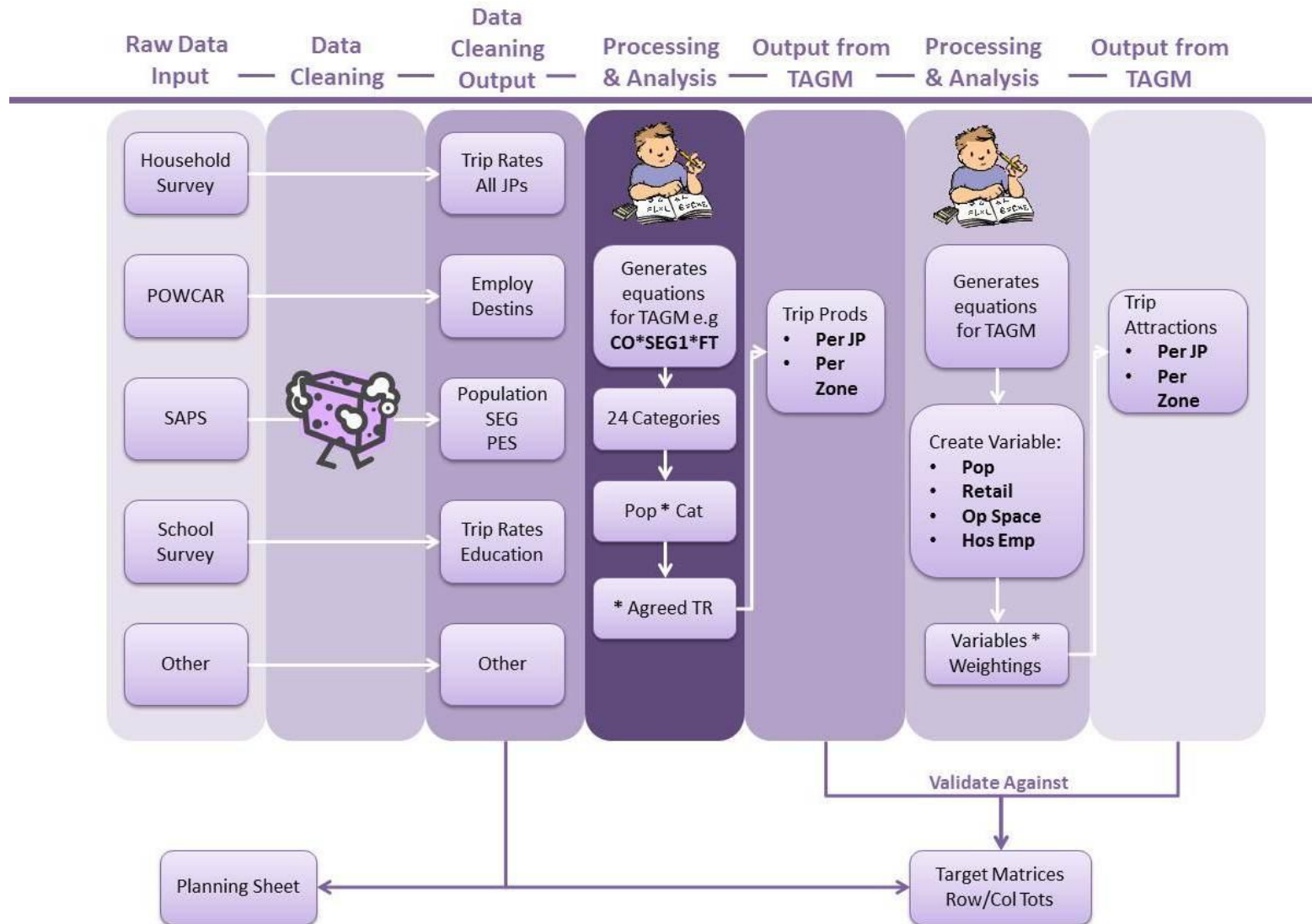
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Trip Attraction and Generation Model



Drivers of Travel Demand – Planning Sheet

Section of 'Planning Sheet' in GDA Model – (first 12 columns only shown)

Model Zone	Zone Name	Zone Area	O_Area Type	D_Area Type	Pop Total	SEG1 %	SEG2 %	SEG3 %	Emp FullTime	Emp PartTime	Retired
1	11101	143090	22	4	1,761	55.66	32.97	11.37	836.99	157.5	224.47
2	11103	2404723	20	8	38	46.33	40.1	13.58	16.65	2.74	3.83
3	11104	392480	22	1	596	46.33	40.1	13.58	261.33	42.88	60.07
4	11105	587195	22	3	5,722	58.25	31.15	10.6	2508.64	411.57	576.69
5	11106	379102	22	1	4,607	58.25	31.15	10.6	2022.47	331.95	464.8
6	13101	76494	31	6	879	33.51	42.9	23.58	324.24	89.75	50.23
7	13102	84536	31	5	1,252	33.51	42.9	23.58	461.72	127.8	71.53
8	13103	138069	31	1	1,867	33.51	42.9	23.58	689.13	190.74	106.75
9	13111	118605	31	1	1,683	35.86	46.2	17.94	754.72	115.53	78.62
10	13112	105131	31	1	2,322	35.86	46.2	17.94	1041.37	159.41	108.48
11	13121	42856	21	1	924	59.5	28.73	11.77	512.51	57.45	48.96
12	13122	86847	21	1	377	46.25	36.69	17.06	209.2	23.45	19.98
13	13123	118184	21	1	1,110	59.5	28.73	11.77	615.87	69.03	58.83
14	13124	126467	21	1	1,253	59.5	28.73	11.77	695.19	77.93	66.42
15	13125	79473	21	4	987	59.5	28.73	11.77	547.29	61.35	52.28

Spatial Scale of GDA Model



Standard Model Outputs

- Mode share – i.e. Trips by Mode.
- Journey times and accessibility by mode.
- Traffic flows and levels of congestion on highway network.
- Passenger flows on bus and rail networks.
- Junction and Link Details.

