



**METRO NORTH
ORAL HEARING**

PROOF OF EVIDENCE

Rob Kelly

Scheme Traffic Management Plan Module B

Thursday 16th April 2009



**Metro North Oral Hearing
Proof of Evidence
Traffic
Module B Scheme Traffic Management Plan
Robert Kelly**

B1.0 Introduction

B1.1 Area of expertise and relevant experience and qualifications

B1.1.1 [SLIDE 2 – INTRODUCTION]

B1.1.2 My name is Robert Kelly. I am a Chartered Civil Engineer specialising and working professionally in the areas of Traffic Management and Transport Planning for over 25 years. I hold a Bachelor of Engineering Degree from UCC - 1982, was appointed as a Chartered Engineer by The Institute of Engineers of Ireland in 1986 and hold a Masters Degree in Urban Design specialising in Metro Planning - UCD 2006, and a higher Diploma in local government management. I am also a member of the UK Institute of Highways and Transportation.

B1.1.3 I am co-author of the National Traffic Management Guidelines Manual 2004 and The National Cycle Facilities Guidelines Manual.

B1.1.4 I am director of my own specialist Traffic and Transportation Consultancy practice, and I am currently working with the Railway Procurement Agency as Metro North Traffic Consultant. I have been working in this role since April 2008.

B1.1.5 I have represented a number of clients on significant projects at Oral Hearings and ABP submissions as Traffic Consultant in recent years, such as Ryan Air at the T2 Dublin Airport hearing, Irish Hardware Association at the IKEA hearing, Ballymore Homes – Bray Golf Course re-development, Cavan Developments – Ratchcoole Resource Recovery Facility hearing, Portmarnock Residents Association – DAA 2nd Runway hearing and others.

B1.1.6 I am a qualified Road Safety Auditor on the National Roads Authority list of certified auditors, and have conducted numerous road safety audits over the last 5 years on both national and non national roads

B1.1.7 I was previously head of the Roads Department for Wexford County Council, head of the Traffic Management Section of the Dublin Transportation Office, and County Engineer for the Augusta Margaret River Shire in Western Australia. I also worked as advisor to the Chief Roads Engineer in Lesotho Africa under a Bi-lateral Aid Programme.

B1.2 Structure of Evidence

B1.2.1 In this part of my evidence I will be presenting Module B of the Traffic Evidence, which will be a chapter by chapter overview of the Scheme Traffic Management Plan.

B1.3 Structure of Scheme Traffic Management Plan

B1.3.1 The Scheme Traffic Management Plan has been developed by RPA to mitigate the impacts generated by the construction phase of Metro North. The STMP report is structured in three parts – Part A, Part B, and Part C as follows:

B1.3.2 [SLIDE 3 – Structure of STMP]

- Part A presents an overview of Metro North and contains the following sub sections:

- Chapter 1 presents an overview of the STMP in terms of its role, purpose and requirements;
 - Chapter 2 presents an overview of Metro North Construction;
 - Chapter 3 presents an overview of the submissions received by An Bord Pleanála;
 - Chapter 4 presents an overview of the Impact Assessment Process; and
 - Chapter 5 presents an overview of Assessment Tools.
- Part B deals with the city wide or strategic impacts and the mitigation measures of Metro North:
 - Chapter 6 presents the Strategic Traffic Assessment;
 - Chapter 7 presents the Strategic Mitigation Measures;
- Part C deals with the local impacts and mitigation measures at each site location:
 - Chapters 8 to 14 of the STMP present the local area impacts by road user group for each of the assessment areas, MN101 to MN107.

B2.0 Chapter 1 - Overview of the Scheme Traffic Management Plan

B2.1.1 [SLIDE 4 – GOAL of STMP]

B2.1.2 The Metro North Traffic Management Plan (STMP) is a citywide traffic management plan to mitigate the impacts of the construction of the Metro North project. The STMP is a stand alone live document that defines the parameters under which the Metro North Scheme is constructed and managed.

B2.1.3 This is a bespoke plan produced by RPA specifically for the Metro North Scheme. It is one of the most comprehensive and detailed Traffic Management Plans developed for any project in this country to date. The scale, length, route and complexity of the Metro North project coupled with the construction programme has required this level of detailed assessment.

B2.1.4 Adherence to this plan will ensure that the Metro North Project can be constructed in Dublin such that the disruption caused by the works will be minimised, manageable and the economic life of the city will be maintained in terms of transportation and access.

B2.1.5 The overarching goal of the STMP is to minimise the impact of the Metro North construction on road users and to maintain access to businesses and other premises, whilst keeping traffic (including vulnerable road users) moving safely.

B2.2 Role of Scheme Traffic Management Plan

B2.2.1 The Environmental Impact Assessment for the Metro North Scheme identified the need for a Scheme Traffic Management Plan (STMP). The primary purpose of the STMP is to further mitigate the impacts identified within the Environmental Impact Statement (EIS) to facilitate the construction of Metro North. The STMP examines the impact on traffic and transport at a greater level of detail than that contained in an EIS. It is a further development of the traffic impacts and mitigation measures for the Metro North Construction works rather than an addendum to the EIS.

B2.2.2 The nature and scale of Metro North is such that disruption generated by the construction works is inevitable. However, the extent of the disruption will be dependent on the location of the work sites, the work methodologies employed and the timeframe of the work.

B2.2.3 There are a number of areas where extensive works will be undertaken within existing roadways and footpaths. The EIS identified these areas as having the greatest level of impact during the construction of Metro North. These areas comprise, amongst others, St Stephen's Green, O'Connell Street, Westmoreland Street, Parnell Square and the Ballymun Road. Other local impact areas along construction vehicle routes and areas in close proximity to the construction works were identified within the EIS such as Mater, Drumcondra, Dublin City University, and the R132 (Swords by-pass).

B2.2.4 The STMP has been developed by the Railway Procurement Agency (RPA), as a guiding plan to manage transport in Dublin during the construction of Metro North. The role of the STMP is to ensure that the economic activity of the city is not unduly affected by Metro North construction works, and that the movement of all road users can be made in a safe manner around the construction sites. The STMP will also set objectives to minimise disruption to all road users, retail/commercial premises and existing access affected by the works. It is intended that the STMP will be a live document, evolving and adapting to changes as necessary during the course of the works contracts.

B2.3 Background to the STMP

- B2.3.1 The development of a traffic management plan to address the construction impact of Metro North has been ongoing since the outset of the Metro North Project. The process is one of identifying goals, setting objectives, defining assessment criteria, measuring impacts through detailed traffic modelling and ultimately, dealing with these impacts in such a way as to minimise disruption to all road users including pedestrians, cyclists, persons with restricted mobility, public transport, HGV, service vehicles, taxis, and general traffic.
- B2.3.2 The STMP will be monitored and reviewed on a regular basis. It has been developed in consultation with Dublin City Council, Fingal County Council, Dublin Bus, Bus Éireann, An Garda Síochána and the Dublin Transportation Office. Presentations were given and feedback was sought from these agencies. Consultation was also carried out with the Dublin City Business Association, Dublin Chamber of Commerce and other individual stakeholders on a regular basis as the plan was being developed.
- B2.3.3 The STMP process will continue as a work in progress up to the commencement of Metro North enabling and construction works and beyond for the duration of the construction period through to the operational phase to ensure compliance to requirements and measured objectives.

