

## 13.0 TRANSPORTATION

### 13.1 ASSESSMENT METHODOLOGY

A Transport Assessment (TA) Report for the proposed Luas Line A1 has been produced as a separate 'stand alone' document separate to this EIS, but the main findings of the TA are presented in this chapter.

As set out in Chapter 2, The Dublin Transportation Office (DTO) published the report 'A Platform for Change' in 2000. This document outlined an integrated transportation strategy for the Greater Dublin Area and recommended an integrated public transport system based upon an extensive rail network which includes a spur to Citywest. The proposal to serve Citywest has also become an objective of the Government's 10-year transport framework, 'Transport 21' which was launched in November 2005. This spur link is planned within the wider context of a number of proposed developments within the Citywest area. These include:

- the construction of the extension to the existing Embankment Road;
- the construction of the Outer Ring Road Phase 3;
- the development of the Citywest Business Campus and surrounding residential areas;
- the overall development of Tallaght Town Centre as outlined in the Tallaght Town Centre Local Area Plan adopted in October 2006.

The TA focused on determining the likely impact of the proposed scheme on the capacity of the highway network immediately surrounding it. The likely operational impact of the scheme was considered in the context of vehicular traffic and also in relation to other modes of travel including alternative public transport services, cyclists and pedestrians. The likely impact of the proposed Luas Line A1 on commercial and residential development was considered, as were the likely effects of construction traffic and the potential for modal shift to occur.

The modelling methodology adopted for the TA was agreed in principle with the Dublin Transportation Office (DTO) and South Dublin County Council (SDCC).

The central element of the methodology was the development of a traffic model using the SATURN suite of traffic modelling programmes. This model was a local area model, representative of the part of Dublin through which the proposed Luas Line A1 will run and which will therefore experience a direct impact from the scheme.

The local area model network was extracted from the larger and more detailed Dublin Transport Office Full Area Model (DTOFAM). Additional road links and model zones were then included in the local area model as appropriate, to allow for a more accurate analysis of the local area to be undertaken.

The local area model was calibrated and validated against observed data for the AM Peak Hour (0800 – 0900) period, for a Base Year of 2005. Following the successful development of the Base Year model, it was submitted to the DTO for comments and approval and was then incorporated back into the DTOFAM. This allowed for forecast year assignments to be undertaken using the DTOFAM.

Forecast assignments were run for the years 2010 (the predicted year of scheme opening) and 2015, for scenarios 'with' and 'without' the proposed Luas Line A1 included. Forecast year trip matrices were developed based upon the latest available data for population and employment projections and the model networks were adjusted to include a number of major highway infrastructure schemes predicted to occur in the period up to 2015. The DTOFAM is developed as a multi modal model and therefore the effects of changes in local and citywide infrastructure provision on public transport demands and future road based traffic conditions were taken into account by using this strategic model.

Following the completion of the DTOFAM forecast year assignments, local area models were extracted from the DTOFAM to allow for an analysis of the likely local impacts of the proposed Luas Line A1 at the local level to be carried out. This methodology ensured that the wider strategic impacts contained in the DTOFAM assignments were included in the assessment at the local level.

Turning flows were extracted from the local area forecast models to allow for capacity assessments to be undertaken at a number of key junctions across the model study area. These assessments were carried out for both of the forecast years and for both the ‘with’ and ‘without’ the proposed Luas Line A1 scenarios.

The junction capacity assessments were undertaken using the TRANSYT junction modelling software.

## 13.2 RECEIVING ENVIRONMENT

The study area used for the TA was focused on the Citywest campus site. It was bounded to the north by the N7 Naas Road, to the east by Belgard Road, to the south by N81 Blessington Road/Tallaght Bypass and to the west by Slade Road and Garter Lane. In addition, the study area included a number of key minor roads in the Citywest area, including Bianconi Avenue, Kingswood Avenue, Kingswood Road, Orchard Avenue and Magna Drive.

The study area included all of the local communities that are adjacent to the proposed route of the Luas Line A1, such as Cairnwood, Belgard Green and Fettercairn, as well as the National Digital Park and the Citywest Campus areas and also Tallaght Town Centre.