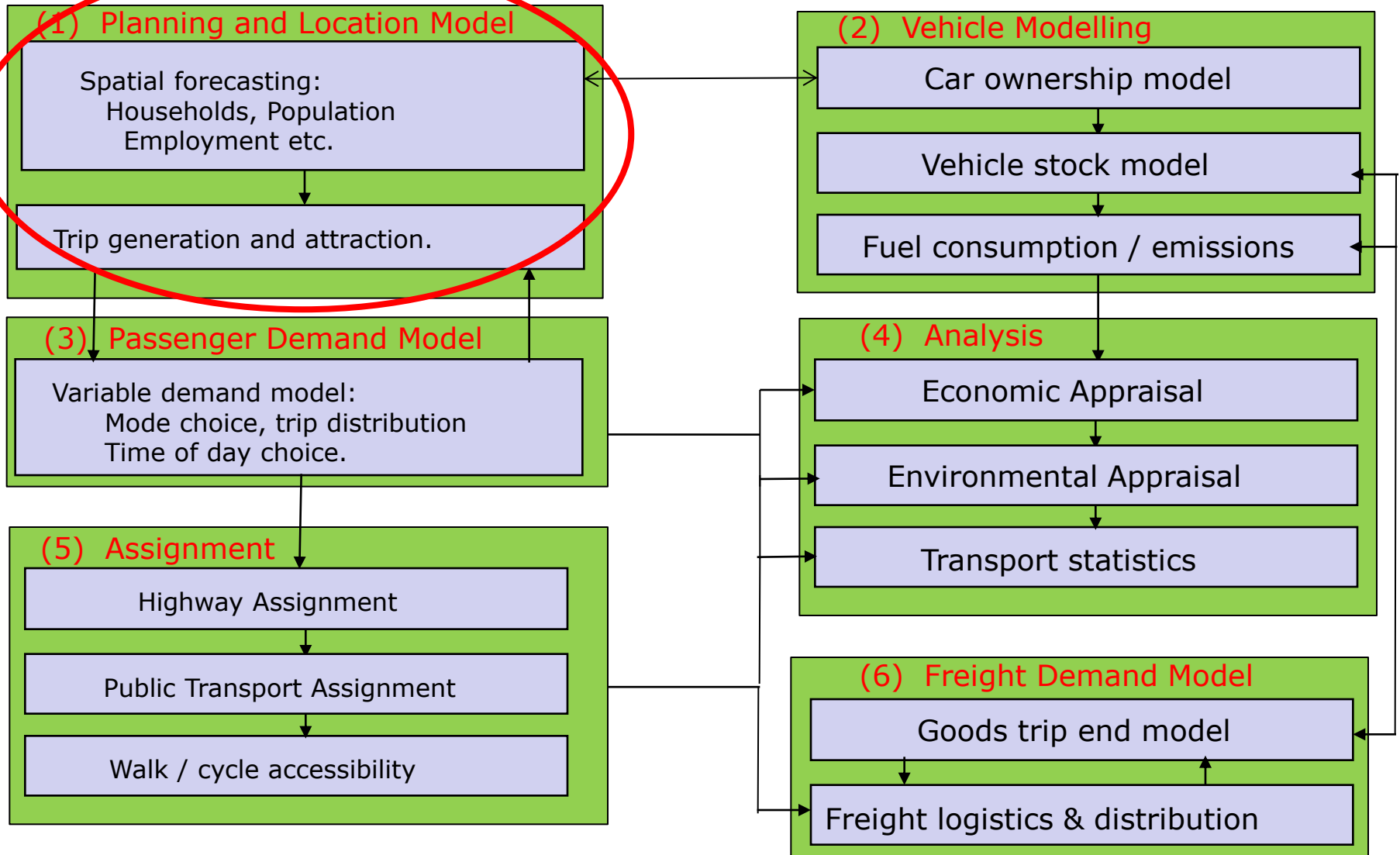
Development of a Framework for Modelling Nationally



Moving Towards a National Transport Model

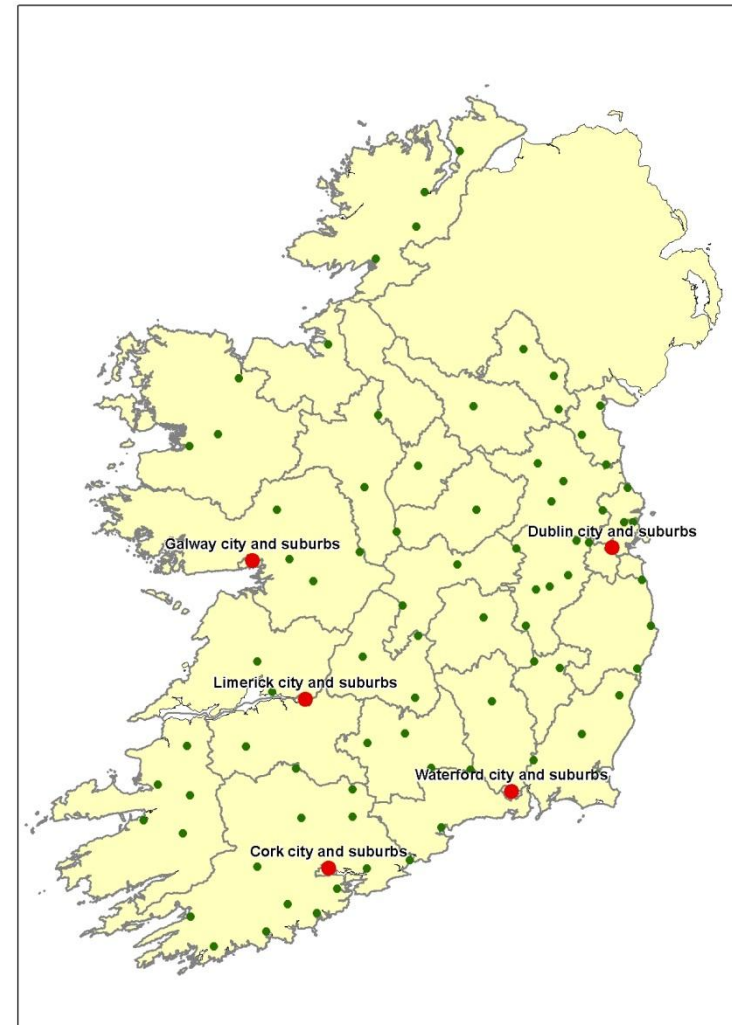
- Feasibility study (jointly undertaken by EPA, DoT and NTA) and completed in 2011.
- Found that it would be feasible and desirable to develop an NTM and that most of the data required to develop it already exists.
- Set out the proposed structure of an NTM to meet the needs of the NTA and other stakeholders.
- Set out a roadmap for it's development.