B2.4 STMP Development Stages

- B2.4.1 As mentioned the STMP is a live document that will continually develop over the course of the works. It has three distinct phases that relate directly to the procurement process for Metro North:
- Stage 1: STMP to Railway Order;
 - Stage 2: STMP to Best and Final Offer (BAFO) and Final Contract Award; and
 - Stage 3: STMP through Construction.
- B2.4.2 The Stage 1 STMP is developed by RPA in order to demonstrate that the traffic impacts of the Metro North works can be mitigated. The STMP at this stage is based on RPA's Reference Design and estimate of the timescales it will take to construct the works. This takes the STMP to the Railway order Stage.
- B2.4.3 Following Stage 1 the STMP will be further developed by the Shortlisted bidders. RPA's procurement strategy for Metro North includes a BAFO (Best and Final offer) stage wherein up to two Tenderer's will be shortlisted and requested to submit final offers including final technical proposals, the final offer will include for adjustments arising out of the railway order process and other updates to the project. As part of the BAFO process the Tenderer's will be obliged to take account of the Stage 1 STMP and will be required to refine and develop it further to suit their emerging design solutions.

B2.4.4 Following the BAFO stage RPA will appoint a preferred bidder who will continue to develop the STMP in conjunction with RPA and other key stakeholders prior to formally entering into contracts with RPA. The Requirements of the STMP will then be mandatory and reflected in the final contracts. The STMP itself will not be a contractual document but the mandatory requirements of the STMP will be reflected in RPA's Construction & Maintenance Requirements or CMR which will form part of the contract; i.e. the CMR will be updated to include a requirement for the contractor to comply with and continue to develop the STMP.

B2.4.5 At Stage 3 the STMP will be used for the construction phase and will remain a live document. The contractor will develop the plan to include any relevant applications or approvals from relevant authorities for traffic management around road works. The construction works will be monitored against the plan and action taken as appropriate to ensure that the requirements and objectives of the plan are continually met. While the contractor will be responsible for implementing the Plan, RPA will include appropriate requirements in the CMR and Infrastructure Contract to ensure compliance.

B2.5 Requirements and Objectives of STMP:

B2.5.1 [SLIDE 5 - STMP Requirements and Objectives]

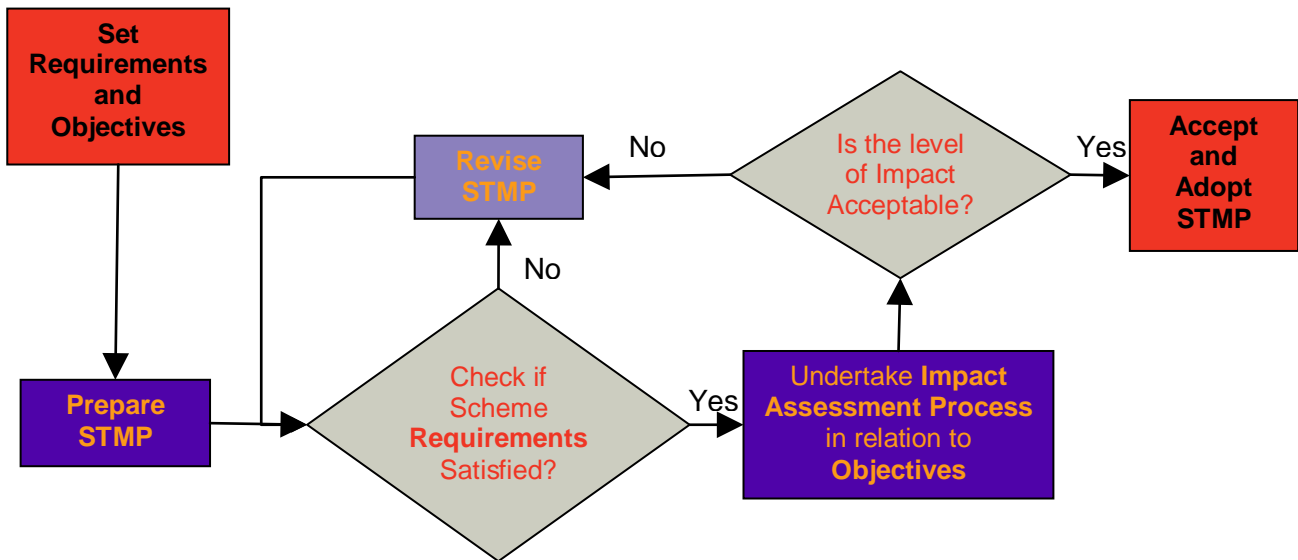
B2.5.2 As stated earlier the overarching goal of Metro North Traffic Management Plan (STMP) is to minimise the impact of the Metro North Scheme on road users and to maintain access to businesses and other premises, whilst keeping traffic (including vulnerable road users) moving safely. In doing so, the economic vibrancy of Dublin City Centre and other key areas will be maintained throughout the construction period.

B2.5.3 In the development of this goal, cognisance has been taken of the sensitive nature of the receiving environment and issues raised by key stakeholders through the consultation process and through submissions received from An Bord Pleanála in relation to the EIS. (I deal with submissions to an Bord Pleanála in module E of my evidence) This goal, therefore, forms the basis for the key Requirements and Objectives which are set for each road user and to which the impact of Metro North construction is benchmarked.

B2.5.4 Figure B2.1 illustrates the iterative process which links the requirements and objectives to the preparation of the STMP and the assessment thereof.

B2.5.5 [SLIDE 6 - Requirements and Objectives Flow Chart]

Figure B 2.1 Integration of Requirements and Objectives with STMP Preparation



B2.5.6 Initially, requirements and objectives were determined for each road user. The requirements and objectives address issues associated with access, buses, taxis, pedestrians, mobility impaired disabled, cyclists, general traffic, emergency vehicles, construction traffic and safety

B2.5.7 A requirement is a minimum standard for which there is no alternative option available and, therefore, must be met by the STMP. For example, it is a prerequisite of the plan to maintain access to all buildings and facilities. As outlined in Figure B2.1, if the requirements are not met, the STMP must be revised.

B2.5.8 An objective is defined as a desired outcome, to which there is an alternative option available, in relation to the transport impact of Metro North. Objectives can be quantified as described above. The objectives are defined to minimise the impact on each road user. To ensure that the impacts of Metro North as outlined in the STMP are not made worse the impact rating set out for a particular objective must be achieved.

B2.5.9 These requirements and objectives form the basis of the preparation of the STMP. They are used to assess the impact of Metro North.

B2.5.10 Table B2.1 below, summarises the requirements and objectives of the STMP for each road user group.

B2.5.11 [SLIDES 7 and 8 - Requirements and Objectives Tables by Road User]

B2.5.12 The Requirements of the STMP are those measures that must form part of any contractor’s obligations under the STMP. The requirements are as follows:

- Maintain access to all buildings and facilities for
 - emergency vehicles,
 - delivery and servicing vehicles
 - private properties,
 - car parks,

- local access,
- on street parking.
- Maintain the existing bus network, frequency and general routing;
- Ensure full compliance for mobility impaired and disabled persons; and
- Maintain safe pedestrian access to all buildings and facilities.

B2.5.13 The Objectives of the STMP are as follows:

- Minimise impact on vehicle journey times along key corridors for general traffic, buses and taxis;
- Minimise congestion for general traffic;
- Minimise impact of increased traffic flow (including HGVs) in local areas;
- Minimise impact of HGVs on other road users e.g. cyclists and pedestrians.
- Minimise impact on loading bay facilities;
- Minimise impact on current bus stop and taxi rank arrangements;
- Minimise impact on pedestrian and cycling facilities;
- Minimise pedestrian congestion in areas with high pedestrian volumes e.g. city centre;
- Maintain existing levels of cycle parking; and
- Minimise impact on cycle route facilities and journey lengths

B2.5.14 All objectives use the term 'minimise'. This is used in the context of the construction methodology and how the objectives are to be measured. Referring to Mr Ian Byrnes evidence – Table A4.1 it can be seen that each Objective has an associated Performance Indicator, its unit of measurement and its resultant impact rating. This rating for the objective, therefore, becomes a requirement for the Contractor to achieve.

B2.5.15 The Metro North Traffic Forum will confirm adherence to these requirements.