### 13.2.1 Traffic Flows

The road hierarchy along the proposed alignment of Luas A1 is dominated by the Cookstown Way and thereafter, by both the internal and surrounding strategic routes associated with the Citywest Business Campus and the National Digital Park. These latter developments have resulted in and continue to realise significant change in the road infrastructure.

The Cookstown Way acts as an important distributor route facilitating access to Tallaght Hospital, The Square shopping centre and surrounding retail elements, as well as the administrative headquarters of South Dublin County Council and the emerging new office and residential developments in the area. Together with Cookstown Road a link is provided to and from the N81 Tallaght By-Pass. Cookstown Way is a two lane single carriageway with footpaths on both sides and a cycleway integrated with and extending along the west side footpath. It incorporates the off-street Luas Red Line tracks between 2nd Avenue and the terminus at The Square on Blessington Road.

Further west, and while not impinging upon the proposed route, the residential estate roads of Fettercairn and Cheeverstown are bisected in turn by the Cookstown Road and Cheeverstown Road, the latter currently being widened to accommodate the development of Phase 3 of the Outer Ring Road Scheme (currently under construction) which scheme is designed to link the N7 with the N81.

The existing and planned developments associated with the Citywest Business Campus and surrounding residential developments have resulted in substantial enhancements of the road infrastructure in this area. The N82 linking the N7 at Kinswood / Brownsbarn with the N81 at the Blessington Road traverses the Campus in a north-south direction and in the process bisects Fortunestown Lane. It is noted that this junction is being upgraded in conjunction with the development of the adjacent Citywest Retail Centre. The proposed Luas Line A1 alignment will cross the N82 between Citywest Avenue and Fortunestown Lane and thereafter will run along the north side of Fortunestown Lane as far as Garter Lane at the western extremities of the scheme.

Peak hour traffic counts were undertaken across the study area in 2005. The two-way values are summarised in the table below.

*Table 13.1: 2005 Two Way Peak Hour Flows*

Location	Peak Hour Flow 0800 - 0900 hr (veh / hr)
Fortunestown Lane (west of N82 Citywest Road)	423
Fortunestown Lane (east of N82 Citywest Road)	1669
N82 Citywest Road (north of Fortunestown Lane)	1424
N82 Citywest Road (south of Fortunestown Lane)	920
Citywest Avenue	197
Cookstown Road (north of Cookstown Way)	1157
Cookstown Road (south of Cookstown Way)	1017
Cookstown Way	477

As can be seen from the above, Fortunestown Lane, N82 Citywest Road and Cookstown Road accommodate the larger volume of traffic movements across the area reflecting not only the locally generated volumes of commuting traffic but the strong north-south desire line for movements between the N7 and N81 corridors.

### 13.2.2 Public Transport Services

Local bus services operate on a number of the key roads that run through the study area and link areas such as the Citywest Campus site and Tallaght town centre with other parts of the Greater Dublin area. Key bus routes include Fortunestown Lane, with a frequency of 6 buses per hour in each direction during the AM Peak hour (0800 – 0900), N81 Blessington Road with a frequency of 12 buses per hour and Cookstown Road with a frequency of 6 buses per hour.

At present, Citywest Business Campus is served by a combination of public and private bus services serving various suburban areas and also providing links to both the Luas Red Line at Tallaght and the DART at Sydney Parade.

The Luas Red Line provides a link from Tallaght to the City Centre via the Naas Road with approximate journey times of 48 minutes.

### 13.2.3 Pedestrian Facilities

Pedestrians are well catered for throughout the study area, with footpaths provided on all major routes and throughout the Citywest Campus and adjacent residential areas. Considering the alignment of Line A1, the section of the route between Cookstown Way and the N82 Citywest Road extends through greenfield lands and therefore no pedestrian facilities are currently provided. It is envisaged that pedestrian facilities would be incorporated into the future development of these lands. From the N82 west to Garter Lane, the proposed alignment extends parallel to Fortunestown Lane. Pedestrians are currently accommodated on Fortunestown Lane through provision of footpaths on the south side between the N82 and Carrigmore Glen and thereafter along both sides of the road as far as Garter Lane.