Outline structure of the National Transport Model



Spatial breakdown of the National Model

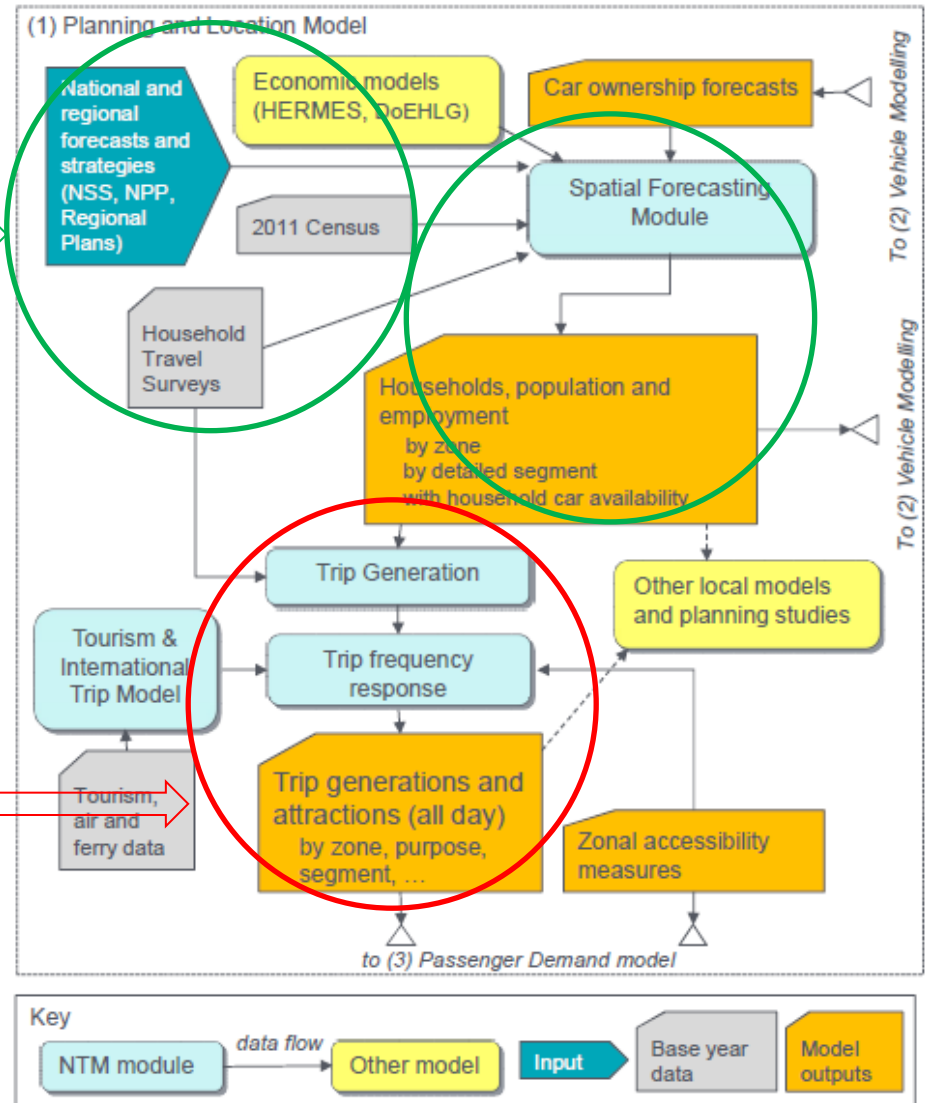
- Agreed to develop a National Trip End Model
- This will provide a common basis for trip forecasting nationally
- Modular approach has been agreed, with NTA working with Local Authorities to develop Regional City Models
 - GDA Model
 - 4 City Region Models
- Inter-regional Modeling capabilities
- (Potential to Integrate with a Northern Ireland Model)



Planning and Location Model

Spatial Analysis of
Land Use Inputs

Development of
Trips Rates



Other Points of Interest

- Planning and location module would input Census data at a ED or SA level – i.e. 3,440 ED's to cover the country.
- A number of zones (perhaps representing counties) will be used to represent travel to and from Northern Ireland.
- Irish Trip End Model will require special zones to represent destinations such as Airports and Ports.
- Highway assignment module could operate with coarser zoning system, but public transport assignment module would be greatly enhanced by retaining the ED level of detail.
- Trip End Model could potentially have up to 15,000 zones!

Uses of the GDA Model as a Policy and Planning Tool

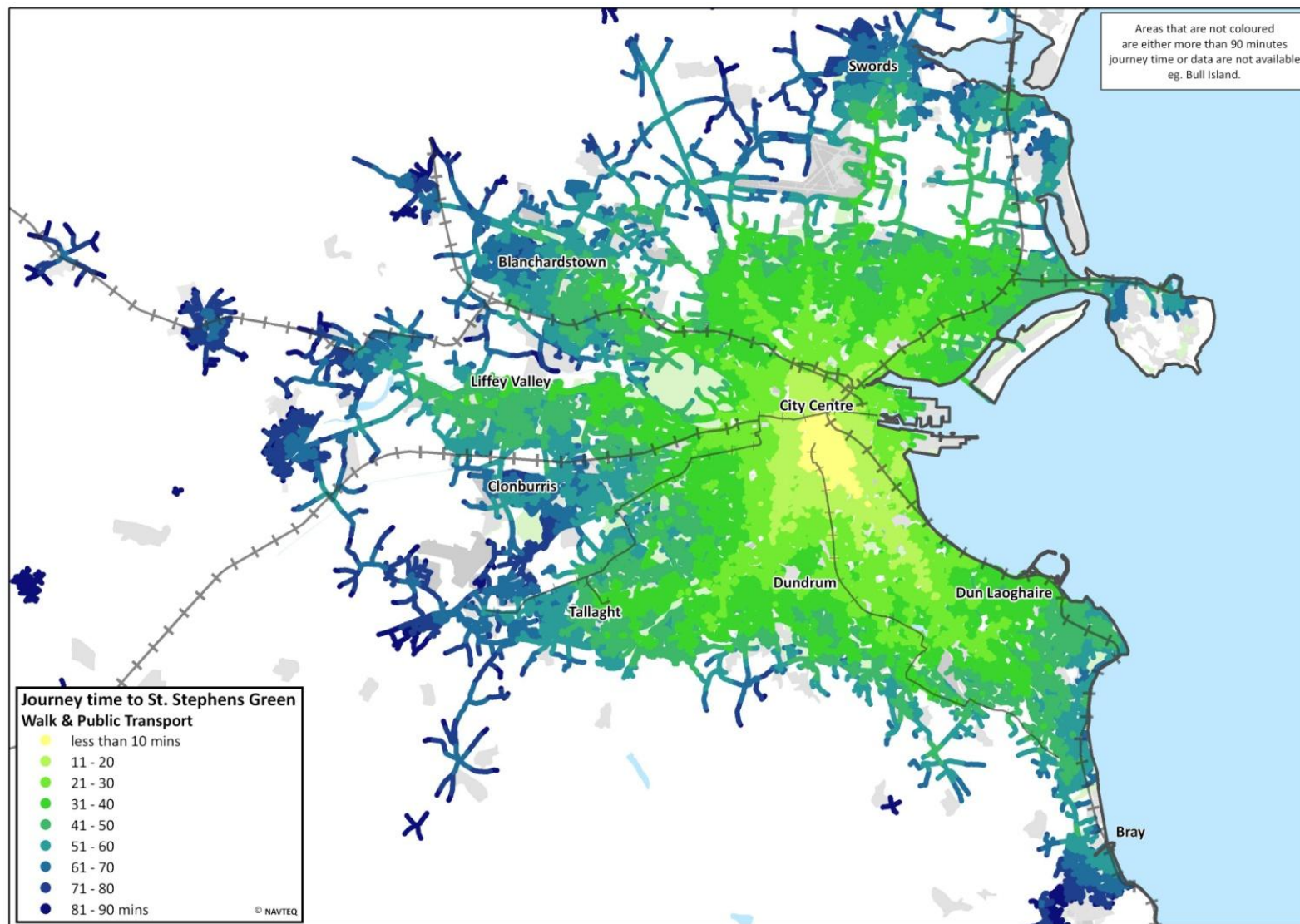
Greater Dublin Area
Draft Transport Strategy
2011-2030
2030 vision