Table B 2.1 Requirements and Objectives By Road User

Road User	Sub Classification	Description	Requirements	Objectives
General Traffic	Emergency Vehicles	Maintain emergency service access to all buildings and facilities	P	
	General Traffic	Minimise impact on vehicle journey times on key corridors (e.g. national route radials) and within areas of strategic importance (e.g. City Centre)		P
	General Traffic	Minimise Congestion		P
	General Traffic	Minimise impact of increased traffic flow in local areas		P
	HGVs	Minimise Impact of Heavy Goods Vehicles on Other Road Users		P
	Delivery/ Servicing	Maintain access for current delivery and servicing arrangements	P	
	Access	Maintain current levels of general access to all properties	P	
	Access	Maintain access to all city centre multi-storey car parks	P	
	Access	Minimise impact on local access diversions		P
	Delivery/ Servicing	Minimise impact on loading bay facilities		P
Access	Minimise impact on current levels of on-street car parking		P	
Public Transport	Bus	Maintain the existing bus network (frequency and general routing)	P	
	Bus	Minimise impact on bus journey times		P
	Bus	Minimise impact on current bus stop arrangements		P
	Taxis	Minimise impact on City Centre taxi ranks		P
	Taxis	Minimise the impact on taxi service coverage		P
Vulnerable Users	Mobility Impaired and Disabled	Ensure full MID compliance	P	

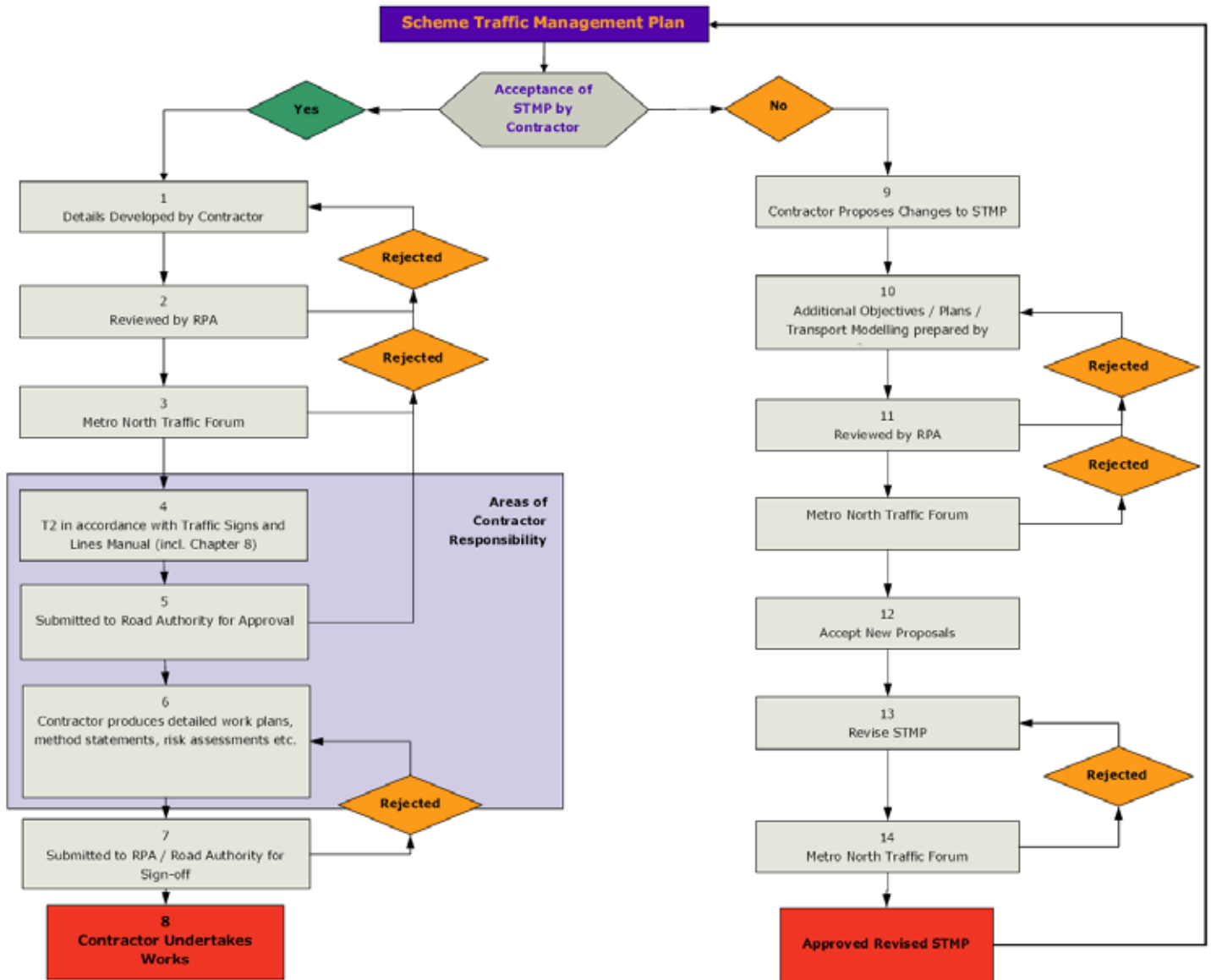
Road User	Sub Classification	Description	Requirements	Objectives
	Pedestrian	Maintain safe pedestrian access to all buildings and facilities	P	
	Pedestrian	Minimise impact on pedestrian facilities (e.g. pedestrian crossings)		P
	Pedestrian	Minimise impact on pedestrian congestion in areas with high pedestrian volumes (e.g. City Centre)		P
	Cyclists	Maintain existing levels of cycle parking		P
	Cyclists	Minimise impact on cycle route facilities		P
	Cyclists	Minimise impact on cycle journey lengths		P

B2.6 Ongoing Monitoring and Development of the STMP

- B2.6.1 Due to the complexity and extensive nature of Metro North construction, it is important that any work undertaken on the traffic management planning, designing and implementation of the project is subject to ongoing scrutiny and review. It is also important that the plan is adaptable to changing environments or events.
- B2.6.2 The contractual elements involved in the delivery of the project are also complex. The main contractor, or others, may wish to propose alternative traffic management designs or arrangements to those proposed in this STMP.
- B2.6.3 For the above reasons it is essential that the STMP as proposed herein incorporates a review mechanism to enable, where necessary, modifications to be made to the original plan. However as stated above the minimum Requirements and Objectives set out in this Plan will be adhered to, and these Requirements and Objectives identified will be met.
- B2.6.4 During the course of the construction works, while the PPP Contractor will be responsible for implementing the STMP, the RPA will include appropriate requirements in the CMR (construction and Maintenance Requirements) and Infrastructure Contract with the PPP contractor to ensure compliance with the plan. The RPA will oversee and report on the implementation of the STMP to the Metro North Traffic Forum.
- B2.6.5 Figure B2.2 shows the Metro North implementation process to ensure compliance, monitoring and enforcement of traffic management interventions during the construction of Metro North. The process allows for the STMP to be adopted or revised by the PPP Contractor subject to the requirements and objectives of the Plan being adhered to. This process will be overseen by RPA and approved by the Metro North Traffic Forum prior to a revised Scheme being adopted.

B2.6.6 [SLIDE 9 – STMP Implementation Flow Chart]

Figure B 2.2 Metro North Implementation Process Chart:



STMP

- 1 Contractor develops traffic management and mitigation designs in accordance with STMP to a level required to undertake the works.
- 2 Prior to submission of contractors traffic management detailed plans to the Traffic Forum, the plans will be vetted by RPA for compliance with STMP and RPA/DCC/FCC other agency requirements.
- 3 Following the approval of the contractors detailed plans by the Traffic Forum. The Road Authority's standard traffic approval applications will be drawn up by the contractor and submitted to the RPA for review.
- 4 Road Authority approves standard traffic approval (T1/T2) application.
- 5 Contractor produces detailed work plan/methodology
- 6 Work plans submitted to RPA for approval.
- 7 Contractor undertakes work in accordance with STMP.