#### **13.2.4 Cyclist Facilities**

Along Cookstown Way, a cycle track integrated with the footpath has been provided along the full extents of the roadway and terminates on Cookstown Road at its junction with Cairn Wood / Belgard Green. This cycle track also continues along Cookstown Road north of the Cookstown Road / Cookstown Way junction on its eastern side as far as Belgard Road where it links in with the cycle facilities on the Belgard Road.

Cycle parking facilities have been provided at the Luas Cookstown stop on Cookstown Way and also at the Tallaght terminus of the Red Line.

On Fortunestown Lane a cycle track integrated with the footpath has been provided on both sides of the road between Carrigmore and Garter Lane.

## **13.3 CONSTRUCTION IMPACTS AND MITIGATION**

#### **13.3.1 Construction Impacts**

The construction of the project would be accomplished in phases – the diversion of utility apparatus followed by the construction of the trackbed and rails; the installation of electrical and operational control systems; construction of stops and associated equipment; and completion of surface finishes. The general sequence of construction activities is described in Section 3.11.

The effect of construction activity on vehicular and pedestrian traffic is likely to centre on a number of key locations – Embankment Road Extension at Cookstown Way; the Outer Phase 3 Ring Road; the N82; and along Fortunestown Lane.

In undertaking the construction across road traffic junctions the works will be phased to maintain traffic movements

Traffic will be generated during the construction phase of the Luas Line A1 project. This traffic will comprise of trips being made for the following purposes:

- clearance of existing site material and waste;
- deliveries of construction material to site;
- removal of construction waste material;
- journeys by construction site employees to and from the site.

These trips will be made by a variety of vehicle types including cars and transit vans, rigid lorries and articulated Heavy Good Vehicles's.

Construction traffic associated with the proposed Luas Line A1 will have localised short term and potentially significant impacts on adjoining land uses and also on vehicular, cycle and pedestrian movements on roads adjacent to the proposed route alignment. It is anticipated that the implementation of suitable remedial measures during the proposed construction period will limit any impacts that occur (see Section 13.3.2 below). Imposing a sensible construction programme and taking steps to ensure that this programme is adhered to and that the construction phase of the project is completed within the predicted timescales will also limit the effect of these impacts.

### 13.3.2 Mitigation

A variety of remedial measures will be implemented so as to limit the potential impact of construction traffic. These measures are outlined below.

Two construction compound areas will be established for the duration of the construction period. These will be located on Fortunestown Lane and also immediately west of the junction of the Outer Ring Road with Embankment Road. These areas will be used to store construction materials and may also provide space for employee parking.

Access to and egress from the construction compounds will only be possible by routes agreed between the contractor and South Dublin County Council Roads Authority. Three routes are being considered and these are via Garter Lane, via the N82 City West Road and via Cookstown Way/Road. Limiting construction traffic to these routes will assist in minimising any impact that occurs. A further reduction in impact could be achieved by reaching agreement with the Roads Authority on hours of operation outside of which construction traffic will be prohibited and by imposing restrictions on vehicle size and weight.

Opportunities will be explored regarding the potential for limiting the numbers of employee vehicles travelling to and from the construction site on a daily basis. Possible solutions could include car sharing or transporting workers to site via pool cars and mini-buses from designated collection points (such as Luas and DART stations or other appropriate locations), or offering subsidised travel via public transport.

Throughout the course of the construction period remedial measures will be implemented to ensure that an appropriate level of access is maintained to all adjoining land uses along the proposed route. This will involve on going consultations with the relevant landowners during the construction phase of the project. Temporary pathways and cycleways will be installed where appropriate and provision will be made to ensure access for the mobility impaired is maintained. Where they are needed, traffic management measures will be discussed and agreed with the roads authority and An Garda Síochána prior to implementation.

Reinstatement of pavement and road surfaces that are disturbed as part of the construction process will be carried out where practical throughout the construction period. Access will also be maintained to existing public utilities (water, gas etc) where necessary.

In order to address the issues outlined above, a Traffic Management Plan will be agreed between the roads authority and the contractor that will provide details of construction traffic routes and hours of operation, plus details of all remedial measures to be undertaken during construction.

During the construction phase of the project, there will be ongoing monitoring of any impact and disturbance that occurs to existing land uses and activities. Public consultation and ongoing local liaison procedures will be established in the area to ensure that any queries from relevant parties are dealt with promptly and efficiently.