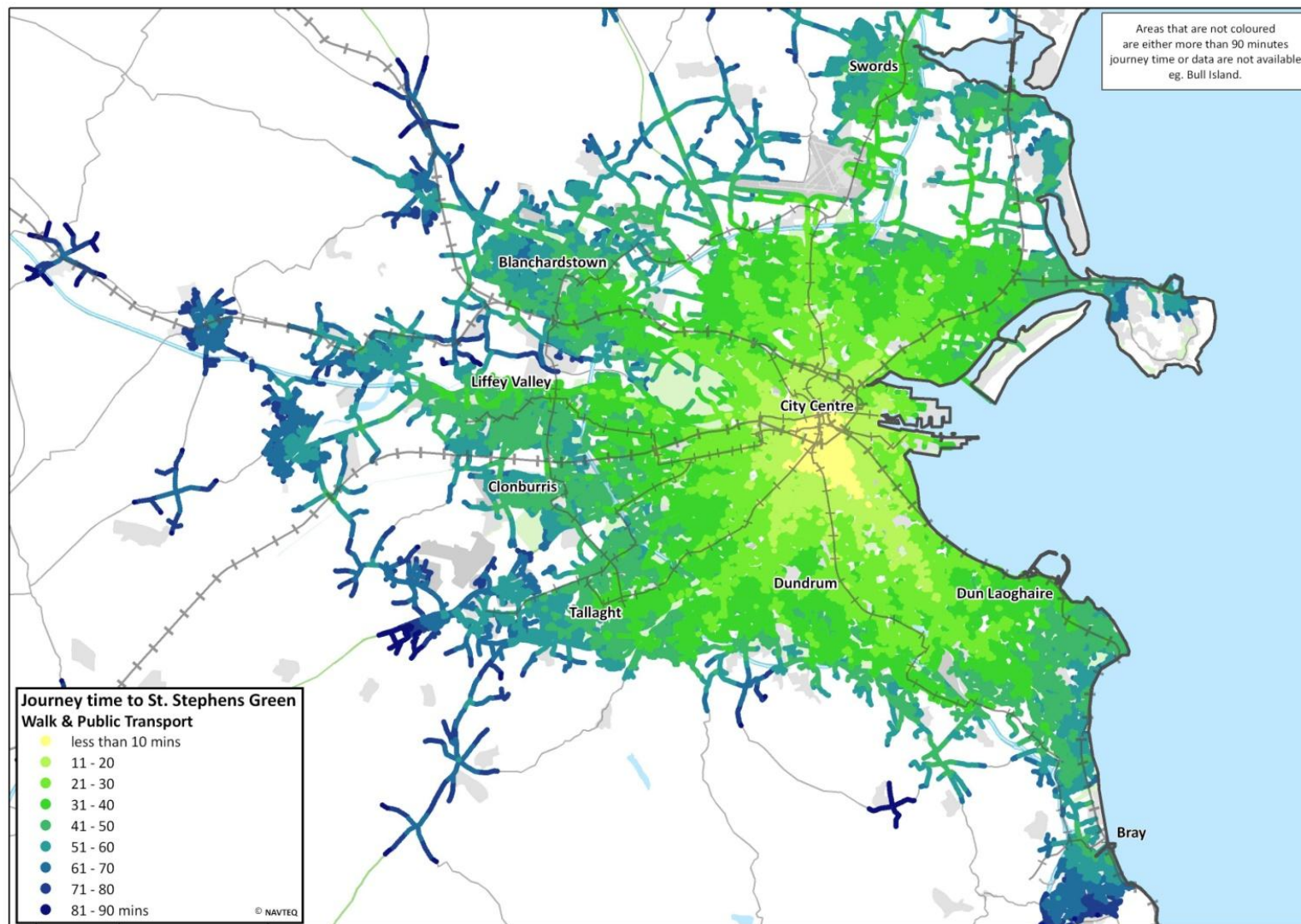
Strategic Policy Testing Tool

- The draft NTA Strategy was fully tested using the GDA Transport Model
- Overall the Strategy performed positively in delivering the established objectives, headline findings included;
 - Public transport usage increased – peak passenger kilometres up by 46%
 - Road congestion reduced when compared with do-minimum
 - Car kilometres down from 13.7m. kms to 8.5m. kms – (2006 figure is 7.9 m.kms.) (AM peak travel period)
 - Walking / Cycling significantly increased
 - 7% decrease in Greenhouse Gas emissions (annualised)

Public transport journey times 2030 – without Strategy

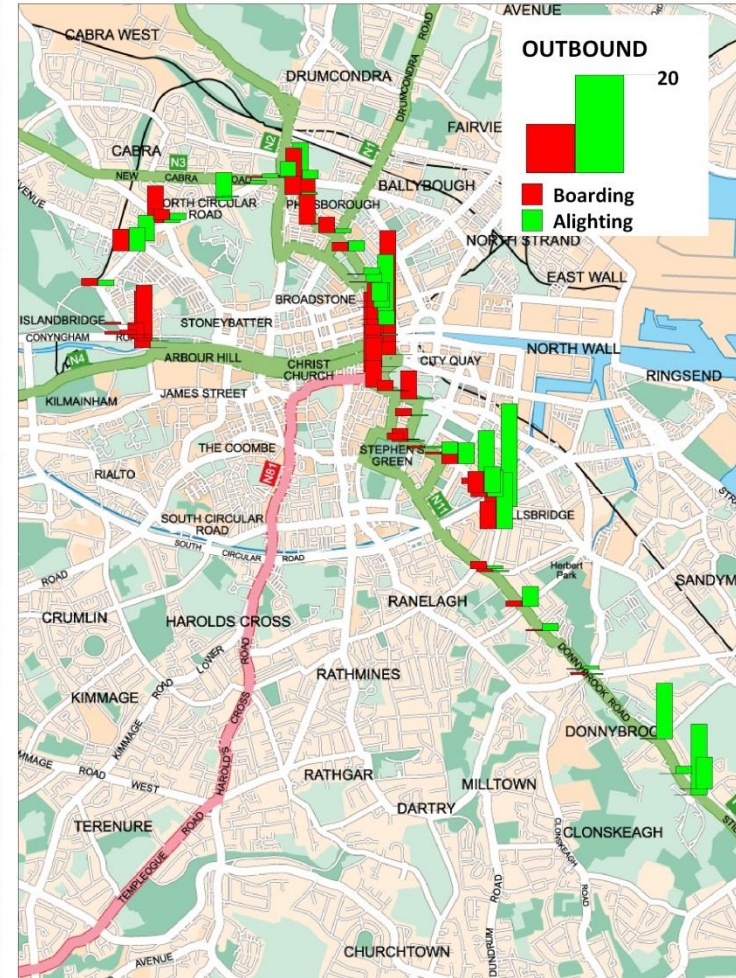
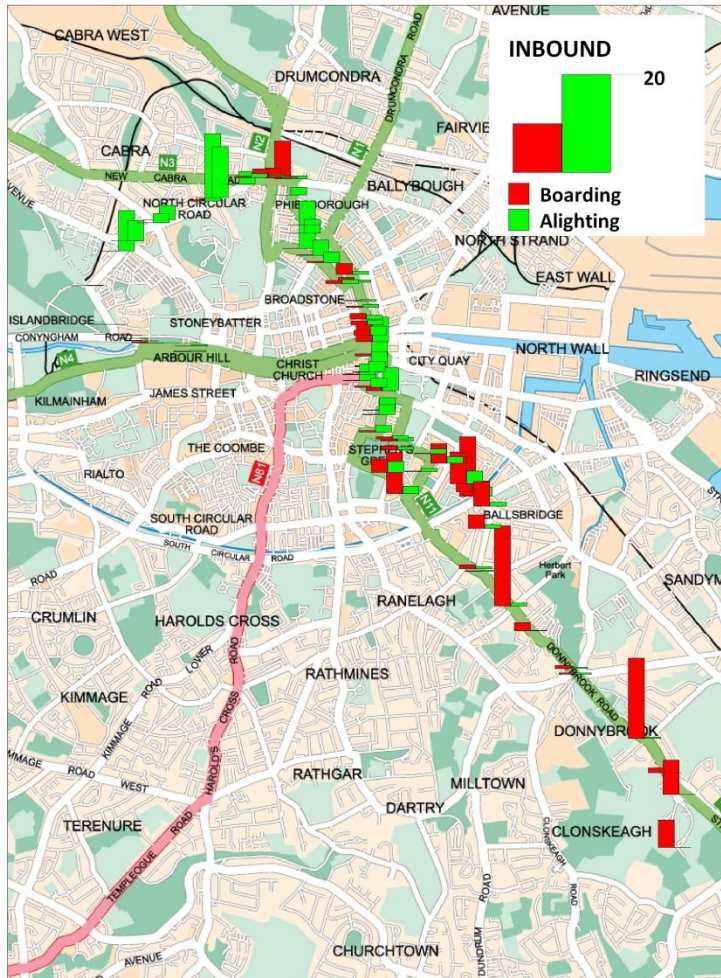


