
QBC MONITORING REPORT

NOVEMBER 2011

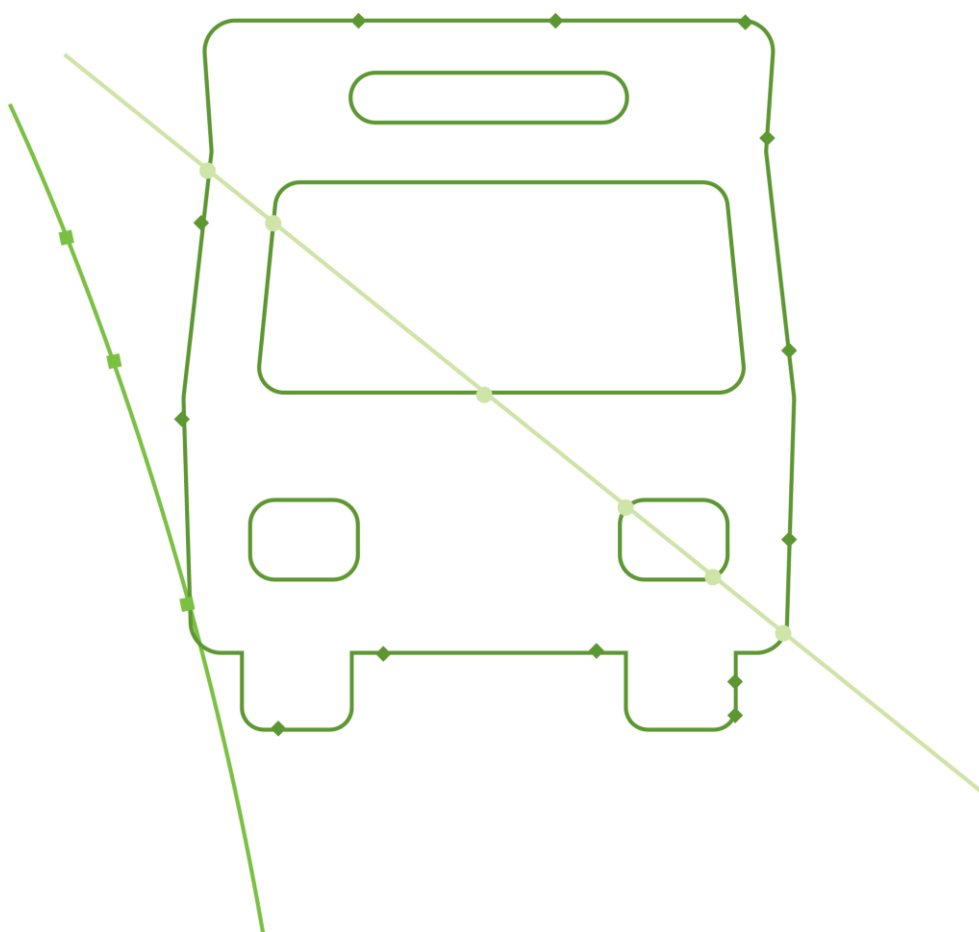


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1. Introduction & Structure of the Report

1.1 Background

The Dublin Transportation Office (DTO) assumed responsibility for Quality Bus Corridor (QBC) monitoring in November 2002. Monitoring had previously been undertaken on a bi-annual basis by Dublin City Council. The functions and responsibilities of the Dublin Transportation Office were transferred to the newly created National Transport Authority on 1 December 2009, and the Authority now monitors the performance of QBC's on an annual basis in November of each year.

QBC monitoring data has now been collected for every year since 2002 for the initial 9 radial QBC's – i.e. Blanchardstown, Finglas, Lucan, Malahide, North Clondalkin, Rathfarnham, Stillorgan, Swords and Tallaght. Since 2004 monitoring data has been collected for an additional 4 QBC's – i.e. Ballymun, Bray (incorporating the N11 extension from Foxrock to Loughlinstown), Clontarf and the Howth Road QBC's. Since 2007 monitoring data has been collected for a further 3 QBC's as follows: Crumlin Road, Rock Road and South Clondalkin QBC's. The data has been collected to measure QBC performance both at a point in time, and over time.

Although this report deals specifically with the results from November 2011, comparisons are made with the results from 2002 to 2010.

The development and enhancement of an expanded Quality Bus Network was a key element of the DTO transport strategy as outlined in *A Platform for Change* and remains central to the current GDA transport strategy. Monitoring the performance of the Quality Bus Corridors in operation helps to measure the efficiency and effectiveness of the bus mode in the delivery of the transport objectives set out in the transport strategy.

1.2 Structure of the Report

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| Section 2 | summarises the main findings from the November 2011 QBC monitoring exercise. |
| Section 3 | sets out the purpose, scope and methodology of the annual monitoring exercise. |
| Section 4 | is a detailed report for each of the 16 individual QBC's monitored and sets out their performance against key performance indicators. |
| Section 5 | is a summary of the trends between 1997 and 2011 in respect to bus supply and patronage and the number of cars crossing the Canal Cordon. |
| Section 6 | is a summary of the comparative bus and car average journey times for morning and evening peak periods for each of the 16 QBCs monitored. |
| Section 7 | contains tables of Performance Indicators measured over the period 2010 to 2011 inclusive. |
| Section 8 | contains tables showing Mode Share expressed in terms of the percentage of total persons crossing the canal cordon points by mode of travel. |
| Appendix 1 | details the Specification against which the performance of each QBC is measured. |

- Appendix 2** is a map showing the full set of Dublin Bus Automatic Vehicle Location (AVL) timing points which have been used to calculate average journey time and speed data on the QBC network
- Appendix 3** is a table showing a sample of Dublin Bus AVL data that which has been used to calculate average journey time and speed data on the QBC network
- Appendix 4** is a map of all canal cordon survey points and is reproduced here for reference.

2. Recent Changes in Methodology

2.1 Bus Journey Time Data Methodology

In 2011, the National Transport Authority employed a different methodology to collect the essential data used to monitor the QBC network. Between 2002 and 2010, the main QBC monitoring data was collected by commissioning consultants to undertake road side surveys throughout the QBC network. However, there were recognised limitations with the road side survey methodology including:

- It only reflected one day of activity on the network.
- It could not accurately take account of schedule adherence or minor disruptions to the network.
- The sample rates that could be achieved was limited as the methodology relied on a limited number of individual surveyors at fixed locations throughout the day and their ability to accurately observe and record bus registrations and a sample of car registrations at each location.
- The approach could not provide significant granular detail in the data collected – e.g. the impacts of specific bottle necks for bus movements could be hidden in data.
- Bus speeds were compared with car speeds, however this assumed that cars travelled between observed survey points adjacent to the QBC without deviating or stopping.

Due to these constraints and the emergence of new technology being employed by Dublin Bus to manage/ track bus operations, the decision has been made to move to using the Dublin Bus AVL data for QBC monitoring. The AVL system monitors in real time, the location, service pattern, speed and direction of buses. AVL data has a number of advantages over the traditional road side survey approach most notably:

- It can provide a full sample of activity along the entire bus network.
- The AVL data can be cross referenced with schedule data in order to identify disruptions to service and schedule adherence on a given day.
- The movements of all Dublin Bus vehicles can be accurately tracked and linked back to other information about the fleet such as vehicle age, type, accessibility etc.
- Timing points can be provided at an individual bus stop level or by stage. This enables the accurate pin pointing of locations where delays are occurring.
- Buses that are delayed excessively, terminate or deviate off route can be easily identified in the data and removed from the data sample if appropriate. In addition, route variations can be easily identified for comparison purposes if required.

Although there are numerous advantages with using AVL there are also some limitations:

- Dublin Bus has kindly provided full AVL data to the NTA. However, the Authority does not currently have access to AVL data for Bus Eireann or the other private operators using the QBC network. Nonetheless, Dublin Bus currently supplies the vast bulk of bus services in Dublin, and hence a sample of their AVL data can be assumed to provide a robust sample of bus speeds on the QBC network as a whole. In the coming years, the Authority will seek to include AVL data from Bus Eireann and private operator in the QBC monitoring exercise.

- Information such as average access and egress time is not available at present from the AVL data. However it is possible to calculate dwell times at stops.
- Information such as vehicle age and vehicle accessibility could be gathered from the AVL data using the registration of the vehicle and cross referencing with fleet data. However such detailed analysis has not been undertaken in the 2011 monitoring exercise.

2.2 Car Journey Time Data Methodology

The NTA investigated using average car speed data taken from observations of mobile phone cellular movements for 2011. However it was found that although this source can potentially provide a very rich and comprehensive dataset, the accuracy of the data in terms of the separation of speeds by different modes of travel could not be verified. Accordingly the Authority did not deem it appropriate to use this data source for the calculation of car journey times in this report. Hence, for the purposes of comparison of Bus and Car speeds, **this report uses car journey times from 2010** as an estimate of car speeds on the QBC routes.