Alternative STMP by Contractor

- 9 The contractor may wish to significantly vary the proposed work methodology or working constraints identified in the STMP.
- 10 The contractor will provide justification for new proposals supported by revised modelling, revised plans, setting out clear objectives as well as advantages of the revised proposals and demonstrate that revised proposals do not result in impacts that are more severe than those identified within the STMP.
- 11 The Contractor will demonstrate that the stated Objectives of the STMP are maintained or improved.
- 12 The Contractor will ensure that the requirements identified in the STMP are adhered to.
- 13 The contractors revised proposals are reviewed by RPA.
- 14 The revised contractors plan must be approved by the Traffic Forum prior to it been agreed to revise the STMP accordingly.
- 15 The STMP is revised by RPA
- 16 Revised STMP is approved by Traffic Forum.

B2.7 STMP Compliance by PPP Contractor

B2.7.1 The PPP Contractor will be responsible for implementing the STMP and adhering to the Requirements and Objectives set out in the agreed plan. RPA will include requirements in the CMR (Construction and Maintenance Requirements) and Infrastructure Contract with the PPP Contractor to ensure that the Plan is implemented and complied with.

Metro North Traffic Forum

B2.7.2 The Metro North Forum is a representative group of the agencies involved with Traffic Management during construction of Metro North and shall comprise of members from the following agencies:

B2.7.3 [SLIDE 10 - Metro North Traffic Forum]

- Dublin City Council;
- Dublin Bus;
- An Garda Síochána;
- Fingal County Council;
- Dublin Transportation Office;
- Bus Éireann;
- Railway Procurement Agency; and
- The Contractor or Contractors.

B2.7.4 [SLIDE 11 - Role of MN Traffic Forum]

B2.7.5 The role of the forum is to:

- Review alternative objectives, plans or modelling provided by the Enabling or PPP Contractor(s) and accept, reject or ask for further revisions or information;
- Approve traffic management details submitted by the contractor in line with STMP requirements and objectives following review and recommendation by the RPA; and
- Act as a reviewer of specific T2 proposals prior to submission to the relevant Local Authority for approval.

B2.7.6 It is envisaged that the Forum will meet fortnightly and will be chaired by the Road Authority or by the Main Contractor (at the request of the Road Authority). The Forum will be provided with progress update reports by the contractor at each meeting and compliance/monitoring issues will be reported by RPA. Administrative support will be provided by the contractor and specific issues requiring decisions will be presented by the contractor to the Forum.

B2.7.7 The Forum would, through RPA, report back to the Transport 21 Implementation Working Group on a monthly basis providing information on progress and planned works.

B2.8 STMP Safety and Standards

B2.8.1 [SLIDE 12 - STMP Safety and Standards]

B2.8.2 In regard to the planning, design and construction of Metro North highway safety and the safety of all road users is paramount. The appropriate highway and street standards and guidelines will be applied to all facets of the work undertaken by enabling works and PPP Contractors, or Sub contractors.

B2.8.3 The safety standards and guidelines appropriate in this regard are not limited but will include the following documents:

- NRA Design Manual For Roads and Bridges - NRA DMRB;
- National Traffic Management Guidelines Manual – DOEHLG;
- Dublin City Council Specifications, Standards and Traffic Management / Road Safety requirements;
- UK - DETR MID Guidance Manual;
- DTO National Cycle Guidance Manual;
- DCC/Fingal Co Co Road Safety Audit Guidelines;
- NRA Road Safety Audit Guidelines;
- NRA Traffic Impact Assessment Guidelines;
- Highway Capacity Manual, 2000;
- DOEHLG Accessibility Guidelines;
- QBN Office design standards and specifications; and
- DOHELG Signs and Lines Manual including the new Chapter 8 – Temporary Roadwork's.

B3.0 Chapter 2 - Overview of Metro North Construction

B3.1 Introduction

- B3.1.1 I will now provide an overview of Chapter 2 of the STMP which describes the Metro North Construction impact by each assessment area, MN101 to MN107, as it relates to traffic.
- B3.1.2 [SLIDE 13 - Overview of Metro North Traffic Assessment Areas/ / Key Facts
- B3.1.3 Metro North has two distinct construction phases with associated impacts and mitigation measures.
- B3.1.4 The enabling phase of the project involves the diversion of utilities currently in the path of the Metro tunnel or stop boxes. It also involves preparation works including junction reconfiguration to enable the first phase of the main construction contract to commence.
- B3.1.5 The main works comprise the construction of Metro from Belinstown to the north to St Stephen's Green in the south. During the course of the main contract staged traffic management arrangements are also required to facilitate the works and to maintain traffic and pedestrian flows around the works.
- B3.1.6 Traffic management changes are required to perform the works. These are described in more detail by my colleague Mr. Richard Tucker as part of Module C of the Traffic Evidence.
- B3.1.7 The enabling and main works are run under separate types of contract:
- the enabling works are procured and undertaken directly by the RPA; and
 - the main works are procured and undertaken as a public private partnership (PPP).
- B3.1.8 The result is that for the enabling works the traffic management arrangements will be under the control of RPA whilst for the PPP traffic management arrangements will be under the control of and be the responsibility of the successful PPP consortium.
- B3.1.9 Both situations transfer differing elements of risks to the contractors. However it is essential to the integrity of the STMP that requirements, objectives, assumptions, works methodologies, and mitigation measures set out in the STMP are undertaken and devolved down to the contractors. A system of monitoring and control is proposed to ensure that the above is the case.
- B3.1.10 The STMP will act as a mechanism for on-going traffic management throughout Metro North from planning through the design stages, during the construction of Metro North and further to include the operation of the Metro System.

B3.2 Key Facts

B3.2.1 Alignment: St Stephen's Green to Belinstown

B3.2.2 Length: 18km total length

- 11 km in tunnel (City centre to Ballymun and Airport);
- 7 km in retained cut, at-grade or elevated;
- 5.3km in twin tube bored tunnel (in city)
- 3.0km in cut and cover tunnel;
- 2.4km in twin tube bored tunnel (airport).

B3.2.3 No of Stops: 17 stops (2 provisional)

- 9 underground stops from St. Stephen's Green to Ballymun and at Airport;
- 8 surface stops;

B3.2.4 Spoil and material quantities:

- 2 Million m³ excavation
- ¾ Million m³ of Concrete
- 150,000 Tonnes Rebar
- 7,000 Tonnes structural steel

B3.3 Enabling Works Overview

B3.3.1 The Enabling works have already been described by my colleague Mr Doug Thompson. Since there are Enabling works in three of the seven areas and the impact on traffic of these works is significantly less than the main works the assessment of impacts has focussed on the main works. The principal areas of Enabling works are at St Stephens Green, Parnell Square, O Connell Bridge and Ballymun.