## 13.4 OPERATIONAL IMPACTS AND MITIGATION

### 13.4.1 Operational Impacts

#### Traffic Flows

Two-way peak flows have been calculated from the model assignments for the forecast years 2010 and 2015, for the 'with' and 'without' Luas Line A1 scenarios. The flows were calculated for the same 8 locations as were detailed above in the analysis of the Base Year, as well as for the additional links of the Embankment Road Extension and the Outer Ring Road Extension which are only operational in the forecast years (Embankment Road and the Outer Ring Road Extensions are included in all future year scenarios). The peak hour flows are summarised in the table below, which also shows the percentage change in flow between the 'without' and 'with' Luas Line A1 scenarios.

*Table 13.2: Forecast Year Flow Comparison*

Location	2010 Peak Hour Flow 0800-0900 hr (veh/hr)		%Diff	2015 Peak Hour Flow 0800-0900 hr (veh/hr)		%Diff
	No Luas	With Luas		No Luas	With Luas	
Fortunestown Lane (west of N82 Citywest Rd)	625	700	+12	517	553	+7
Fortunestown Lane (east of N82 Citywest Rd)	1263	1384	+10	1454	1565	+8
N82 Citywest Rd (north of F'town Lane)	1020	984	-4	1383	1229	-11
N82 Citywest Rd (south of F'town Lane)	867	772	-11	1340	1223	-9
Citywest Avenue	1181	1195	+1	1341	1376	+3
Cookstown Rd (north of C'town Way)	363	356	-2	363	321	-12
Cookstown Rd (south of C'town Way)	609	592	-3	627	637	+2
Cookstown Way	488	503	+3	503	492	-2
Embankment Road	1355	1316	-3	1794	1682	-6
Outer Ring Road	1401	1374	-2	1533	1475	-4

Analysis of the information in this table confirms that in the majority of cases, link flows will decrease as a result of the implementation of the proposed Luas Line A1. Whilst the model overall shows that the ‘with Luas’ scenarios leads to small increases in vehicular traffic on the network there are few cases where there is an increase in peak hour flows as a result of the scheme. This is caused by trips reassigning in the model minimising journey times between origin and destination pairs. The increase in flow is generally below 10%; an increase considered not likely to have a significant impact.

### Junction Capacity

Junction capacity assessments were undertaken using the TRANSYT software at 5 key junctions located across the model study area. The analysis was carried out for both of the forecast assignment years, for the scenarios ‘with’ and ‘without’ the proposed Luas Line A1. The results of this assessment were analysed by comparing the Degree of Saturation (DOS) for all of the various movements permitted at each junction, together with associated queues and delays. Full details of the methodology adopted and of the analysis of the results are contained in the Transport Assessment Report.

The analysis of the results from the junction capacity assessment confirmed that the implementation of the proposed Luas Line A1 will not have a detrimental impact on the capacity of any of the key junctions analysed. Similarly, it will not result in any significant changes to queues and delays at these junctions in comparison to the ‘without’ the proposed Luas Line A1 scenario.

## Public Transport

The proposed Luas Line A1 will have a beneficial impact for public transport services within the study area. This will result primarily because the scheme itself is providing an additional public transport service to the commercial and residential areas in this part of Dublin and improving links between this area and the remainder of the Greater Dublin Area.

The proposed Luas Line A1 will be easily accessible due to the location of five new stops along the route alignment to serve the principal residential and business areas. This will include the provision of the new Park and Ride site at Cheeverstown.

Areas will be provided adjacent to each stop location to facilitate set down/pick up of passengers. It is also anticipated that discussions will take place with public transport operators to ensure that bus-stopping facilities are provided where feasible within the vicinity of the stops. Such facilities that are proposed include a bus lay by at the reconfigured Belgard Stop; a car drop off and turning facility at Fettercairn Stop until the Fettercairn Link Road to Embankment Road is constructed; a bus lay by and taxi stand at Cheeverstown stop; a planned car and bus turning circle at Citywest Campus Stop; a planned bus lay by on Fortunestown Lane adjacent to the Fortunestown stop to be provided as part of the road and widening in this area; and a proposed bus lay-by and taxi stand at the Saggart stop terminus.