It should be noted that the 2010 car journey time data was gathered using roadside survey, and hence the accuracy of the data is subject to the limitations referred to in 2.1 above. This report has attempted to marry the AVL data and average car journey time data from 2010 as accurately as possible. However, it should be noted that the car journey time data has been captured at a different spatial level to the Bus AVA data. For this reason, and in recognition of the gap of one year in the two datasets, the 2011 report has omitted link by link comparisons between bus and car speeds. The Authority intends to undertake its own car journey time surveys in the Dublin area in 2012 and subsequent years, and hence the link by link comparisons of bus and car journey times will be reinstated in the 2012 and subsequent QBC monitoring reports.

Section 4.3 below provides a detailed description of the methodology for analysis of the QBC network.

3. Main Findings

3.1 Main Findings Overall

The number of bus passengers crossing the Canal Cordon on QBC corridors increased by 8,791 (29%) between November 1997 and November 2011 (See Table 2 for details). There was also an increase in passenger numbers of 3% or 1,181 over the last 12 months (See Table 3 for details). The number of buses crossing the cordon has decreased by 4% in the last year while car mode share has decreased by 2%. Overall since 1997 car mode share crossing the canal cordon has dropped by 18%

In the case of 6 out of the 16 QBCs monitored, bus average journey times were faster than the corresponding car journey times in the morning peak. Of these 6 QBCs, 4 of them reported average bus journey times in excess of 10% lower than the corresponding car journey times. Of the 10 QBC's where car journey times were faster, bus journey times were within 10 minutes of the equivalent car journey times in the case of 5 of these. Only one QBC reported bus times that were more than 12 minutes slower than car journey times.

For the initial 9 radial QBCs, bus mode share is up almost 2% since 2010, while passenger numbers on QBC designated routes are up 1,338 (3%) for the same period. Bus mode share on the 7 other QBCs is down by 6% and passenger numbers on designated QBC routes are down 8% for the same period. The highest bus mode share crossing the cordon is on the Malahide/Clontarf QBC at 57.47% with the lowest on the Bray/Rock Road QBC at 20.80%

The bus mode share crossing the canal cordon on QBC corridors is on average 39.5%, this compares favourably to the mode share on non QBC corridors at 9.0%. The car mode share on QBC corridors is 35.1% and 46.3% on non QBC corridors. More details are available in tables 8a to 8c.

Overall since 2010 bus mode share crossing the canal in the morning peak is up by 1%, rail and LUAS are static at 13% and 5% respectively. Public transport overall has a 47.2% mode share, over 1% up on last year. Car mode share is down by 2% over the same period. In total in 2011, 87,132 people crossed the canal cordon in the morning peak on public transport (excluding taxi), and 54,251 of these were on bus. Some 69,681 people crossed the canal by car in the same period. In overall terms there was a 1% increase in total trips crossing the canal cordon between 2010 and 2011. However there was a 3% increase in public transport trips and a 5% increase in bus trips. More details are available in table 8c.

3.2 Main Findings by Corridor

The bus mode share crossing the cordon on the **Blanchardstown QBC** designated routes increased by over 4% between 2010 and 2011. Car mode share for the same period decreased by over 3% whilst total persons crossing the canal for the same period increased by over 1%. In the morning peak bus journey times on the Blanchardstown QBC were the same as the corresponding car journey times. Blanchardstown QBC designated routes carry over 4,650 passengers across the canal in the morning peak, the highest of all QBC's.

Bus journey times on the **Finglas QBC** in the morning peak were almost 6 minutes faster than the corresponding car journey times. In spite of this, bus mode share at the canal cordon is down just over 1% from 2010 with car mode share up by almost 3% in the same period.

Bus journey times in the morning peak are over 8 minutes less than that of corresponding car journey times on the **Lucan QBC**. Bus and car mode share at the canal cordon have

remained broadly static since 2010 with both bus and car mode share down by less than 1%. Bus passenger numbers and overall person trips at the cordon since 2010 remain broadly static with a change of less than 1%.

Morning peak bus journey times on the **Malahide QBC** were almost double the corresponding car journey times. The bus mode share crossing the canal is up almost 2% from 2010 with car mode share down 2% in the same period. Bus enjoys almost 60% of mode share at Newcomen Bridge, the highest mode share on the cordon.

Bus journey times on the **North Clondalkin QBC** are over 14 minutes more than corresponding car journey times in the morning peak. Bus mode share at the canal cordon is up almost 2% from 2010 with car mode share down almost 1% in the same period.

Car journey times in the morning peak were almost 3 minutes more than the corresponding bus journey times on the **Rathfarnham QBC**. Bus mode share at the canal cordon was down 4% with car mode share up 4% on 2010. Total person numbers crossing the canal were up over 6% from 2010. However bus passenger numbers on QBC designated routes are unchanged over the same period.

Bus journey times on the **Stillorgan QBC** were on average over 1 minute less than corresponding car journey times in the morning peak. Car mode share at the canal cordon was down over 1% with bus mode share up over 3% between 2010 and 2011. Overall person numbers crossing the canal were down 10%. However, passenger numbers on QBC designated bus routes were up almost 15% in the same period.

Bus journey times on the **Swords QBC** were on average over 3 minute more than corresponding car journey times in the morning peak. Bus mode share was up 1% while car mode share was down almost 3% at the canal between 2010 and 2011. Total persons crossing the canal were up over 1% for the same period. Meanwhile, passenger numbers on designated QBC routes are up over 1% also.

Average car journey times were over 5 minutes more than corresponding bus journey times on the **Tallaght QBC** in the morning peak. Bus mode share at the canal cordon was up over 8% from 2010, the highest annual increase out of all QBC's. Car mode share was down over 4% with increases in mode share for both walk and cycle in the same period.

Bus journey times on the **Ballymun QBC** in the morning peak were over 3 minutes faster than car. Bus mode share crossing the canal was up almost 4% on 2010 figures while car mode share was down over 5% over the same period.

Average bus journey times on the **Bray QBC** in the morning peak were some 4 minutes faster than car. Bus mode share crossing the canal is up 3% on 2010 figures, while car mode share is down 4%. Total passenger journeys crossing the canal was up 9%. However, the passenger numbers on designated QBC routes was up 6%.

Bus journey times were almost 5 minutes faster than car journey times on the **Clontarf QBC** were almost the same. The bus mode share crossing the canal was up almost 2% on 2010 with car mode share down by 2%. Bus enjoys almost 60% of mode share at Newcomen Bridge, the highest on the cordon.

Bus journey times on the **Howth Road QBC** was surveyed at over 3 times car journey time. In spite of this bus mode share crossing the canal was up almost 2% on 2010 with car mode share down 2%. Bus enjoys almost 60% of mode share at Newcomen Bridge, the highest on the cordon.

Average bus journey times on the **Crumlin Road QBC** in the morning peak were over 3 minutes slower than corresponding car journey times. Bus mode share was down almost 5% crossing the canal at Dolphins Barn between 2010 and 2011, while car mode share was up almost 5% for the same period. Walking and cycling also showed a marginal decline in mode

share. There were 1,288 fewer person trips since 2010 and 478 fewer bus trips in the same period.

Average car journey times on the **Rock Road QBC** were more than half average bus journey times in the AM peak. In spite of this bus mode share was up 3% on 2010 figures, while car mode share was down 4% for the same period. Total persons crossing the canal cordon was up almost 10% on this corridor. Bus passenger numbers on QBC routes was up over 25% on 2010 figures. However the Rock Rd QBC has the lowest bus mode share of all QBCs at just under 24%. Walking and cycling have a 16% mode share on this corridor.

Average bus and car journey times on the **South Clondalkin QBC** in the morning peak were close, with the bus 2 minutes faster. Bus mode share was down almost 5% crossing the canal at Dolphins Barn between 2010 and 2011, while car mode share was up the same amount for the same period. Although total person trips are down almost 20%, bus passenger numbers are up almost 13%.

4. Purpose, Scope & Methodology

4.1 Purpose

The purpose of the monitoring exercise is to undertake a time series analysis of the operation of each QBC including journey times of buses within sections of each corridor, equivalent journey times by car, the pattern of flow of buses and the resultant passenger wait times. Additional data is collected and used to measure bus usage; mode share for city bound journeys, the level of bus priority, passenger waiting facilities, passenger information, the quality of buses and passenger satisfaction levels. The results are compared to the specification set out and agreed for the performance of Quality Bus Corridors.

4.2 Scope

16 QBCs have been analysed over a 4 week period in November 2011. Please refer to figure 1 for a map of the geographical extent of the QBCs monitored.

4.3 Methodology

In 2011 for the first time roadside surveys were not carried out. Dublin Bus has now rolled out a full program of AVL on their fleet. The AVL system monitors in real time, the location, service pattern, speed and direction of buses. This data is then stored within a centralised database. By interrogation of this data it is possible to build up a very accurate picture of the performance of each QBC. A sample of the Dublin Bus AVL data is provided in Appendix 3. AVL data was used for the first time in QBC monitoring in 2010 to supplement Roadside Survey data, and this proved to be very successful. AVL provides a far more granular profile of the performance of the network than observations at strategic locations. Although only Dublin Bus services could be monitored, evidence from roadside surveys suggests that Dublin Bus vehicles do not perform any differently to Bus Eireann or other private bus operators and are a good proxy for network performance as a whole.