Public transport journey times 2030 – with Strategy



Model Outputs – Bus Boardings

ROUTE 10 BELFIELD --> HEUSTON 2030 MODELLLED BOARDINGS AND ALIGHTINGS



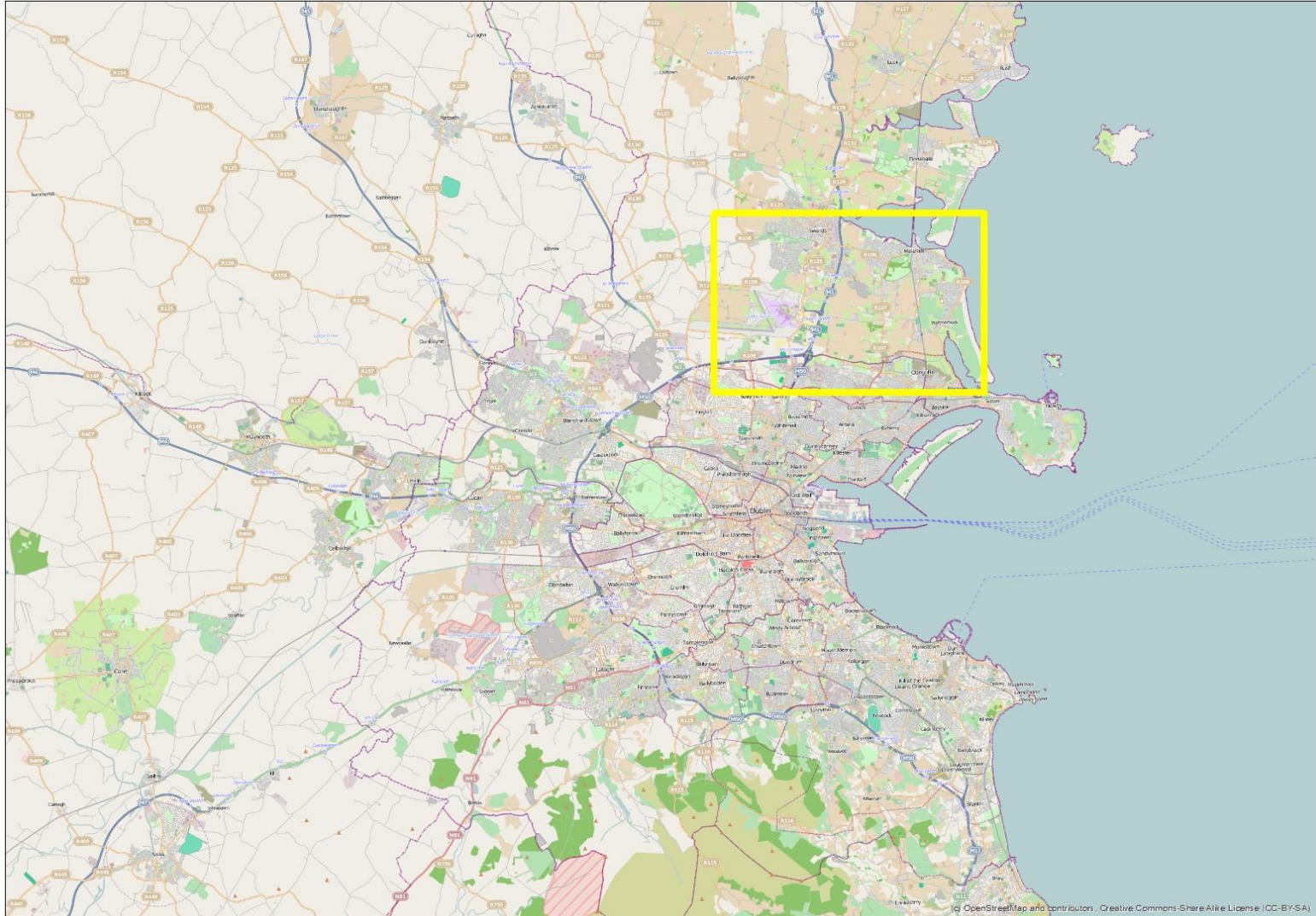
Assessment Tool for Major Infrastructural Projects

- Introducing LUAS to Dublin
- Two-way running of St. Stephen's Green East
- Making the case for Metro and DART underground in Dublin
- The need for tolling in the Port Tunnel
- Proving the need for Quality Bus Corridors