The highway capacity assessment has shown that the implementation of the proposed Luas Line A1 scheme will not have significant adverse impacts on the local highway network and will not result in any significant increases in junction delay. It is therefore reasonable to conclude that there will not be an impact on travel times and movements of existing bus services through the study area compared to a scenario where there is no Luas line.

## Park and Ride

A new Park and Ride site is to be provided adjacent to the proposed Luas Line A1 at the Cheeverstown stop. Approximately 310 spaces are to be provided of which 10 are to be assigned for mobility impaired persons.

The proposals for Luas Line A1 incorporate the construction of a new road – the Citywest Link Road – which will run westwards to Citywest Avenue from the Outer Ring Road junction with the proposed Embankment Road Extension. Vehicular access to the Park and Ride site will be provided off this Citywest Link Road via a proposed new roundabout.

The existing Citywest Avenue will be realigned at its eastern end to accommodate the Citywest Link Road and will be upgraded to local authority road standards as required and agreed with the road authority.

An analysis has been undertaken to assess the impact of the Park and Ride on the highway network. The analysis was undertaken for 2010 and 2015 in line with the traffic analyses undertaken elsewhere along the route and for the AM and PM peak periods. The analysis illustrates that the additional impact of the park and ride traffic is not significant.

It is proposed to locate VMS signs at appropriate locations on approach roads to the Park and Ride site to provide motorists with information on car park capacity.

## Cyclists and Pedestrians

The implementation of the proposed Luas Line A1 will not result in significant adverse impacts on cyclists and pedestrians in the study area. Traffic volumes will not generally increase as a result of the scheme and there are unlikely to be any significant differences in the highway conditions experienced by these modes of travel between the 'with' and 'without' Luas Line A1 scenarios.

The proposed Embankment Road Extension by SDCC will run parallel to the proposed Luas Line A1. Following discussions with South Dublin County Council Roads Department, it has been agreed that the footpath and cycle track on the southern side of the proposed road will be relocated south of the proposed Luas A1 alignment. Therefore between Cookstown Road junction and the Outer Ring Road junction there will be a footpath offering pedestrian linkages to the adjacent residential areas and the Fettercairn stop. It is proposed to accommodate pedestrians through the provision of a footpath along the alignment on the northside of Fortunestown Way between the N82 and Carrigmore Glen. The boundary wall at Carrig Court will be modified and visibility splays introduced in order to provide sufficient intervisibility between trams and other road users including pedestrians.

Cyclists and pedestrians will benefit as a result of the improved facilities for these modes that are to be incorporated at a number of junctions in the study area, notably at the junctions of Embankment Road with Cookstown Way and the Outer Ring Road.

A pedestrian walkway will be provided adjacent to the alignment between Citywest Campus stop and the N82 providing greater accessibility to the proposed Luas Line A1.

Cycle parking facilities will be provided at all proposed Luas Line A1 stops.

New controlled pedestrian crossings will be provided at the N82 Citywest Road crossing in conjunction with the signalised crossing of the tramway; at Fortunestown Lane adjacent to the Fortunestown stop and in conjunction with the widening and realignment of the roadway, at Carrig Court linking to the existing footpath and cycleway accommodated to the south of Fortunestown Lane between the N82 and Carrigmore Glen and at Fortunestown Lane at the Saggart stop. In addition, and as part of the planned Embankment Road Extension scheme of South Dublin County, controlled pedestrian crossings at new road junctions are to be provided adjacent to stop locations at Fettercairn and at Cheeverstown.

All proposed pedestrian crossing facilities installed as part of the proposed Luas system will incorporate audio/tactile units to facilitate mobility and visual impaired persons. Appropriate signage in common with what is employed elsewhere on the existing system will be installed to advise pedestrians of appropriate crossing locations.

Ramps will be provided at both ends of each stop platform to enable access for mobility impaired persons.

### Potential Modal Shift

In 2010 it is forecast that Luas Line A1 will remove 973 car trips from the road network in the morning peak hour period. In 2015 this figure will rise to 2,071 car trips removed. There may additionally be a small modal shift from other forms of public transport and from cyclists and pedestrians to the new tram service.

#### 13.4.2 Mitigation

The capacity analysis undertaken as part of the transport assessment, discussed above, illustrated that once the tram was operational it would not impact significantly on the highway network. No further mitigation is necessary.