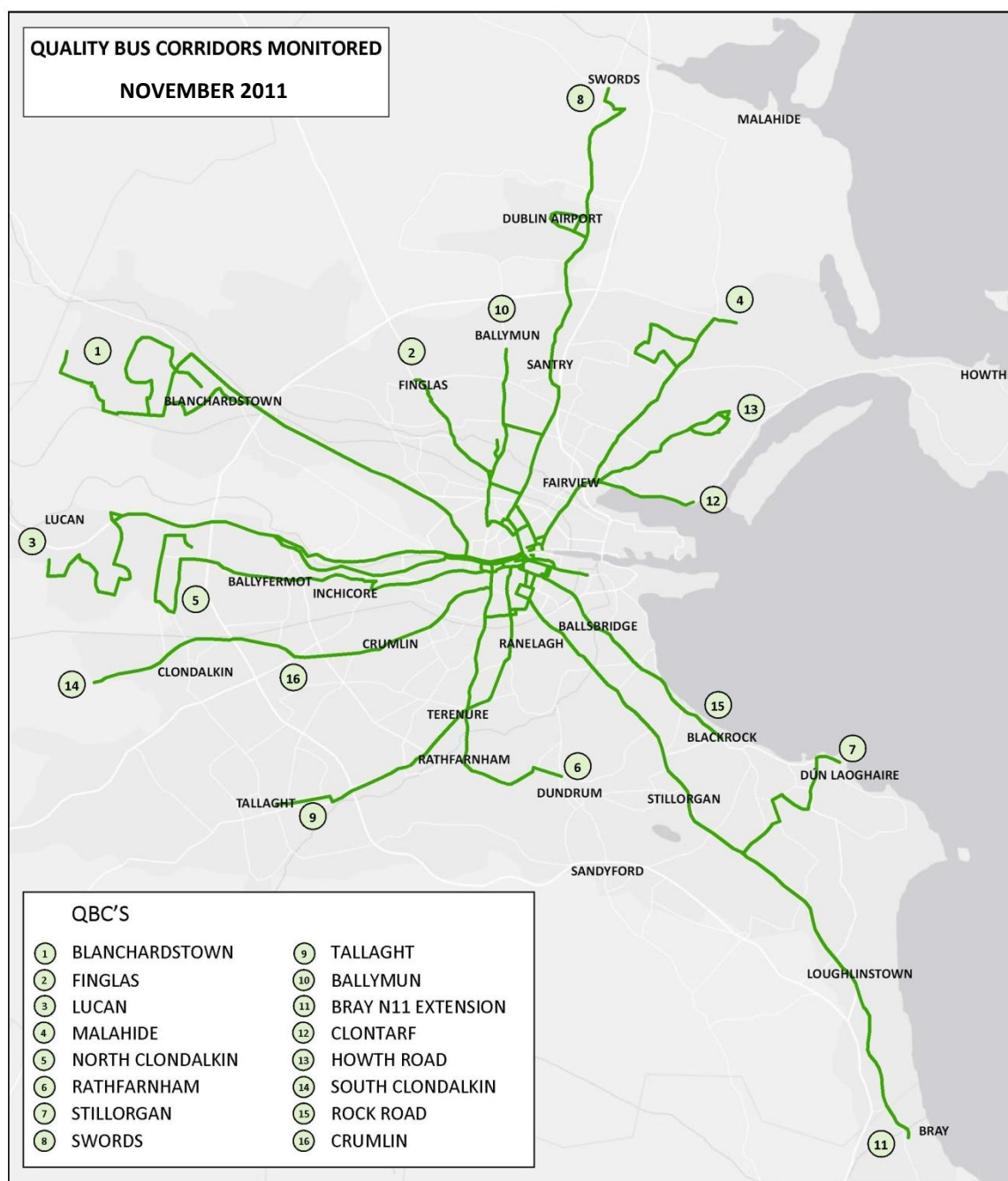
Dublin Bus provided the NTA with a database of AVL data for the entire month of November 2011. Link by link journey time data for Dublin Bus routes operating on all 16 QBC's was averaged and divided into hourly time segments, and weekends were excluded from this data. This gave a sample of over a thousand bus journeys on most links for the entire month. The standard deviation was also calculated on a link by link basis to ensure the data contained no anomalies. The link by link data could then be aggregated to produce journey time data at a corridor level.

Traffic Cordon Counts were undertaken by Dublin City Council measuring the volume of city bound traffic and persons crossing the canal cordon in the morning peak period with a view to reporting on modal share. Dublin Bus undertook bus passenger counts for all city bound passengers crossing the Canal Cordon (Appendix 4). The Railway Procurement Agency undertook an all-day passenger count on LUAS which included measuring the volume of city bound passengers during the morning peak period. A similar all day passenger count was undertaken by Irish Rail from which the data on the volume of city bound passengers was extracted.

An infrastructure audit, undertaken in May to June 2006 including the use of GPS tracked video footage, was used to report on QBC attributes including the levels of bus priority, passenger waiting facilities and passenger information.

Passenger satisfaction levels were recorded for each QBC using the data from a survey carried out by Dublin Bus in 2002.

Figure 1: Corridors Analysed in November 2011



5. Individual QBC Reports

This section includes individual reports (in the form of tables) on each of the 16 QBC's that were monitored. Each table gives the measured performance of the QBC against key performance indicators as follows:

- Bus journey times
- Bus speeds
- Comparative bus and car journey times
- Boarding and alighting times
- Mode Share
- Passenger journeys

The codes in the left hand column of each table - headed "Spec Ref" - refer to the performance indicators set out in the QBC Specification (see Appendix I).

Note: average car speeds were surveyed in 2010.

Table 1.1 Blanchardstown QBC

Quality Bus Corridor Monitoring Annual Summary Report Blanchardstown Nov. 2011							
Spec Ref		Key Objectives	Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		Navan Rd. Travelodge to College Green TCD
A5	Corridor Bus Journey Time (Average)		43:31		1:00:01		
A5	Sample Size		1,738		1,557		
A5	Corridor Bus Speed		18.68 kph		13.54 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		New River Rd / Navan to Manor Street
A5	Comparison of Bus v Car Journey Times (Average)		27:49		27:40*		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		New River Rd to Westmoreland St.
	Surveyed November 2007		9.4%		10.8%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Cordon Counts at Blackhorse Avenue Old Cabra Road & St Peters Church
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	43.5%	47.9%	4.4%	
			Car	45.2%	41.8%	-3.4%	
			Taxi	1.3%	1.2%	-0.1%	
			Cycle	2.0%	2.2%	0.2%	
			Walking	6.7%	5.2%	-1.5%	
			Total Persons	14,101	14,343	242	
E1	Passenger Journeys (Total)		Pax.	3,658	4,653	995	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.2 Finglas QBC

Quality Bus Corridor Monitoring Annual Summary Report Finglas Nov. 2011						
Spec Ref	Key Objectives	Performance Indicators				Notes
A5	Corridor Bus Journey Times	AM Peak	PM Peak		Finglas Rd. / Ballygall Rd. to Kildare St.	
A5	Corridor Bus Journey Time (Average)	38:35	46:15			
A5	Sample Size	1,134	1,091			
A5	Corridor Bus Speed	17.98 kph	15.50 kph			
A5	Comparison of Corridor Journey Times Bus v Car	Bus AM Peak	Car AM Peak		Finglas Main St. to Dorset St. Lwr. (Jnc. Blessington St.)	
A5	Comparison of Bus v Car Journey Times (Average)	25:37	31:23*			
B2	Boarding & Alighting Time as % of total journey time	AM Peak	PM Peak		Finglas to Parnell Sq.	
	Surveyed November 2007	18.6%	8.4%			
D1	Assess & Quantify the Effect of QBC on all Modes	% Mode Share at Canal Cordon				Survey at Binn's Bridge Includes Swords QBC
		Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)	Bus	44.5%	45.7%	-1.2%	
		Car	41.3%	38.5%	2.8%	
		Taxi	2.1%	1.6%	0.5%	
		Cycle	2.7%	3.9%	-1.2%	
		Walking	7.7%	8.7%	-1.0%	
		Total Persons	14,147	14,330	-183	
E1	Passenger Journeys (Total)	Pax.	2,116	2,514	-398	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.3 Lucan QBC