B3.4 Main Works Overview

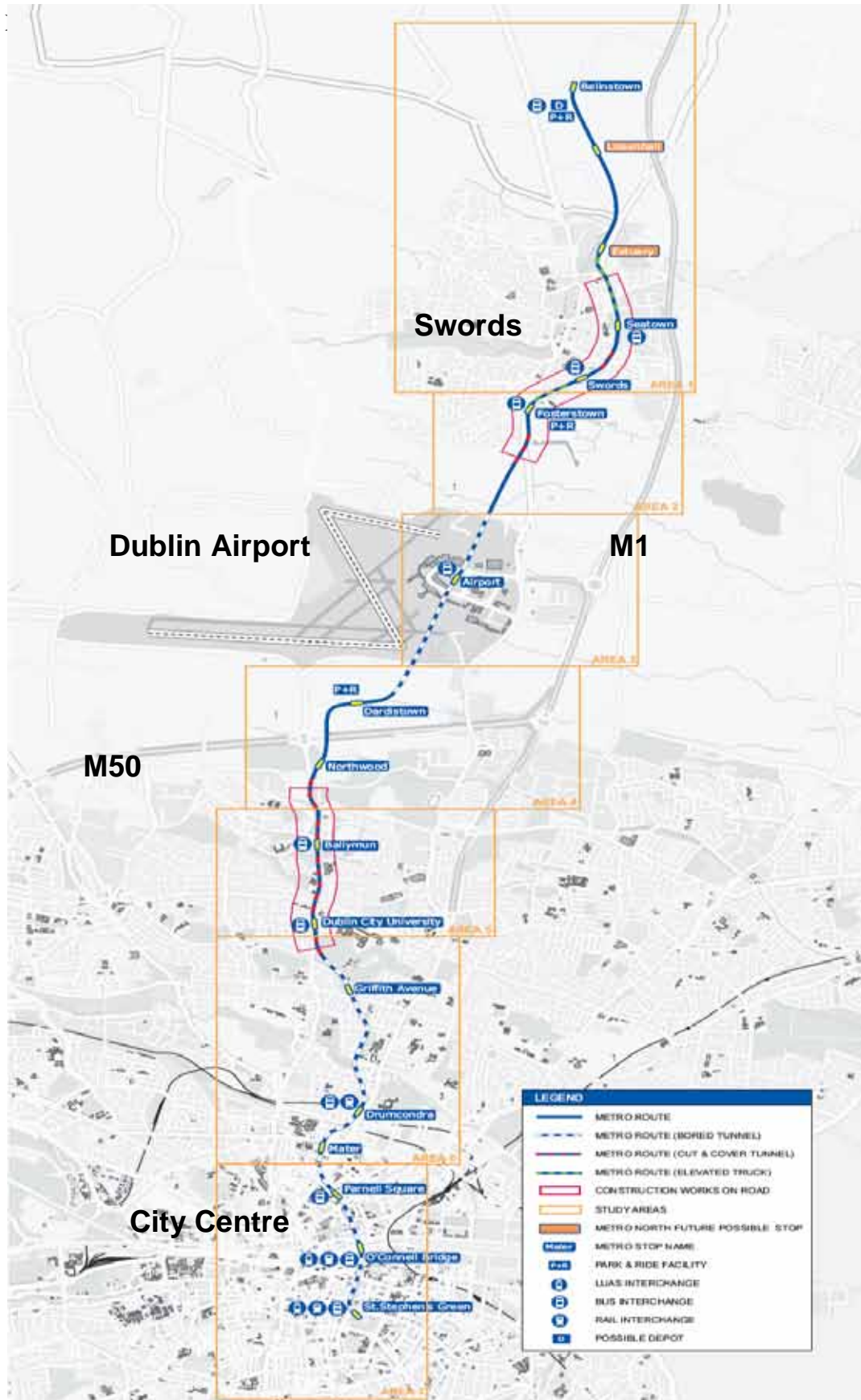
Area MN101-MN107 – 17 Stops

B3.4.1 The whole alignment extends over a distance of 18 km and will be constructed in tunnel, at grade and on elevated bridge sections. 11 km will be constructed in tunnel (City centre to Ballymun and Airport) and 7 km in retained cut, at-grade or elevated.

B3.4.2 The underground tunnel section extends from St Stephen's Green North to Albert College Park, then cut/cover tunnel to just south of the Northwood stop, followed by an at grade section to north of Dardistown. The alignment is then bored tunnel under the airport, and then at grade north to Pinnockhill and on to Belinstown, with elevated sections between Fosterstown to Swords and Seatown to Estuary. See below.

- B3.4.3 The construction of Metro North also involves the construction of 17 stops, nine of which are constructed underground and eight stops at grade. The project will require the removal of approximately 2 million cubic metres of material, as well as the importation of 800,000 cubic metres of concrete and other construction materials. Metro North also involves the construction of three Park and Ride Sites at Belinstown, Fosterstown, and Dardistown.
- B3.4.4 The impact of construction activities will result in increased congestion due to construction traffic and loss of road capacity, coupled with local access issues to business, homes, retail and commercial facilities. The roads most severely affected will be those in the vicinity of the stops, serving as access to construction sites and as the construction vehicle haul routes.
- B3.4.5 In terms of the construction impacts generated by Metro North, the most affected areas are the roads and footpaths in the vicinity of the stops located in St Stephen's Green, O'Connell Bridge / Westmoreland St / O'Connell Street, Parnell Square, Ballymun along the R108, and the R132 between Pinnockhill Roundabout and Estuary Road.
- B3.4.6 The construction of the Stop Areas and the tunnel will also require the diversion of all utilities that would interfere with the main construction works. This will also have an impact in footpaths located in the vicinity of St Stephen's Green, O'Connell Bridge / Westmoreland St / O'Connell Street, Parnell Square, Ballymun along the R108, and the Old Swords Bye Pass R132 between Seatown and Estuary Roads.

Figure B 3.1 Metro North Route Area MN101 – MN107



B4.1 Area by Area overview of Metro North Construction

B4.1.1 [SLIDE 14 - Area MN101 – 5 Stops]

Area MN101 – 5 Stops - Belinstown, Lissenhall, Estuary Seatown and Swords

Figure B4.1 Metro North Route Area MN101



- B4.1.2 The northern terminus of Metro North will be located at Belinstown west of the M1 and north of the Estuary Roundabout. The construction of Metro North within Area MN101 will largely take place in a green field environment. The most significant traffic impact north of Estuary Roundabout will result from additional traffic generated by construction vehicle movements. In addition, there will be localised impacts where new road infrastructure will be built to tie-in with the existing road network in order to access the park-and-ride sites.
- B4.1.3 Initially, four stops will be constructed within Area MN101 at Belinstown, Estuary Seatown and Swords. The most northerly stop will be located at Belinstown and provision will be made for a 2000 space multi-storey park and ride facility. All the stops within Area MN101 will be constructed at-grade. A further stop will be built at Lissenhall as demand grows.
- B4.1.4 South of Estuary Roundabout, the alignment follows the route of the R132. Various methods of construction will be employed depending on the vertical alignment through Area MN101. Generally, along elevated sections, Metro North will comprise a viaduct which is erected on pillars which are largely constructed in-situ. Many of the sections will be pre-cast so as to minimise construction duration and hence reduce construction impact on the local area. (Visual representation of the Viaduct was presented to the hearing by my colleague Mr Richard Spalding).
- B4.1.5 The viaduct in Area MN101 will extend across two junctions - the Estuary and Seatown roundabouts. The traffic management arrangements to facilitate construction works at Estuary and Seatown roundabouts will be complex requiring many different phases of traffic diversions. Night-time closures of carriageways at these junctions will be required to complete connections between phases. During some of the night-time closures, traffic will be diverted in temporary contra flow lanes on the opposite side of the road.
- B4.1.6 During the construction phase, the number of traffic lanes on the R132 will remain unaltered, i.e. two general traffic lanes in each direction. However, the existing hard shoulder will be removed.
- B4.1.7 The existing bus lanes south of the Malahide Roundabout will be suspended for the duration of construction in the area. In addition, major alterations will be made to the layout, configuration and operation of a number of junctions along the R132

Area MN102 – 1 Stop - Fosterstown

- B4.1.8 [SLIDE 15 - Area MN102 – 1 Stop - Fosterstown]
- B4.1.9 The alignment, through Area MN102, closely follows the R132 from north of the Pinnockhill Roundabout as far south as the junction with Rathingle Road. Subsequently, the alignment heads south west through predominantly green field areas until it reaches the Naul Road at the southern boundary of Area MN102.
- B4.1.10 One stop will be located within Area MN102 at Fosterstown near the Airside Retail and Business Park. The method of construction within Area MN102 will be by way of elevated track on viaducts descending to ground level at the proposed Fosterstown Stop.
- B4.1.11 Metro North will be predominantly constructed away from the R132 carriageway and the direct impact on road traffic will be significantly reduced as a result. South of the proposed stop at Fosterstown, the alignment will traverse the R132 crossing at a skew angle from east to west. Construction works at this location will be managed to minimise impact, further details of which are provided below.