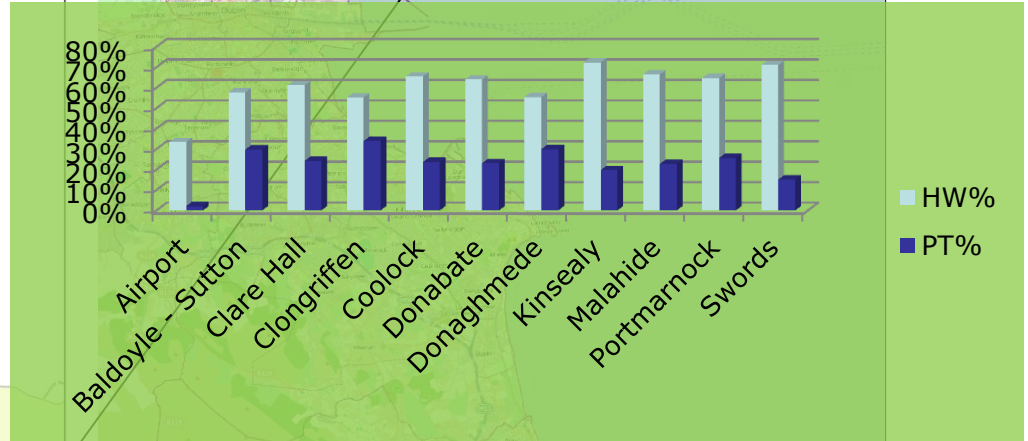
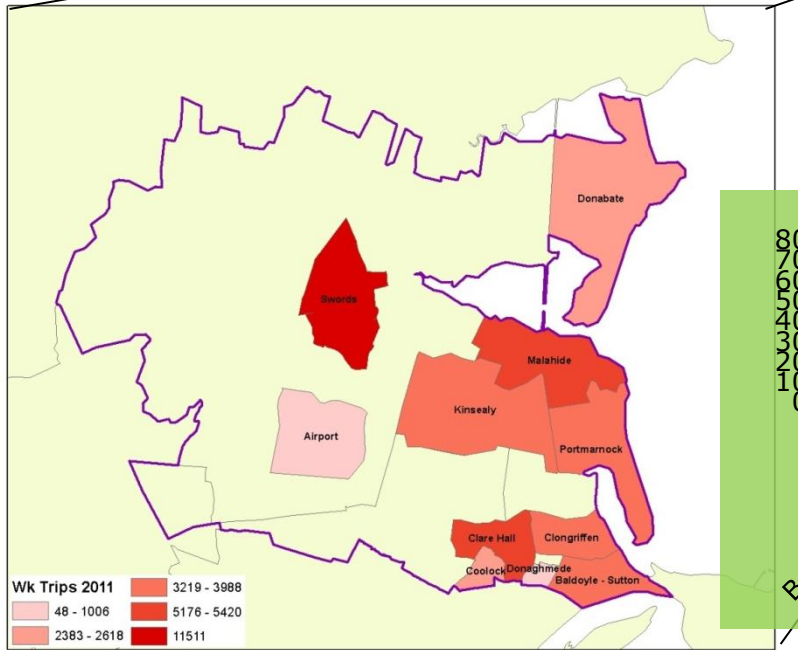
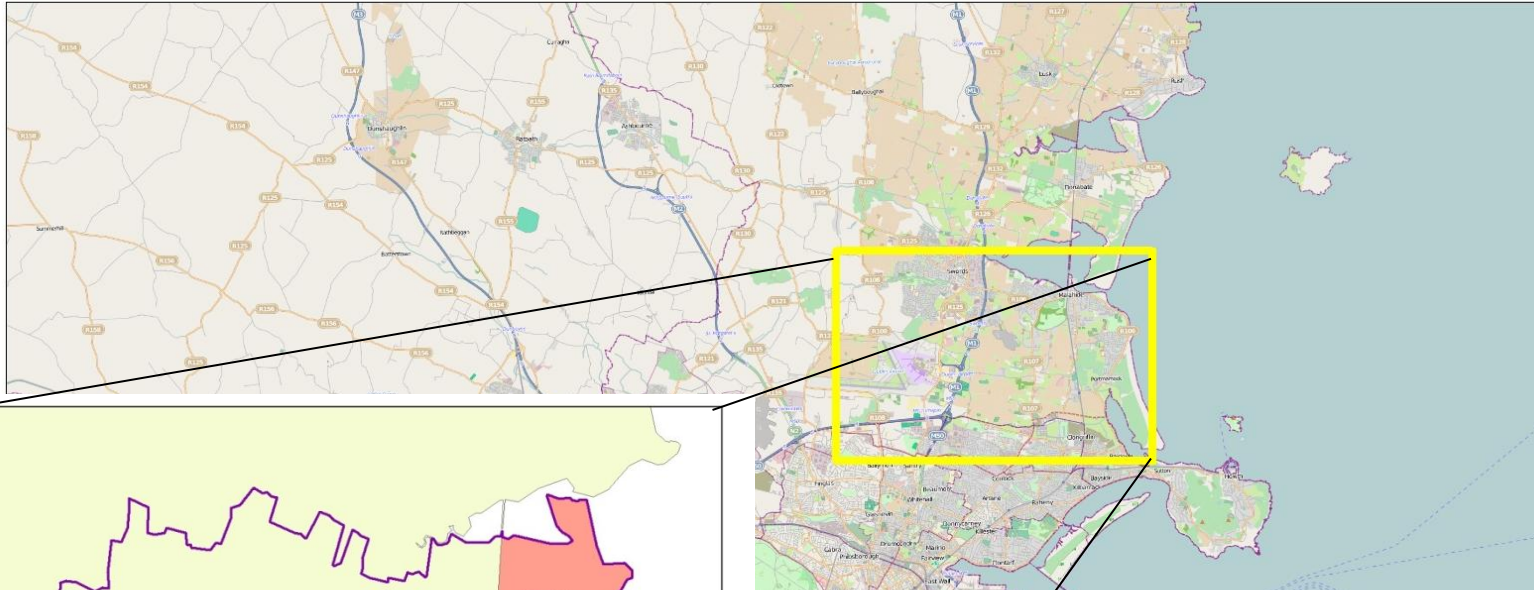
Assessment Tool for Multi Agency Projects

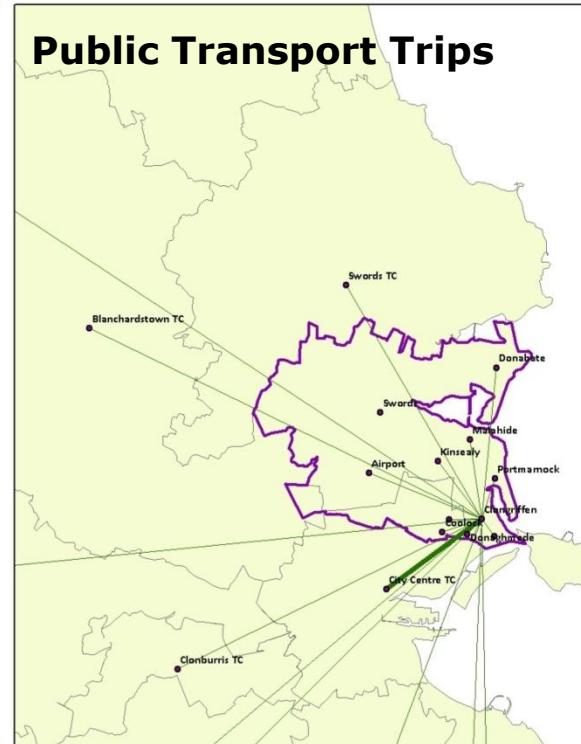
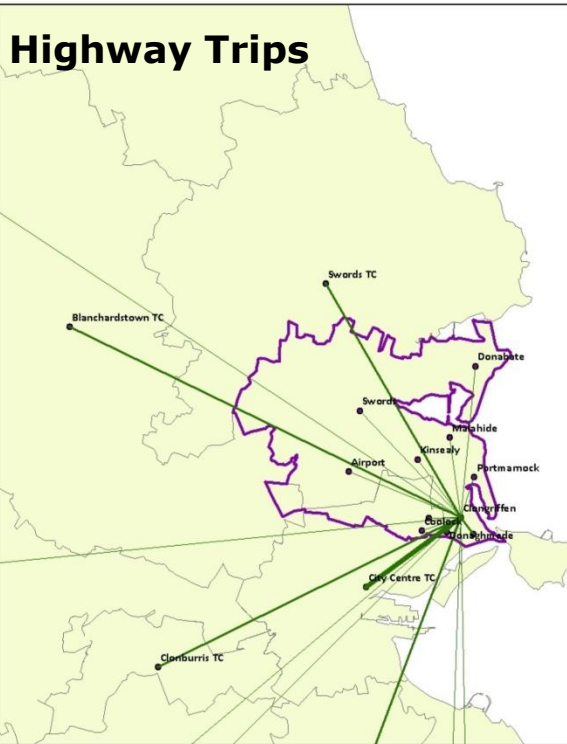
- Assessment of Land Use Proposals and Plans
- Allows Land Use Development to be Analysed Strategically to illustrate:
 - Strategic Impact on existing networks
 - Potential Phasing of Development
 - Potential Success of Transport Solutions
- Numerous Examples of this type of Analysis
 - E.g. North East Dublin Study