Quality Bus Corridor Monitoring Annual Summary Report Lucan Nov. 2011							
Spec Ref		Key Objectives	Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		Foxhunter Pub to Ormond Quay / Capel St. (via Chapelizod Bypass)
A5	Corridor Bus Journey Time (Average)		31:21		43:55		
A5	Sample Size		1,343		1,308		
A5	Corridor Bus Speed		36.88 kph		27.32 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		Foxhunter Pub to Arran Quay (via Chapelizod Bypass)
A5	Comparison of Bus v Car Journey Times (Average)		26:30		34:53*		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		Palmerstown to Bachelors Wlk.
	Surveyed November 2007		13.3%		9.7%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at St. John's Rd. & Conyngham Rd.
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	48.6%	47.7%	-0.9%	
			Car	45.2%	44.6%	-0.6%	
			Taxi	2.2%	1.8%	-0.4%	
			Cycle	1.0%	1.4%	0.4%	
			Walking	1.0%	2.1%	1.1%	
			Total Persons	13,523	13,637	114	
E1		Passenger Journeys (Total)	Pax.	4,680	4,410	-270	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.4 Malahide QBC

Quality Bus Corridor Monitoring Annual Summary Report Malahide Nov. 2011							
Spec Ref	Key Objectives		Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		Greencastle Rd. to Amiens St. / Nrth. Strand
A5	Corridor Bus Journey Time (Average)		35:14		27:18		
A5	Sample Size		578		559		
A5	Corridor Bus Speed		15.88 kph		22.84 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		Greencastle Rd. to Malahide Rd at Golf Club opposite Casino Park
A5	Comparison of Bus v Car Journey Times (Average)		24:56		13:01*		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		Greencastle Rd. to Amiens St.
	Surveyed November 2007		22.0%		15.5%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon*				Survey at Newcomen Bridge
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	57.5%	59.2%	1.7%	
			Car	25.4%	23.6%	-1.9%	
			Taxi	3.0%	4.2%	1.2%	
			Cycle	6.0%	16.3%	10.3%	
			Walking	6.4%	18.5%	12.0%	
			Total Persons	13,810	13,114	-696	
E1		Passenger Journeys (Total)	Pax.	4,471	3,965	-506	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.5 North Clondalkin QBC

Quality Bus Corridor Monitoring Annual Summary Report North Clondalkin Nov. 2011							
Spec Ref	Key Objectives		Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak	PM Peak		Coldcut Rd. to Fishamble St.	
A5	Corridor Bus Journey Time (Average)		39:45	47:44			
A5	Sample Size		385	378			
A5	Corridor Bus Speed		19.69 kph	16.58 kph			
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak	Car AM Peak		Coldcut Rd. to Cornmarket	
A5	Comparison of Bus v Car Journey Times (Average)		37:24	22:57*			
B2	Boarding & Alighting Time as % of total journey time		AM Peak	PM Peak		Coldscut Rd. to Westmoreland St.	
	Surveyed November 2007		11.1%	8.5%			
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Old Kilmainham Rd.
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	35.6%	37.3%	1.7%	
			Car	58.4%	57.7%	-0.7%	
			Taxi	1.2%	0.5%	-0.7%	
			Cycle	0.7%	0.9%	0.2%	
			Walking	2.3%	1.9%	-0.4%	
			Total Persons	3,965	4,613	648	
E1		Passenger Journeys (Total)	Pax.	1,280	1,407	127	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.6 Rathfarnham QBC

Quality Bus Corridor Monitoring Annual Summary Report Rathfarnham Nov. 2011							
Spec Ref	Key Objectives		Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		Rathfarnham Castle to Georges St. / Dame St.
A5	Corridor Bus Journey Time (Average)		35:14		38:03		
A5	Sample Size		1,257		1,238		
A5	Corridor Bus Speed		15.58 kph		14.67 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		Rathfarnham to Aungier Street / Bishop Street
A5	Comparison of Bus v Car Journey Times (Average)		27:02		29:57*		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		Rathfarnham to Westmoreland St.
	Surveyed November 2007		16.8%		10.0%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Harold's Cross Bridge
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	33.7%	29.8%	-3.9%	
			Car	46.6%	50.7%	4.1%	
			Taxi	1.2%	1.5%	0.3%	
			Cycle	7.1%	7.7%	0.6%	
			Walking	9.2%	7.8%	-1.4%	
			Total Persons	7,264	7,739	475	
E1		Passenger Journeys (Total)	Pax.	1,495	1,491	-4	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.7 Stillorgan QBC

Quality Bus Corridor Monitoring Annual Summary Report Stillorgan Nov. 2011							
Spec Ref		Key Objectives	Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		Foxrock Church to Leeson St. / Appian Way
A5	Corridor Bus Journey Time (Average)		32:47		28:32		
A5	Sample Size		1,683		1,692		
A5	Corridor Bus Speed		24.84 kph		28.09 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		Stillorgan Rd / Mount Merrion Ave. to Leeson St.
A5	Comparison of Bus v Car Journey Times (Average)		19:34		21:19		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		Foxrock Church to Leeson St.
	Surveyed November 2007		21.2%		15.2%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Leeson St. Bridge
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	40.6%	43.7%	3.1%	
			Car	41.8%	40.4%	-1.4%	
			Taxi	2.0%	1.2%	-0.8%	
			Cycle	5.7%	4.0%	-1.7%	
			Walking	8.2%	9.3%	1.1%	
			Total Persons	10,975	9,848	- 1,127	
E1		Passenger Journeys (Total)	Pax.	3,285	3,777	492	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.8 Swords QBC

Quality Bus Corridor Monitoring Annual Summary Report Swords Nov. 2011							
Spec Ref	Key Objectives		Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		Swords main St. to O'Connell St. / Nrth. Earl St.
A5	Corridor Bus Journey Time (Average)		54:58		1:05:28		
A5	Sample Size		521		581		
A5	Corridor Bus Speed		24.25 kph		20.56 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		Airside Business Park to Dorset St. Lwr.
A5	Comparison of Bus v Car Journey Times (Average)		32:01		41:51*		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		Cloghran Roundabout to Lower Abbey St.
	Surveyed November 2007		11.3%		7.4%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Binns Bridge (includes Finglas QBC)
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	44.5%	45.7%	1.2%	
			Car	41.3%	38.5%	-2.8%	
			Taxi	2.1%	1.6%	-0.5%	
			Cycle	2.7%	3.9%	1.2%	
			Walking	7.7%	8.7%	1.0%	
			Total Persons	14,147	14,330	183	
E1		Passenger Journeys (Total)	Pax.	2,767	2,805	38	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.9 Tallaght QBC

Quality Bus Corridor Monitoring Annual Summary Report Tallaght Nov. 2011							
Spec Ref		Key Objectives	Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		West of M50 to Westmoreland St.
A5	Corridor Bus Journey Time (Average)		51:50		52:23		
A5	Sample Size		575		591		
A5	Corridor Bus Speed		18.46 kph		18.38 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		West of M50 to Camden St. Upper
A5	Comparison of Bus v Car Journey Times (Average)		39:49		32:57*		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		Templeogue Rd. to Westmoreland St.
	Surveyed November 2007		11.9%		10.8%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Portobello Bridge.
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	45.8%	54.1%	8.3%	
			Car	25.5%	21.1%	-4.4%	
			Taxi	1.5%	0.7%	-0.8%	
			Cycle	7.5%	7.7%	0.2%	
			Walking	18.6%	15.5%	-3.1%	
			Total Persons	8,142	8,107	-35	
E1		Passenger Journeys (Total)	Pax.	2,629	2,921	292	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.10 Ballymun QBC

Quality Bus Corridor Monitoring Annual Summary Report Ballymun Nov. 2011							
Spec Ref	Key Objectives		Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		Ballymun to O'Connell St.
A5	Corridor Bus Journey Time (Average)		38:54		36:16		
A5	Sample Size		745		725		
A5	Corridor Bus Speed		15.27 kph		18.50 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		Ballymun to Dorset St. Lwr.
A5	Comparison of Bus v Car Journey Times (Average)		34:39		23:02*		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		Ballymun to O'Connell St.
	Surveyed November 2007		11.4%		22.1%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Phibsborough Rd.
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	35.8%	39.5%	3.7%	
			Car	47.7%	42.3%	-5.4%	
			Taxi	2.2%	2.2%	0.0%	
			Cycle	2.5%	3.8%	1.3%	
			Walking	10.1%	9.3%	-0.8%	
			Total Persons	7,255	7,607	352	
E1		Passenger Journeys (Total)	Pax.	1,544	1,753	209	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.11 Bray QBC

Quality Bus Corridor Monitoring Annual Summary Report Bray Nov. 2011							
Spec Ref	Key Objectives		Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak	PM Peak		Bray to Foxrock Church	
A5	Corridor Bus Journey Time (Average)		33:31	38:42			
A5	Sample Size		184	213			
A5	Corridor Bus Speed		29.85 kph	25.85 kph			
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak	Car AM Peak		Bray to Stillorgan Rd. / Mount Merrion Ave.	
A5	Comparison of Bus v Car Journey Times (Average)		44:08	40:51*			
B2	Boarding & Alighting Time as % of total journey time		AM Peak	PM Peak		Bray Main St. to Foxrock Church	
	Surveyed November 2007		18.1%	10.1%			
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Mount St. Bridge
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	20.8%	23.9%	3.1%	
			Car	59.7%	55.5%	-4.2%	
			Taxi	2.3%	2.9%	0.6%	
			Cycle	4.9%	5.7%	0.9%	
			Walking	10.2%	10.2%	0.0%	
			Total Persons	4,269	4,683	414	
E1		Passenger Journeys (Total)	Pax.	1,711	1,819	108	