Figure B 4.2 Metro North Route Area MN102



- B4.1.12 The construction of Metro North will require alterations to the configuration of the R132 between the northern boundary of Area MN102 and the junction with Rathingle Road. The existing number of general traffic lanes will be maintained during all phases of construction. Whilst works are on-going in the area it will be necessary to close the existing bus lanes in both directions along the entire length of the construction works area.

Area MN 103 – 1 Stop - Airport

- B4.1.13 [SLIDE 16 -Area MN 103 – 1 Stop - Airport]

Figure B 4.3 Metro North Route Area MN103



- B4.1.14 The alignment, through Area MN103, extends south from the Naul Road to the Airport Road. The method of construction for Metro North within Area MN103 will be predominantly in tunnel. The tunnels will be bored from end to end. The main

tunnelling worksite will be located at Ballystraun on the south side of the Airport within Area MN104.

- B4.1.15 One stop is to be located within Area MN103 which will be located at Dublin Airport. This stop will be an underground stop. It will be constructed from ground level and excavated to facilitate the construction of the stop platform, concourse, access and ventilation shafts and other components.
- B4.1.16 There will be no alterations to configuration or layout of the general road network within Area MN103 as a result of the construction of Metro North. The internal road network within the Airport will need to be modified in order to allow for the construction of the Airport Stop.
- B4.1.17 The Airport Stop will be located south of the northern Airport internal access road and to the west of the existing terminal building and the adjacent multi-storey car-park. The construction of the stop will be entirely within the Airport lands, and will not encroach on the public road network.

Area MN 104 – 2 Stops - Northwood and Dardistown

- B4.1.18 [SLIDE 17 - Area MN 104 – 2 Stops - Northwood and Dardistown]

Figure B 4.4 Metro North Route Area MN104



- B4.1.19 Within Area NM104, Metro North alignment extends southwards from the Old Airport Road as far as the junction of the Ballymun Road, Santry Avenue and Balbutcher Lane. The vertical alignment of Metro North will comprise underground, at-grade and elevated sections.

B4.1.20 The main tunnel worksite will be located at Ballystraun which is within Area MN104. On exiting the Airport tunnel the route returns to grade, across green field lands. There is to be a Park and Ride facility constructed to the north of the Dardistown Stop which will serve as a construction worksite for the surrounding works. South of the Dardistown Stop, Metro North will be elevated so as to cross the M50 on a newly constructed bridge with adequate clearance for traffic below. The Northwood Stop will be constructed at-grade south of the M50. Once through the Northwood Stop the route descends through a retained cutting into a cut and cover section that runs beneath Ballymun Road for the remainder of the route within Area MN104.

Area MN 105 – 2 Stops - DCU and Ballymun

B4.1.21 [SLIDE 18 - Area MN 105 – 2 Stops - DCU and Ballymun]

Figure B 4.5 Metro North Route Area MN105



B4.1.22 The proposed alignment, through Area MN105, generally follows the Ballymun Road, R108 from Santry Cross southbound towards Albert College Park. Two stops will be located within Area MN105, Ballymun and DCU. The method of construction for Metro North within Area MN105 will be predominantly cut and cover.

B4.1.23 The construction of Metro North will have a significant impact on traffic conditions within this Area, particularly along the Ballymun Road, R108. During the construction phase, the number of traffic lanes will be reduced from three lanes to two lanes in each direction. In addition, alterations will be made to the layout, configuration and operation of a number of junctions along the Ballymun Road.

B4.1.24 There are a substantial number of buses that operate along the Ballymun Road. Given the importance of these bus services, and the need to maintain an adequate level of public transport provision, one of the remaining traffic lanes is designated as a bus lane as a replacement for the existing Ballymun QBC.

Area MN 106 – 3 Stops - Mater, Drumcondra and Griffith Avenue

B4.1.25 [SLIDE 19 - Area MN 106 – 3 Stops - Mater, Drumcondra, and Griffith Avenue]

Figure B 4.6 Metro North Route Area MN106



B4.1.26 South of the DCU Stop, the alignment remains in a cut and cover section along the eastern edge of the R108 for a short section. Subsequently the alignment turns south east through Albert College Park. Within the park itself, a tunnel portal will be constructed from which the route will continue in a twin bore tunnel for the remaining distance to St. Stephen's Green.

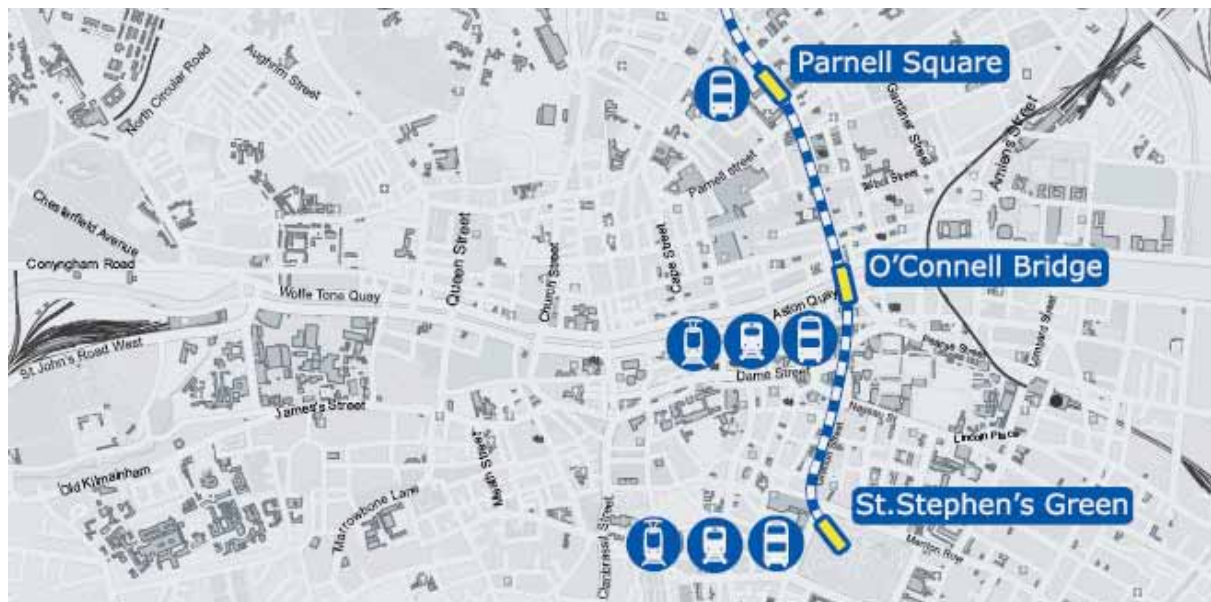
B4.1.27 Three stops are to be constructed within Area MN106, Griffith Avenue Stop, Drumcondra Stop and the Mater Stop. The stops will be constructed in cut and cover boxes. All of the stop locations within Area MN106 are off-road and the impact on traffic will be limited. Each of the construction sites at the three stops will have individual site access arrangements for construction traffic.

- B4.1.28 A combined ventilation and emergency escape shaft is to be constructed at St Patrick's College. It is a sensitive location with regard to access requirements for construction traffic and careful consideration has been given to this area to mitigate the impacts.
- B4.1.29 The impact of the construction of Metro North within Area MN106 will largely be a result of the construction of the underground stops and shaft, and construction vehicle traffic to and from the works sites.