North East Dublin Study



North East Dublin Study



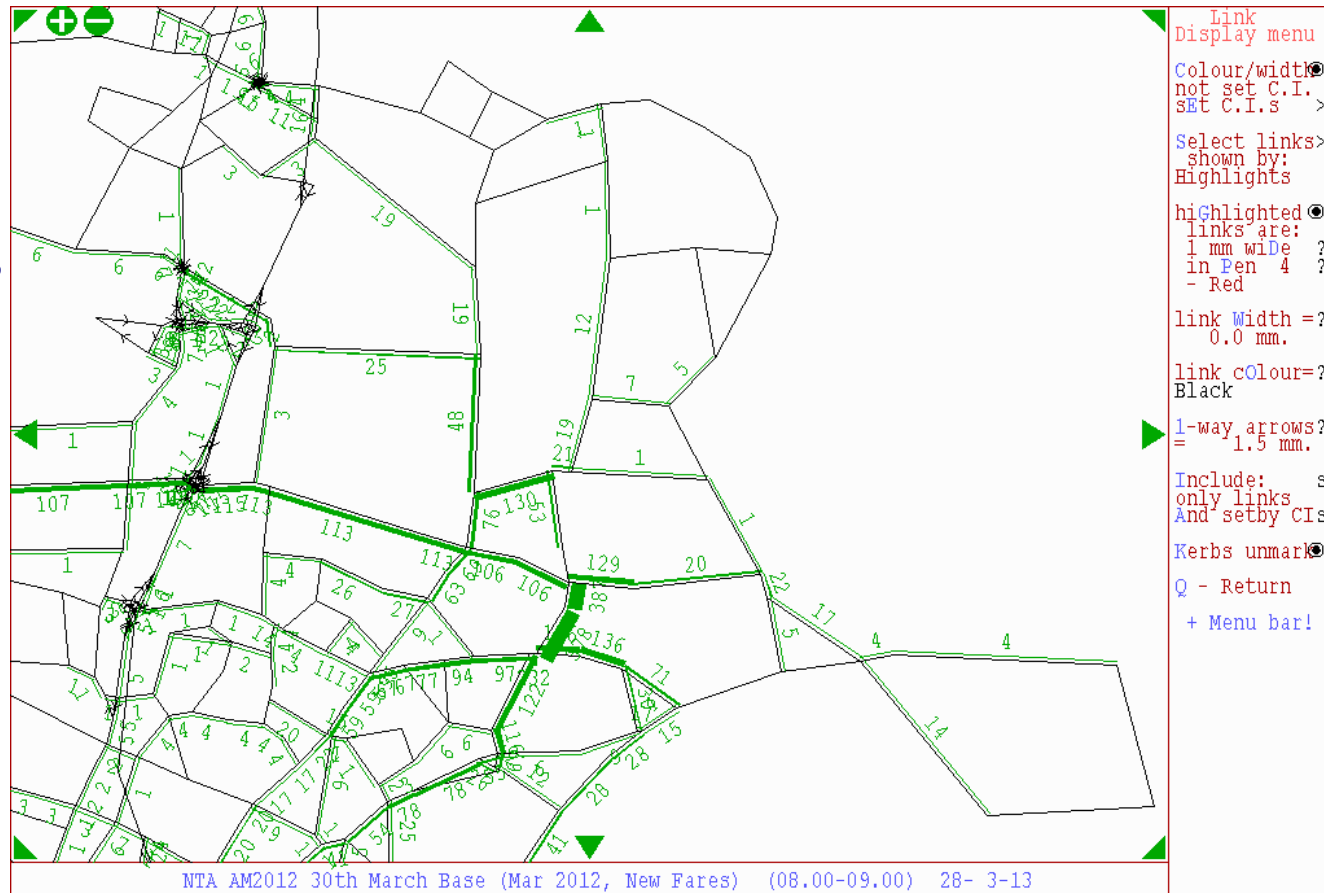


2011

Destinations	HW	PT	HW%	PT%	Destinations	HW	PT	HW%	PT%
Airport	48	5	91%	9%	Dundrum TC	51	33	61%	39%
Baldoyle - Sutton	98	3	97%	3%	Kinsealy	5	5	50%	50%
Blanchardstown TC	106	13	89%	11%	Liffey Valley TC	32	6	84%	16%
Bray TC	2	5	29%	71%	Malahide	17	1	94%	6%
City Centre TC	815	849	49%	51%	Naas TC	7	1	88%	13%
Clare Hall	39	8	83%	17%	Navan TC	7	1	88%	13%
Clonburris TC	58	14	81%	19%	Portmarnock	14	3	82%	18%
Clongriffin	10	1	91%	9%	Swords	11	0	100%	0%
Coolock	1	1	50%	50%	Swords TC	108	6	95%	5%
Donabate	6	2	75%	25%	Tallaght TC	28	4	88%	13%
Donaghmede	23	1	96%	4%	Wicklow TC	0	0	0%	0%
Dun Laoghaire TC	13	45	22%	78%					