* Car average speed surveyed November 2010

Table 1.12 Clontarf QBC

Quality Bus Corridor Monitoring Annual Summary Report Clontarf Nov. 2011							
Spec Ref		Key Objectives	Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		Clontarf Garage to Junc. Clontarf Rd. / Malahide Rd.
A5	Corridor Bus Journey Time (Average)		11:37		11:03		
A5	Sample Size		402		716		
A5	Corridor Bus Speed		26.17 kph		25.99 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		Clontarf Garage to Junc. Clontarf Rd. / Malahide
A5	Comparison of Bus v Car Journey Times (Average)		11:37		16:25*		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		Clontarf Garage to Fairview
	Surveyed November 2007		23.4%		15.6%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Newcomen Bridge
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	57.5%	59.2%	1.7%	
			Car	25.4%	23.6%	-1.9%	
			Taxi	3.0%	4.2%	1.2%	
			Cycle	6.0%	16.3%	10.3%	
			Walking	6.4%	18.5%	12.0%	
			Total Persons	13,810	13,114	-696	
E1		Passenger Journeys (Total)	Pax.	1,279	1,196	-83	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.13 Howth Rd. QBC

Quality Bus Corridor Monitoring Annual Summary Report Howth Rd. Nov. 2011							
Spec Ref	Key Objectives		Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak	PM Peak		Raheny to Junc. Clontarf Rd. / Malahide Rd.	
A5	Corridor Bus Journey Time (Average)		35:47	15:38			
A5	Sample Size		750	694			
A5	Corridor Bus Speed		12.52 kph	27.02 kph			
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak	Car AM Peak		Raheny to Junc. Clontarf Rd. / Malahide Rd.	
A5	Comparison of Bus v Car Journey Times (Average)		35:47	10:27*			
B2	Boarding & Alighting Time as % of total journey time		AM Peak	PM Peak		Raheny to Fairview	
	Surveyed November 2007		17.1%	14.3%			
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Newcomen Bridge
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	57.5%	59.2%	1.7%	
			Car	25.4%	23.6%	-1.9%	
			Taxi	3.0%	4.2%	1.2%	
			Cycle	6.0%	16.3%	10.3%	
			Walking	6.4%	18.5%	12.0%	
			Total Persons	13,810	13,114	-696	
E1		Passenger Journeys (Total)	Pax.	1,474	1,455	-19	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.14 Crumlin Rd. QBC

Quality Bus Corridor Monitoring Annual Summary Report Crumlin Rd. Nov. 2011							
Spec Ref	Key Objectives		Performance Indicators			Notes	
A5	Corridor Bus Journey Times		AM Peak	PM Peak		Drimnagh Rd. to Eden Quay	
A5	Corridor Bus Journey Time (Average)		28:30	40:39			
A5	Sample Size		688	650			
A5	Corridor Bus Speed		18.13 kph	15.82 kph			
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak	Car AM Peak		Crumlin Rd. / St. Mary's Rd. to Dean St.	
A5	Comparison of Bus v Car Journey Times (Average)		19:36	15:53*			
B2	Boarding & Alighting Time as % of total journey time		AM Peak	PM Peak		Drimnagh Rd. to Westmoreland St.	
	Surveyed November 2007		17.0%	11.2%			
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon			Survey at Dolphins Barn	
			Mode	Nov. 2010	Nov. 2011		2010-2011
	(Time Series Analysis)		Bus	43.8%	39.1%		-4.7%
			Car	46.3%	51.0%		4.7%
			Taxi	2.1%	3.3%		1.2%
			Cycle	1.9%	1.6%		-0.3%
			Walking	3.6%	2.9%		-0.7%
			Total Persons	6,555	5,267		- 1,288
E1		Passenger Journeys (Total)	Pax.	2,401	1,923	-478	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.15 Rock Rd. QBC

Quality Bus Corridor Monitoring Annual Summary Report Rock Rd. Nov. 2011							
Spec Ref	Key Objectives		Performance Indicators				Notes
A5	Corridor Bus Journey Times		AM Peak		PM Peak		Blackrock to O'Connell St.
A5	Corridor Bus Journey Time (Average)		40:34		49:14		
A5	Sample Size		732		752		
A5	Corridor Bus Speed		20.00 kph		16.48 kph		
A5	Comparison of Corridor Journey Times Bus v Car		Bus AM Peak		Car AM Peak		Blackrock to Northumberland Ave. / Merrion Rd. / Anglesea Rd.*
A5	Comparison of Bus v Car Journey Times (Average)		21:58		10:38*		
B2	Boarding & Alighting Time as % of total journey time		AM Peak		PM Peak		Blackrock to O'Connell St.
	Surveyed November 2007		7.0%		15.1%		
D1	Assess & Quantify the Effect of QBC on all Modes		% Mode Share at Canal Cordon				Survey at Mount St. Bridge.
			Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)		Bus	20.8%	23.9%	3.1%	
			Car	59.7%	55.5%	-4.2%	
			Taxi	2.3%	2.9%	0.6%	
			Cycle	4.9%	5.7%	0.9%	
			Walking	10.2%	10.2%	0.0%	
			Total Persons	4,269	4,683	414	
E1		Passenger Journeys (Total)	Pax.	764	959	195	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

Table 1.16 South Clondalkin QBC

Quality Bus Corridor Monitoring Annual Summary Report South Clondalkin Nov. 2011						
Spec Ref	Key Objectives	Performance Indicators				Notes
A5	Corridor Bus Journey Times	AM Peak	PM Peak	Grange Castle (Wyeth) to Eden Quay		
A5	Corridor Bus Journey Time (Average)	58:59	1:06:28			
A5	Sample Size	688	650			
A5	Corridor Bus Speed	24.44 kph	21.15 kph			
A5	Comparison of Corridor Journey Times Bus v Car	Bus AM Peak	Car AM Peak	Grange Castle (Wyeth) to Eden Quay		
A5	Comparison of Bus v Car Journey Times (Average)	58:59	01:01:08*			
B2	Boarding & Alighting Time as % of total journey time	AM Peak	PM Peak	Grange Castle to Bachelors Walk		
	Surveyed November 2007	14.9%	10.8%			
D1	Assess & Quantify the Effect of QBC on all Modes	% Mode Share at Canal Cordon				Survey at Dolphins Barn
		Mode	Nov. 2010	Nov. 2011	2010-2011	
	(Time Series Analysis)	Bus	43.8%	39.1%	-4.7%	
		Car	46.3%	51.0%	4.7%	
		Taxi	2.1%	3.3%	1.2%	
		Cycle	1.9%	1.6%	-0.3%	
		Walking	3.6%	2.9%	-0.7%	
		Total Persons	6,555	5,267	-1288	
E1	Passenger Journeys (Total)	Pax.	522	588	66	Cordon Counts (0700 - 1000) BAC Designated QBC Routes

* Car average speed surveyed November 2010

6. Trends in Bus Supply and Patronage

6.1 Trends in Bus Supply and Patronage 1997 to 2011

Table 2 gives a summary of the trends in bus supply and bus patronage between November 1997 and November 2011 in respect of the initial 9 QBC radial routes, as measured at the point where each radial QBC crosses the Canal Cordon. The table also compares the bus figures with the number of cars crossing each Cordon point.

Table 2: Summary of Progress 1997 – 2011

QBC Monitoring Nov 1997 - Nov 2011 Cars Crossing Canal Cordon by Corridor BAC Buses Crossing Canal Cordon by Corridor BAC Bus Passengers Crossing Canal by Corridor 0700 - 1000				
Corridor	Mode	Nov. 1997	Nov. 2011	% Change
Stillorgan	Cars	5,794	3,833	-34%
	Buses	40	112	180%
	Bus PAX	1,787	3,777	111%
Blanchardstown	Cars	5,963	5,361	-10%
	Buses	83	94	13%
	Bus PAX	4,573	5,688	24%
Lucan	Cars	6,104	5,496	-10%
	Buses	71	101	42%
	Bus PAX	4,303	5,401	26%
Finglas / Swords	Cars	5,678	4,970	-12%
	Buses	112	169	51%
	Bus PAX	5,670	8,473	49%
North Clondalkin	Cars	1,555	2,253	45%
	Buses	46	31	-33%
	Bus PAX	2,079	1,721	-17%
Malahide	Cars	4,620	3,421	-26%
	Buses	133	152	14%
	Bus PAX	4,747	7,580	60%
Tallaght	Cars	3,314	1,840	-44%
	Buses	72	92	28%
	Bus PAX	4,098	4,389	7%
Rathfarnham	Cars	3,605	2,725	-24%
	Buses	76	49	-36%
	Bus PAX	3,285	2,304	-30%
Total	Cars	36,633	29,899	-18%
	Buses	633	800	26%
	Bus PAX	30,542	39,333	29%

Table 2 shows that overall there has been a 26% increase in bus supply and a 29% increase in bus patronage on the QBC radials over the past 14 years, and a corresponding decrease of 18% in the number of cars crossing the Canal Cordon on these QBC routes.