Area MN 107 – 3 Stops - St Stephen's Green, O Connell St, and Parnell Square

- B4.1.30 [SLIDE 20 - Area MN 107 – 3 Stops - St Stephen's Green, O Connell St, and Parnell Square]

Figure B 4.7 Metro North Area MN107



- B4.1.31 Three stops are to be constructed within Area MN107, Parnell Square, O'Connell Bridge, and St Stephen's Green Stops. The stops will be constructed in cut and cover boxes. All of the stop locations within Area MN107 are on-road and the impact on traffic movement in the area will be significant without mitigation. All of the construction sites at the three stations will have individual site access arrangements for construction traffic. The impact of the construction of Metro North within Area MN107 will largely be a result of the construction of the underground stops, and the requirements to close or partially close some streets, reduce footpath widths and provide construction vehicle access to and from the works sites.

B5.0 Chapter 3 – Overview of Submissions Received

B5.1.1 Chapter three of the STMP provides an overview of submissions received by An Bord Pleanála in respect to the publication of the Metro North Environmental Impact Statement. There have been 190 submissions received which relate to traffic in some way.

B5.1.2 A review of the submissions identified fourteen key areas of concern. These have been ranked in accordance with the number of times they were mentioned within each submission. Each individual query was allocated to one of the following key categories

- Construction management plan and related construction issues
(90 individual queries within the submissions);
- The Scheme Traffic Management Plan and related issues
(63 individual queries within the submissions);
- Pedestrian safety and access
(41 individual queries within the submissions);
- Access to city centre car parks
(38 individual queries within the submissions);
- Access for residents to on-street parking and to homes
(32 individual queries within the submissions);
- Road Configurations and new access points
(28 individual queries within the submissions);
- Bus rerouting and access issues
(26 individual query within the submissions);
- Delivery arrangements for city centre businesses
(17 individual queries within the submissions);
- Consultation Process
(10 individual queries within the submissions);
- Traffic Modelling Data
(9 individual queries within the submissions);
- Cycling facilities
(8 individual queries within the submissions);
- Access arrangements for schools, hospitals, churches and businesses
(5 individual queries within the submissions);
- Loss of taxi ranks and access issues
(3 individual queries within the submissions); and
- Mitigation issues
(2 individual queries within the submissions).

B5.1.3 Some concerns raised within the submissions were deemed to have been sufficiently addressed within the EIS. These concerns relate to the transport of workers to and from work sites. This issue was addressed within the mitigation measures outlined in the EIS Section 7.3.2.2 (Remedial measures - construction phase). Additionally, the location, size and need for the Fosterstown and Belinstown Park and Ride facilities were questioned in a number of submissions. This is an operational issue and was dealt with within the EIS.

B5.1.4 Furthermore, a number of issues were beyond the scope of the STMP and are not addressed within the document. These issues include concerns raised by the Mater Hospital and Mater Private; a separate Traffic Impact Assessment is being undertaken for the Mater Stop. However, the findings of this assessment are taken into consideration in the STMP.

B5.2 Construction management plan and related construction issues

B5.2.1 The main issues of concern with regards to the construction of Metro North, of which there were 90 individual queries, relate to the phasing of construction and how areas will be affected during these periods. Furthermore, the volumes of construction vehicles and the suitability of local roads to accommodate these HGVs was raised.

B5.3 Scheme Traffic Management Plan and related issues

B5.3.1 The development of a STMP was identified in the EIS as a future task. However, a number of respondents expressed concern that this plan was not provided for review during the consultation period for the EIS and stated that it was not possible to fully access the EIS in the absence of this plan. Questions were also raised in relation to what issues the STMP would address, how it would minimise the impact of the Scheme on road users and maintain access to business and other premises.

B5.4 Pedestrian Safety and Access

B5.4.1 The primary area of concern with regards to pedestrians relates to safety and access issues and accounted for 41 individual queries within the submissions. These include footpath widths, the provision of crossing facilities and access to buildings. In addition, a number of submissions concerned the replacement of the Estuary and Seatown footbridges by signalised pedestrian crossings. The majority of pedestrian submissions related to Area MN107 (City Centre) and were received from a number of businesses operating in the O'Connell Street and Grafton Street areas.

B5.5 Access to city centre car parks

B5.5.1 A number of submissions were received from businesses and car park operators within Area MN107. The main areas of concern were related to changes to traffic management in the city centre and how this would affect accessibility to multi-storey car parks. Levels of congestion and how this impacts on the continued operations of these car parks was also raised.

B5.6 Access for residents to on-street parking and to homes

B5.6.1 Respondents expressed concern over how access to individual properties is to be maintained during the construction of the scheme. This issue was most prominent in Areas MN105 and MN106. Furthermore, the loss of on-street residential parking, without the provision of alternative parking, is deemed to be a significant impact of the Scheme.

B5.7 Road Configurations and new access points

- B5.7.1 A number of submissions specifically address the changes to road configurations and associated access arrangements as a result of the scheme. For instance, the reconfiguration of the Estuary and Seatown Roundabouts is of concern, as is the closure of Glovers Alley in Area MN107.

B5.8 Bus rerouting and access issues

- B5.8.1 The impact of construction on the operation of bus services was of concern along the full alignment of the Scheme. Clarification was sought as to how bus routes and the efficiency of services are to be maintained, and on the affect of construction on bus stop locations.

B5.9 Delivery arrangements for city centre businesses

- B5.9.1 As a result of changes in traffic management within the city centre, a number of respondents requested reassurances regarding accessibility for deliveries in order to ensure the continued viability of businesses.

B5.10 Consultation

- B5.10.1 Consultation by the RPA with stakeholders, including businesses and residents, is requested in order to fully inform interested parties on traffic management changes and the impacts of the Scheme, and to receive feedback from such parties.

B5.11 Modelling data

- B5.11.1 Requests for clarification were made regarding the assessment tools used in the analysis of the EIS and STMP

B5.12 Cycling facilities

- B5.12.1 Clarification on the impact of the construction phase on cyclists and cycling facilities was sought. Safety was the primary area of concern

B5.13 Access arrangements for schools, hospitals, churches and businesses

- B5.13.1 Direct access to specific businesses, schools and churches was raised by submitters in 26 instances. Clarification is sought on how access to premises is to be maintained. It is requested that the STMP ensures the continued safe and successful operation of these businesses.

B5.14 Loss of taxi ranks and access issues

- B5.14.1 As with car park access and delivery arrangements which are discussed above, the main areas of concern relate to changes to traffic management in the city centre and how this will affect accessibility. The loss of taxi ranks was also an area of concern.

B5.15 Conclusions

- B5.15.1 In general the issues raised in the submissions above are dealt with in the STMP.

B6.0 Chapter 4 – Overview of Impact Assessment Process

- B6.1.1 This chapter presents the Impact Assessment Process (IAP) used within the STMP to identify and measure impacts generated by the construction of Metro North. This process has been developed and undertaken by reference to best practice guidelines, both in Ireland and Internationally. The Impact Assessment methodology is a bespoke process developed specifically for the Metro North Scheme. The intention of the assessment methodology is to provide a framework for identifying and rating the impacts of the construction works on all road users.
- B6.1.2 The IAP evaluates the impact of construction on general traffic, including HGV's, buses and cars as well as pedestrians and cyclists.
- B6.1.3 The process is one of determining whether an impact as a result of the works is significant, categorising an impact as being slight, moderate or severe and then assigning a rating level to that impact.
- B6.1.4 The process has been presented previously by Mr. Ian Byrne in Module A of the traffic evidence.