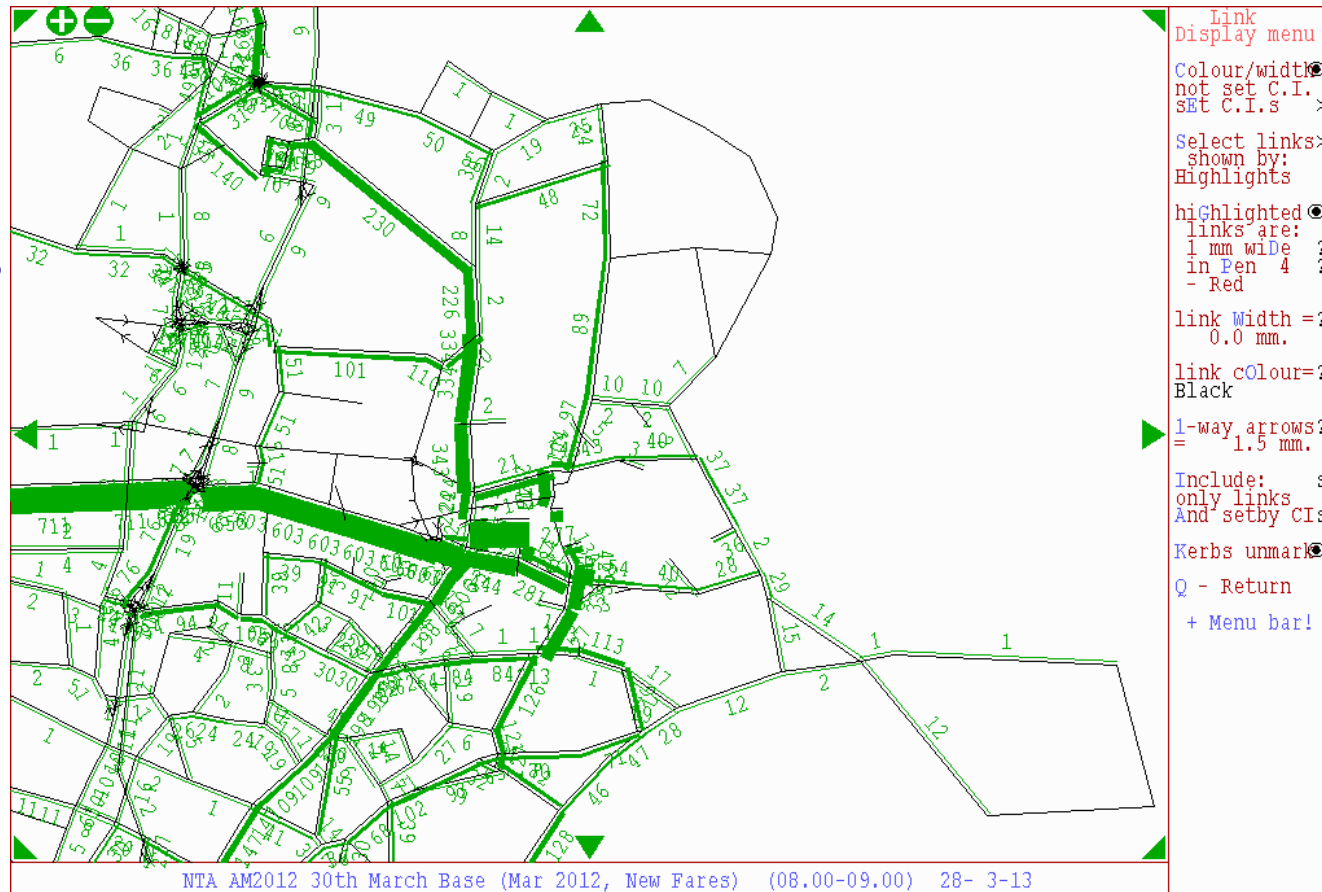
North East Dublin Study

- 2006 select link analysis of 2 Clongriffin zones
- 8-9 AM Peak

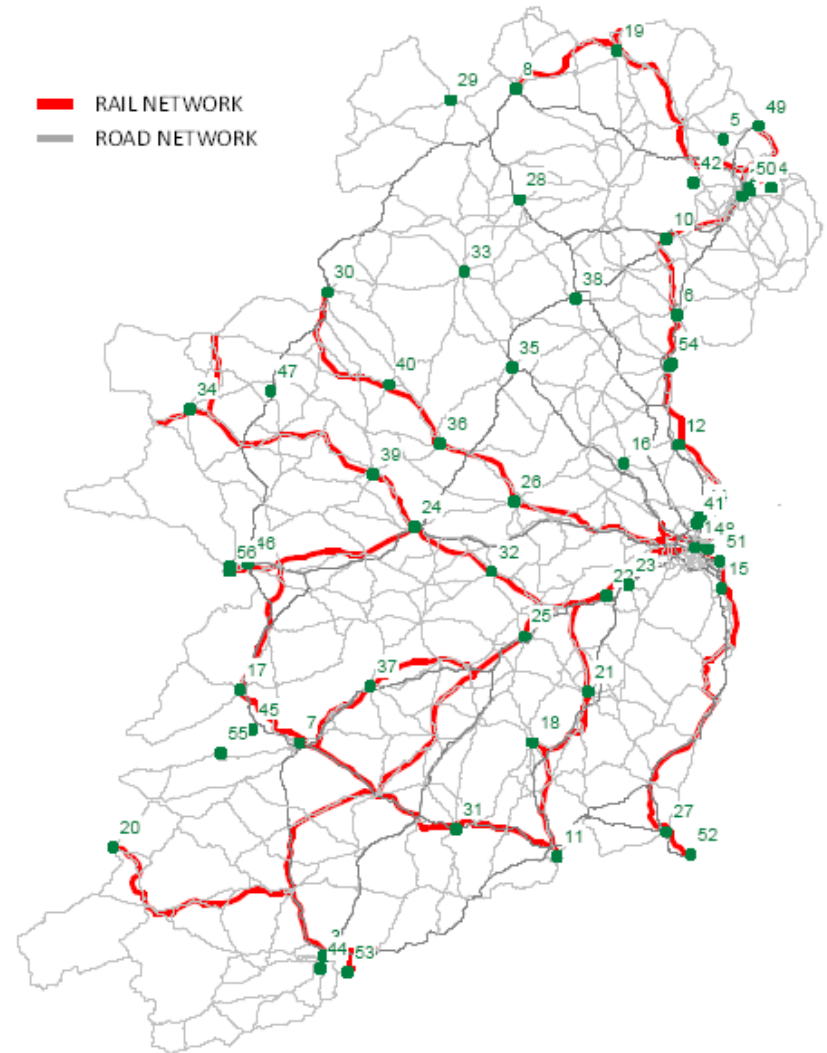


North East Dublin Study

- 2018 select link analysis of 2 Clongriffin zones
- 8-9 AM Peak
- Illustrates substantial increase in the network



Benefits of the Framework for Modelling Nationally for Policy and Planning Analysis



Potential benefits of this Framework

- Deciding on public transport investment priorities at a national and regional level
- Providing a consistent national framework and a consistent set of national forecasts for its GDA model and for other regional city models
- Informing the development of national and regional policy (e.g Freight Movement)
- Informing decisions on licensing of bus services nationally

Additional Benefits

- Facilitate the monitoring of key transport trends against central government objectives and policies
- Tracking trends in transport energy consumption and in meeting national transport emissions targets
- Testing the impacts of policy interventions (e.g. financial, regulatory, fares etc.) on the transport system

Conclusions

- **Agreed Framework is Key**
- Common Structure
- Standardised / Agreed Assumptions
- Normalised Output

- Developing a framework for agreement and collaboration between multiple stakeholders, will determine the success of our work

Thank You

Any Questions?