6.2 Changes since 2010

Table 3 below shows the changes in bus supply and patronage on the radial QBC routes over the last 12 months.

Table 3: Summary of Progress 2010 – 2011

QBC Monitoring Nov 2010 - Nov 2011 Cars Crossing Canal Cordon by Corridor BAC Buses Crossing Canal Cordon by Corridor BAC Bus Passengers Crossing Canal by Corridor 0700 - 1000				
Corridor	Mode	Nov. 2010	Nov. 2011	% Change
Stillorgan	Cars	4,159	3,833	-8%
	Buses	100	112	12%
	Bus PAX	4,375	3,777	-14%
Blanchardstown	Cars	5,215	5,361	3%
	Buses	113	94	-17%
	Bus PAX	4,896	5,688	16%
Lucan	Cars	5,326	5,496	3%
	Buses	106	101	-5%
	Bus PAX	5,677	5,401	-5%
Finglas / Swords	Cars	5,391	4,970	-8%
	Buses	172	169	-2%
	Bus PAX	7,681	8,473	10%
North Clondalkin	Cars	1,980	2,253	14%
	Buses	37	31	-16%
	Bus PAX	1,410	1,721	22%
Malahide	Cars	3,525	3,421	-3%
	Buses	157	152	-3%
	Bus PAX	7,936	7,580	-4%
Tallaght	Cars	1,983	1,840	-7%
	Buses	95	92	-3%
	Bus PAX	3,732	4,389	18%
Rathfarnham	Cars	2,921	2,725	-7%
	Buses	52	49	-6%
	Bus PAX	2,445	2,304	-6%
Total	Cars	30,500	29,899	-2%
	Buses	832	800	-4%
	Bus PAX	38,152	39,333	3%

Table 3 shows that in the last year, there has been a decrease in bus supply of 4% on the initial 9 radial QBC routes but an increase in bus patronage of 3%. In the past year, there has been a 2% decrease in the number of cars crossing the Canal Cordon on these QBC radial routes.

7. Comparative Bus & Car Journey Times in the Morning & Evening Peak

The performance of each of the 16 QBC's was measured in terms of bus journey times compared to car journey times for inbound journeys in the AM Peak on specific sections of each route. Table 4 summarises the results of this comparison of bus and car journey times and describes the section of each QBC where the journey times were measured.

Table 4: Comparative Bus and Car Journey Times in the AM Peak

Quality Bus Corridor Monitoring Nov. 2011 Summary of AM Peak Comparative Bus and Car Journey Times					
Corridor	Section Measured	Bus Ave. Journey Time	Car Ave. Journey Time*	Time Diff.	% Diff.
Lucan	Foxhunter Pub to Arran Quay	00:26:30	00:34:53	00:08:23	31.6%
Swords	Airside Business Park to Dorset St. Lwr.	00:32:01	00:41:51	00:09:50	30.7%
Finglas	Finglas to Dorset St. Lwr.	00:25:37	00:31:23	00:05:46	22.5%
Rathfarnham	Rathfarnham to Aungier St. / Bishop St.	00:27:02	00:29:57	00:02:55	10.8%
Stillorgan	Mount Merrion Ave. to Leeson St.	00:19:34	00:21:19	00:01:45	8.9%
South Clondalkin	Grange Castle to Bachelors Walk	00:58:59	01:01:08	00:02:09	3.6%
Blanchardstown	New River Rd. to Manor St.	00:27:49	00:27:40	(00:00:09)	-0.5%
Bray	Bray to Stillorgan Rd. / Mount Merrion Ave.	00:44:08	00:40:51	(00:03:17)	-7.4%
Tallaght	West of M50 to Camden St. Upper	00:39:49	00:32:57	(00:06:52)	-17.2%
Crumlin Road	Crumlin Rd. / St. Mary's Rd. to Dean St.	00:19:36	00:15:53	(00:03:43)	-19.0%
Ballymun	Ballymun to Dorset St. Lwr.	00:34:39	00:23:02	(00:11:37)	-33.5%
Clontarf	Clontarf Bus Garage to Malahide Rd.	00:26:17	00:16:25	(00:09:52)	-37.5%
North Clondalkin	Coldcut Rd. to Cornmarket	00:37:24	00:22:57	(00:14:27)	-38.6%
Malahide	Greencastle Rd. to Malahide Rd.	00:24:56	00:13:01	(00:11:55)	-47.8%
Rock Road	Blackrock to Merrion Rd.	00:21:58	00:10:38	(00:11:20)	-51.6%
Howth Road	Raheny to Clontarf Rd. / Malahide Rd.	00:35:47	00:10:27	(00:25:20)	-70.8%

Table 4 shows that average Bus journey times in the morning peak were less than the corresponding car average journey times in the case of 6 out of the 16 QBCs monitored. In the case of the remaining QBC's, bus journey times were within 5 minutes of the equivalent car journey times on 3 corridors and within 10 minutes on 5 corridors. The difference exceeded 12 minutes on only 1 corridor.

Table 5: Comparative Bus and Car Journey Times in the PM Peak

Quality Bus Corridor Monitoring Nov. 2011 Summary of PM Peak Comparative Bus and Car Journey Times					
Corridor	Section Measured	Bus Ave. Journey Time	Car Ave. Journey Time*	Time Diff.	% Diff.
Lucan	Wellington Quay to Foxhunter Pub	00:27:11	00:49:56	00:22:45	83.7%
Stillorgan	Leeson St. to Stillorgan Rd.	00:17:33	00:26:20	00:08:47	50.0%
Rock Road	Merrion Rd. to Blackrock	00:17:57	00:25:02	00:07:05	39.5%
Swords	Dorset St. Lwr. to Airside Business Park	00:38:57	00:48:52	00:09:55	25.5%
Howth Road	Fairview / Malahide Rd. to Raheny	00:15:38	00:19:32	00:03:54	24.9%
Blanchardstown	Manor St. to New River Rd.	00:27:25	00:31:01	00:03:36	13.1%
Malahide	Malahide Rd. to Greencastle Rd.	00:12:30	00:13:03	00:00:33	4.4%
Tallaght	Harcourt Rd. to West of M50	00:29:53	00:27:24	(00:02:29)	-8.3%
South Clondalkin	Bachelors Walk to Grange Castle	01:06:28	00:55:25	(00:11:03)	-16.6%
Crumlin Road	Dean St. to Crumlin Rd. / St. Mary's Rd.	00:15:28	00:12:01	(00:03:27)	-22.3%
Rathfarnham	Aungier St. / Bishop St. to Rathfarnham	00:35:03	00:26:40	(00:08:23)	-23.9%
Bray	Mount Merrion Ave. to Bray	00:42:51	00:29:00	(00:13:51)	-32.3%
Finglas	Dorset St. Lwr. to Finglas	00:26:46	00:18:01	(00:08:45)	-32.7%
North Clondalkin	Cornmarket to Coldcut Rd.	00:47:44	00:31:13	(00:16:31)	-34.6%
Ballymun	Dorset St. Lwr. to Ballymun	00:31:19	00:19:34	(00:11:45)	-37.5%
Clontarf	Malahide Rd. to Clontarf Bus Garage	00:22:38	00:12:27	(00:10:11)	-45.0%

In the evening peak 7 out of the 16 QBC's monitored had lower average journey times than that for car. Out of the remaining QBC's that had greater average bus journey times than car; 2 were within 5 minutes and 4 were within 10 minutes of the equivalent car journey time. The difference in journey time exceeded 12 minutes on only 2 corridors. The worst performing QBC was the Clontarf QBC on which bus journey times were 45% (10:11 minutes) slower than corresponding car journey times. In general average bus and car journey times in the evening peak are closer than in the morning peak. This could be as a result of the less spread out nature of the evening peak as opposed to the morning peak.

8. QBC Performance relative to 2010

8.1 QBC Performance relative to 2010

Table 6 compares the performance of the 9 initial radial QBC's relative to the results in 2010 for the key performance indicators as follows:

- Bus average journey times in the morning peak period inbound to the city.
- Bus average journey times in the evening peak period outbound from the city.
- Bus average speeds in the morning peak period inbound.
- Bus average speeds in the evening peak period outbound.
- Bus passengers on designated QBC routes in the morning peak period inbound.
- Cars crossing the canal cordon points in the morning peak period inbound.
- Bus mode share in the morning peak period inbound.

Table 7 gives the same comparison for the 7 remaining QBC's. The areas highlighted in yellow in each table indicate those areas where performance has improved since 2009.

Both tables give the relevant targets from the QBC specification (see Appendix 1) where appropriate.