B7.0 Chapter 5 – Overview of Assessment Tools

- B7.1.1 This chapter describes the modelling tools that have been developed to assess the impact of the Metro North Scheme. In order to undertake an assessment of the impacts of the construction and operation of a Scheme as large as Metro North a comprehensive set of traffic modelling tools deemed 'fit for purpose' must be developed.
- B7.1.2 These modelling tools must be capable of identifying the changes in traffic conditions as a result of the metro works and operations.
- B7.1.3 Other assessment tools have been developed to assess the impacts of the works in particular on pedestrians.
- B7.1.4 A comprehensive and detailed assessment was also undertaken for pedestrian impacts around the construction works for the City Centre Stops.
- B7.1.5 In order to achieve the above a number of traffic models were developed as follows:
- The Metro North Traffic Model – MNTN for the city wide or Strategic Assessment;
 - Vissim micro simulation models for the city centre, Ballymun, and Swords;
 - Dublin City Council Q Paramics Traffic Model for the City Centre PM peak; and
 - The Dublin Transportation Multi Model to determine mode share change.
- B7.1.6 The assessment tools have been presented previously by Mr. Ian Byrne in Module A of the traffic evidence.

B8.0 Chapter 6 – Strategic Traffic Assessment

- B8.1.1 The traffic impacts generated by the construction of Metro North will be experienced on both a local level at individual worksites and on a city wide basis due to the cumulative impact of the works, e.g. the combined impact of construction vehicles generated from each work site arriving together at the Belinstown depot.
- B8.1.2 Strategic impacts are only relevant to certain user groups such as general traffic including cars, HGV's and public transport.
- B8.1.3 The Impact Assessment Process identified is used to undertake the Strategic assessment. This chapter details the findings of those impacts.
- B8.1.4 The Strategic Impact Assessment will be dealt with in detail by Mr. Ian Byrne in Module D of the traffic evidence.

B9.0 Chapter 7 – Strategic Mitigation Measures

B9.1.1 [SLIDE 21 - Strategic STMP Mitigation Measures]

B9.1.2 This chapter of the STMP describes the strategic mitigation measures that are proposed to reduce the traffic impact during the construction of Metro North. As described in evidence presented by my colleague Mr Ian Byrne, there will be an impact on strategic general traffic movement during the construction period.

B9.1.3 These impacts relate to the redistribution of traffic away from construction areas in Swords, Ballymun and the Core City Centre as the road capacity available within these areas has been reduced. The strategic traffic modelling using the MNTM traffic model shows that traffic will find alternative routes to avoid these areas. While most mitigation measures proposed can only be implemented at a local level, there are a number of strategic mitigation measures proposed that will reduce the strategic impact of Metro North Construction, as follows:

- Public Transport Gate at College Green;
- Metro North Traffic Forum;
- STMP Public Information Campaign;
- Vehicle Recovery Plan; and
- Park and Ride.

B9.2 Public Transport Gate at College Green

B9.2.1 [SLIDE 22 -College Green Public Transport Gate Drawing]

B9.2.2 [SLIDE 23 -College Green Public Transport Gate - Detail]

B9.2.3 [SLIDE 24 and 25 -College Green Bus Gate text]

B9.2.4 The Public Transport Gate at College Green is a significant mitigation measure for Metro North construction. As will be presented in Module D of the traffic evidence, the PT Gate significantly improves the bus operating environment in the City Centre and also removes large volumes of through traffic from the vicinity of the works around O'Connell Bridge stop. The PT Gate will also result in a transfer from car to public transport which will further reduce the impact of construction works on general traffic movement.

B9.2.5 Furthermore the PT Gate significantly improves the pedestrian environment in the City Centre and will be demonstrated in module E of my evidence it improves the journey times to many of the City Centre car parks.

B9.3 Metro North Traffic Forum

B9.3.1 The role of the forum is to:

B9.3.2 Review alternative objectives, plans or modelling provided by the Enabling or PPP Contractor(s) and accept, reject or ask for further revisions or information;

B9.3.3 Approve traffic management details submitted by the contractor in line with STMP requirements and objectives following review and recommendation by the RPA; and

B9.3.4 The Forum will meet fortnightly. It is envisaged that the Forum will be Chaired by the Road Authority or by the Main Contractor (at the request of the Road Authority). The Forum will be provided with progress update reports by the contractor at each meeting and compliance/monitoring issues will be reported by the RPA. Administrative support will be provided by the contractor and specific issues requiring decisions will be presented by the contractor to the Forum.

B9.3.5 The Forum would, through RPA, report back to the Transport 21 Implementation Working Group on a monthly basis providing information on progress and planned works.

B9.4 STMP Public Information Campaign (Traffic)

B9.4.1 A comprehensive publicity campaign will be instigated by RPA at the appropriate time to inform the general public and business community of the following:

- Changes to traffic management arrangements;
- Nature and duration of works phases; and
- Impact on public transport services.

B9.4.2 The public information campaign will be co-ordinated with the relevant transport agencies and local authorities.

B9.5 Vehicle Recovery Plan

B9.5.1 To facilitate the timely removal of vehicles that may break down in the vicinity of the construction works where road capacity is significantly affected (e.g. O'Connell

Bridge, Parnell Square), the Contractor will provide a vehicle recovery service capable of timely removal of any vehicle creating a traffic disruption at key locations. Due to the sensitive nature of the city centre the recovery vehicle will need to be located in close proximity of the City Centre Construction sites. This recovery service will have direct communication links with An Garda Síochána and operate 24 hours per day.

B9.6 Park and Ride

B9.6.1 Proposals for a Park and Ride schemes are being developed by the Transport 21 Contingency Planning Sub-Group to be effective during the main works. The potential benefits of these measures will be considered as part of a further development of the STMP.

B9.6.2 [SLIDE 26 - Other mitigation Measures for the Main works]

B9.7 Other Mitigation Measures:

- A new bridge is to be provided linking Marlborough Street and Hawkins Street across the Liffey;
- The new Macken Street Bridge under construction
- A complete ban on right turning vehicles from Bachelor's Walk to O'Connell bridge;
- A complete ban on right turning vehicles from O'Connell Bridge to Eden Quay;
- The provision of two lanes northbound and southbound on O Connell Street

B9.7.1 [SLIDE 27 OCS 4 lanes]

B9.7.2 [SLIDE 28 OCS 4 lanes]

- The provision of a single public transport lane through the work site on Westmoreland Street

B9.7.3 [SLIDE 29 PT Lane Westmoreland St]

B9.7.4 [SLIDE 30 PT Lane Westmoreland St]

- The provision of a single public transport southbound lane through the work site on Parnell Square East

B9.7.5 [SLIDE 31 PT Lane Southbound Parnell Sq East]

B10.0 Chapters 8 to 14 - Local Area Assessment of Areas MN101 to MN107

B10.1.1 This part (Part C) of the Scheme Traffic Management Plan is concerned with local issues. It details the local impacts to access (including car park access, servicing, bus services, pedestrians, taxis and cyclists) along the alignment due to both enabling and construction works of the Scheme. It also considers the impact of construction vehicles on local areas along the route.

B10.1.2 The local impacts caused by the Metro North construction works are discussed for the seven assessment areas in the following chapters:

- Chapter 8: Area MN101 - Belinstown to Swords;
- Chapter 9: Area MN102 - Swords to Dublin Airport North;
- Chapter 10: Area MN103 - Dublin Airport;
- Chapter 11: Area MN104 - Dublin Airport South to Santry Avenue;
- Chapter 12: Area MN105 - Santry Avenue to Albert College Park;
- Chapter 13: Area MN106 - Albert College Park to Mater; and
- Chapter 14: Area MN107 - Mater to St Stephen's Green.

B10.1.3 Details of the local area assessment will be discussed in detail by my colleague Mr Richard Tucker in Module C of the traffic evidence.

Conclusion:

B10.1.4 This STMP has been produced by the RPA specifically for the Metro North Scheme. It is one of the most comprehensive and detailed Traffic Management Plans developed for any project in this country to date. Adherence to this plan will ensure that the Metro North Project can be constructed in Dublin such that the disruption caused by the works will be minimised, manageable and the economic life of the city will be maintained in terms of transportation and access.

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