Table 6: Performance Indicators 2010/2011

Quality Bus Corridor Monitoring Nov. 2011 QBC Performance Indicators Comparison 2010 - 2011										
Corridor	Bus Speeds AM Peak		Bus Speeds PM Peak		BAC Bus PAX QBC Routes		Cars Crossing Canal Cordon		Bus Mode Share	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Blanchardstown	15.7	18.7	14.0	13.5	3,658	4,653	4,902	4,119	43.5%	47.9%
Finglas	14.3	18.0	14.9	15.5	2,116	2,514	4,867	4,557	44.5%	45.7%
Lucan	20.5	36.9	18.2	27.3	4,680	4,410	4,816	5,031	48.6%	47.7%
Malahide	15.2	15.9	15.7	22.8	4,471	3,965	2,808	2,597	57.5%	59.2%
North Clondalkin	14.8	19.7	12.6	16.6	1,280	1,407	1,899	2,165	35.6%	37.3%
Rathfarnham	10.6	15.6	9.8	14.7	1,495	1,491	2,772	2,547	33.7%	29.8%
Stillorgan	17.0	24.8	18.7	28.1	3,285	3,777	3,789	3,427	40.6%	43.7%
Swords	15.2	24.3	13.8	20.6	2,767	2,805	4,867	4,557	44.5%	45.7%
Tallaght	12.0	18.5	12.7	18.4	2,629	2,921	1,774	1,412	45.8%	54.1%
Total for 9 QBCs	15.0	21.4	14.5	19.7	26,381	27,943	32,494	30,412	N/A	N/A
QBC Spec.	17.6	17.6	17.6	17.6	N/A	N/A	N/A	N/A	N/A	N/A

Notes

N/A = Not Applicable

ND = No Data

QBC Specification of Bus Journey Speed of 20 kph minimum excluding boarding and alighting time (ave. 12%)

BAC Bus Pax source: Cordon Counts 0700-1000

Swords & Finglas QBC both cross cordon at Binns Bridge

Items **Highlighted** Indicate an Improvement in last 12 Months

Table 7: Performance Indicators 2010/2011

Quality Bus Corridor Monitoring Nov. 2011 QBC Performance Indicators Comparison 2010 - 2011										
Corridor	Bus Speeds AM Peak		Bus Speeds PM Peak		BAC Bus PAX QBC Routes		Cars Crossing Canal Cordon		Bus Mode Share	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Ballymun	11.3	15.3	11.4	18.5	1,544	1,753	2,491	2,683	35.8%	40.6%
Bray	22.2	29.9	22.6	25.9	1,711	1,735	1,711	1,831	20.8%	23.9%
Clontarf	16.5	26.2	18.3	26.0	1,474	1,196	2,808	2,597	57.5%	59.2%
Crumlin Rd.	14.9	18.1	13.7	15.8	2,401	1,923	2,401	2,104	43.8%	39.1%
Howth Rd.	15.8	12.5	15.2	27.0	1,124	1,455	2,808	2,597	57.5%	59.2%
Rock Rd.	16.2	20.0	13.2	16.5	764	959	1,711	1,831	20.8%	23.9%
South Clondalkin	15.7	24.4	15.8	21.2	522	588	2,401	2,104	43.8%	39.1%
Total for 7 QBCs	16.0	20.0	15.73	21.54	9,540	9,609	16,331	15,747	N/A	N/A
QBC Spec.	17.6	17.6	17.6	17.6	N/A	N/A	N/A	N/A	N/A	N/A

Notes

N/A = Not Applicable

ND = No Data

QBC Specification of Bus Journey Speed of 20 kph minimum excluding boarding and alighting time (ave. 12%)

BAC Bus Pax source: Cordon Counts 0700-1000

Canal Crossing point for Clontarf QBC & Howth Rd. QBC at Newcomen Bridge

Canal Crossing point for Crumlin Road QBC & South Clondalkin QBC at Dolphins Barn

Items **Highlighted** Indicate an Improvement in last 12 Months

9. Mode Share

9.1 Mode Share at the Canal Cordon

The performance of the QBC's can be measured in terms of their impact on the mode share of people travelling across the cordon formed by the Royal and Grand Canals by the different means of travel in the AM-Peak. The NTA has assembled data for the Canal Cordon from QBC monitoring and a number of other sources as follows:

- Dublin City Council has been undertaking surveys at 33 locations around the Canal Cordon (see Appendix 4 for a map of these locations) on a single day in November each year since 1980. This survey counts pedestrians, cyclists, cars, taxis, buses, goods vehicles and motorcycles crossing the cordon points in the inbound direction in the three hour period 07:00 to 10:00. The survey, however does not count the numbers of people travelling across the cordon in buses, trains or LUAS trams, and hence cannot give a full picture of mode share in terms of the movement of people into the city centre.
- To complement the Dublin City Council Canal Cordon annual surveys, Dublin Bus has undertaken their own surveys annually on a single day in November (not necessarily on the same day as the Dublin City Council cordon counts). This survey counts the number of passenger on all buses (including privately operated bus services) crossing inbound over the canal cordon points. This survey is undertaken at the 22 cordon points that are on bus routes into the city.
- Iarnrod Eireann have undertaken a Rail census on a single day in November at all rail stations on the DART and suburban rail network within the Greater Dublin Area (GDA). The census has been undertaken in most years (there are a number of gaps) since 1997. This census counts passenger boardings and alightings on all trains passing through all GDA rail stations on the specific day and enables a calculation of the numbers of rail passengers crossing the three Canal Cordon points (in the inbound direction) between 07:00 and 10:00 on the census day.
- The Railway Procurement Agency has annually undertaken a full census of boardings and alightings at all LUAS tram stops (Red and Green lines and extensions). This census is undertaken in a single day in November, and has been undertaken every year since both LUAS lines became operational in 2004. This data enables calculation of the numbers of LUAS passengers crossing the two Canal Cordon points inbound between 07:00 and 10:00 on the census day.

By combining these four data sources, the NTA has been able to compile a comprehensive picture of the modes of travel used by people travelling across the Canal Cordon into the city on a typical morning peak period. There are a number of gaps in some of the sources of data in some years, and some changes in survey methodology have been introduced in recent years in the case of the Dublin City Council cordon counts. In addition, the introduction of LUAS had a significant impact on the data trends. For these reasons, the analysis of trends in this section is restricted to the years 2006 to 2011. For these five years, the Authority has access to a consistent and continuous set of data that enables a direct comparison of mode share trends.

The impact of the QBC's on mode share at the Canal Cordon is shown in the data presented in the four tables below:

Table 8	shows the number of people entering the city at those crossing points that are served by Quality Bus Corridors.
Table 8a	shows the same results for the other crossing points that are served by bus.
Table 8b	shows the same results for the remaining crossing points that have no bus services and also provides the summary position for the whole cordon.
Table 8c	is a summary of the mode share covering the years 2006 to 2011.

Table 8: QBC Cordon Points

Mode Share - November 2011																	
Corridor	All Bus Pax	Mode Share	Rail	Mode Share	Car Persons	Mode Share	Taxi Pax	Mode Share	CV	Mode Share	M / C	Mode Share	Cycle	Mode Share	Walk	Mode Share	Totals
Stillorgan	4,303	43.7%			3,975	40.4%	116	1.2%	32	0.3%	112	1.1%	397	4.0%	913	9.3%	9,848
Lucan	6,503	47.7%			6,088	44.6%	246	1.8%	151	1.1%	177	1.3%	189	1.4%	283	2.1%	13,637
Blanchardstown	6,872	47.9%			5,990	41.8%	177	1.2%	108	0.8%	140	1.0%	315	2.2%	741	5.2%	14,343
Malahide	7,762	27.6%	14,990	53.3%	3,090	11.0%	547	1.9%	27	0.1%	173	0.6%	805	2.9%	710	2.5%	28,104
Tallaght	4,389	54.1%			1,709	21.1%	55	0.7%	21	0.3%	54	0.7%	623	7.7%	1,256	15.5%	8,107
Swords/Finglas	6,546	45.7%			5,514	38.5%	235	1.6%	70	0.5%	165	1.2%	553	3.9%	1,247	8.7%	14,330
Rathfarnham	2,304	29.8%			3,922	50.7%	119	1.5%	70	0.9%	125	1.6%	598	7.7%	601	7.8%	7,739
North Clondalkin	1,721	37.3%			2,663	57.7%	23	0.5%	50	1.1%	28	0.6%	40	0.9%	88	1.9%	4,613
Crumlin Road	2,061	39.1%			2,693	51.0%	174	3.3%	77	1.5%	33	0.6%	85	1.6%	153	2.9%	5,276
Rock Road	1,120	23.9%			2,600	55.5%	135	2.9%	22	0.5%	62	1.3%	266	5.7%	478	10.2%	4,683
Phibsborough Rd	3,091	40.6%			3,220	42.3%	165	2.2%	75	1.0%	55	0.7%	292	3.8%	709	9.3%	7,607
QBC Totals	46,672	39.5%	14,990	12.7%	41,464	35.1%	1,992	1.7%	703	0.6%	1,124	1.0%	4,163	3.5%	7,179	6.1%	118,287

Table 8a: Non QBC Cordon Points

Mode Share - November 2011																			
Cordon	All Bus Pax	Mode Share	Rail	Mode Share	Luas Pax	Mode Share	Car Persons	Mode Share	Taxi Pax	Mode Share	CV	Mode Share	M / C	Mode Share	Cycle	Mode Share	Walk	Mode Share	Totals
Charlemount	131	1.4%			6,672	68.8%	1,519	15.7%	66	0.7%	17	0.2%	30	0.3%	382	3.9%	875	9.0%	9,692
Sth Circular Rd	486	7.8%	2,980	47.8%	3,277	52.6%	2,097	33.7%	46	0.7%	23	0.4%	24	0.4%	76	1.2%	202	3.2%	6,231
Charleville Rd	515	47.3%					374	34.4%	11	1.0%	13	1.2%	7	0.6%	48	4.4%	120	11.0%	1,088
Baggot Street	336	7.9%					2,452	57.7%	134	3.2%	10	0.2%	56	1.3%	281	6.6%	984	23.1%	4,253
Ballybough Rd	711	12.9%					4,088	74.1%	41	0.7%	49	0.9%	30	0.5%	180	3.3%	420	7.6%	5,519
Barrow Street	463	10.5%					2,206	50.1%	125	2.8%	52	1.2%	37	0.8%	254	5.8%	1,269	28.8%	4,406
Clogher Road	604	12.8%					3,869	82.2%	12	0.3%	19	0.4%	26	0.6%	103	2.2%	75	1.6%	4,708
Non QBC Totals	3,246	9.0%	2,980	8.3%	9,949	27.7%	16,605	46.3%	435	1.2%	183	0.5%	210	0.6%	1,324	3.7%	3,945	11.0%	35,897
QBC Totals	46,672	39.5%	14,990	12.7%			41,464	35.1%	1,992	1.7%	703	0.6%	1,124	1.0%	4,163	3.5%	7,179	6.1%	118,287
All Bus Crossings	49,918	32.4%	17,970	11.7%	9,949	6.5%	58,069	37.7%	2,427	1.6%	886	0.6%	1,334	0.9%	5,487	3.6%	11,124	7.2%	154,184

Table 8b: Non Bus Cordon Points & Cordon Totals

Mode Share - November 2011																			
Cordon	All Bus Pax	Mode Share	Rail	Mode Share	Luas Pax	Mode Share	Car Persons	Mode Share	Taxi Pax	Mode Share	CV	Mode Share	M/C	Mode Share	Cycle	Mode Share	Walk	Mode Share	Totals
Grand Canal St	-		4,386	57.3%			1,834	24.0%	144	1.9%	20	0.3%	27	0.4%	184	2.4%	1,059	13.8%	7,654
Huband Bridge	-						402	44.1%	30	3.3%	3	0.3%	13	1.4%	150	16.5%	313	34.4%	911
Herberton Bridge	276	9.5%					2,508	86.7%	45	1.6%	21	0.7%	20	0.7%	134	4.6%	164	5.7%	2,892
Kilmainham Lane	-						1,008	84.3%	42	3.5%	3	0.3%	17	1.4%	61	5.1%	65	5.4%	1,196
Phoenix Park Main	-						328	53.9%	2	0.3%	2	0.3%	16	2.6%	155	25.5%	106	17.4%	609
Phoenix Park Back	-						850	83.6%	1	0.1%	11	1.1%	3	0.3%	41	4.0%	111	10.9%	1,017
Annamoe Road	-						584	71.2%	13	1.6%	11	1.3%	6	0.7%	35	4.3%	171	20.9%	820
Royal Canal Bank	-						24	8.6%	1	0.4%	2	0.7%	1	0.4%	66	23.6%	186	66.4%	280
Russell Street	-						1,224	75.3%	16	1.0%	25	1.5%	15	0.9%	101	6.2%	245	15.1%	1,626
Ossory Road	-						267	49.8%	12	2.2%	8	1.5%	4	0.7%	38	7.1%	207	38.6%	536
Sheriff St Lower	-						1,078	66.7%	19	1.2%	47	2.9%	14	0.9%	32	2.0%	427	26.4%	1,617
North Wall Quay	-						945	53.5%	47	2.7%	118	6.7%	16	0.9%	198	11.2%	442	25.0%	1,766
Non Bus Totals	276	1.3%	4,386	21.0%			11,052	52.8%	372	1.8%	271	1.3%	152	0.7%	1,195	5.7%	3,496	16.7%	20,924
Non QBC Totals	3,246	9.0%	2,980	8.3%	9,949	27.7%	16,605	46.3%	435	1.2%	183	0.5%	210	0.6%	1,324	3.7%	3,945	11.0%	35,897
QBC Totals	46,672	39.5%	14,990	12.7%			41,464	35.1%	1,992	1.7%	703	0.6%	1,124	1.0%	4,163	3.5%	7,179	6.1%	118,287
All Bus Crossings	49,918	32.4%	17,970	11.7%	9,949	6.5%	58,069	37.7%	2,427	1.6%	886	0.6%	1,334	0.9%	5,487	3.6%	11,124	7.2%	154,184
All Crossings	50,194	28.7%	22,356	12.8%	9,949	5.7%	69,121	39.5%	2,799	1.6%	1,157	0.7%	1,486	0.8%	6,682	3.8%	14,620	8.3%	175,108

Table 8c: Mode Share Summary 1997 to 2011

Mode Share Summary - Persons Crossing Canal Cordon 0700-1000																					
Year	Total	Bus	Bus %	Rail	Rail %	Luas	Luas %	All PT	PT %	Car	Car%	Taxi	Taxi %	Walk	Walk%	Cycle	Cycle%	CV	CV%	MC	MC %
2006	207,379	59,874	30%	33,534	16%	9,029	5%	102,437	51.1%	76,850	34%	1,453	1%	17,114	9%	4,839	3%	2,291	1%	2,395	1%
2007	203,959	57,201	28%	35,692	17%	9,171	4%	102,064	50.0%	71,597	35%	2,154	1%	18,594	9%	5,676	3%	1,445	1%	2,429	1%
2008	199,767	60,438	30%	32,324	16%	9,242	5%	102,004	51.1%	67,732	34%	1,930	1%	18,360	9%	6,143	3%	1,223	1%	2,375	1%
2009	188,540	56,168	30%	25,723	14%	8,776	5%	90,667	48.1%	71,043	38%	2,739	1%	14,618	8%	6,326	3%	1,087	1%	2,060	1%
2010	181,042	50,420	28%	23,580	13%	9,111	5%	83,111	45.9%	71,978	40%	2,260	1%	15,092	8%	5,952	3%	993	1%	1,656	1%
2011	183,569	54,251	30%	22,932	12%	9,949	5%	87,132	47.5%	69,681	38%	2,674	1%	14,551	8%	6,870	4%	1,176	1%	1,485	1%

Notes

Taxi figures are passengers carried - taxi occupancy counted by DCC.

CV - Commercial vehicles.

MC – Motorcycles.

Luas services were introduced in 2004.

All data collected in November of each year

Appendix 1

Specification for Quality Bus Corridors

Goal: to provide a clearly defined, high performance bus transportation system segregated from other road traffic.

A) Infrastructure Objectives

1. Start on the regional or higher classification road.
2. Prioritise the access from lower classification roads for the bus services entering the Quality Bus Corridor.
3. Deliver bus journey speeds on the corridor of at least 20kph average over the whole corridor with a minimum increase of 25% in bus journey speeds on all QBCs.
4. Operate on segregated lanes over the complete length of the corridor, except where the road width is too narrow to permit the provision of a segregated lane.
5. Monitor the performance of all QBC sections with particular emphasis on non-segregated sections.
6. Operate on non-segregated lengths to the highest possible performance levels by the use of sophisticated traffic management techniques.
7. Operate on a 12-hour basis with a specified period for loading if required.
 - 7(a) Have clearly defined bus lanes.
8. Have bus stops positioned to minimise total walk times for existing and potential passengers taking into account such issues security, traffic conditions, mobility impaired access.
9. Have high-quality waiting areas at all high usage bus stops, including shelters, level platforms that minimise the vertical and horizontal gap for boarding passengers, seating and additional facilities such as telephones, ticket vending machines and cycle parking.
10. Have real-time Passenger Information at high usage bus stops.
11. Have a network of pedestrian walkways to bus stops which are landscaped, well-lit, direct, with safe road crossings.

B) Service Objectives

The bus service on a Quality Bus Corridor shall

Provide the following profile of passenger waiting at all points on the corridor before boarding a bus

Average Wait Time (minutes)		Average Excess Wait Time (minutes)	
Peak	Off-Peak	Peak	Off-Peak
3	4	2	2

C) Fleet Objectives

1. Provide bus stop annunciation over a public address system, with explanations of all deviations from regular service
2. Have an average vehicle age not greater than five years, and a maximum age not greater than 8 years
3. Be operated only by uniformed staff

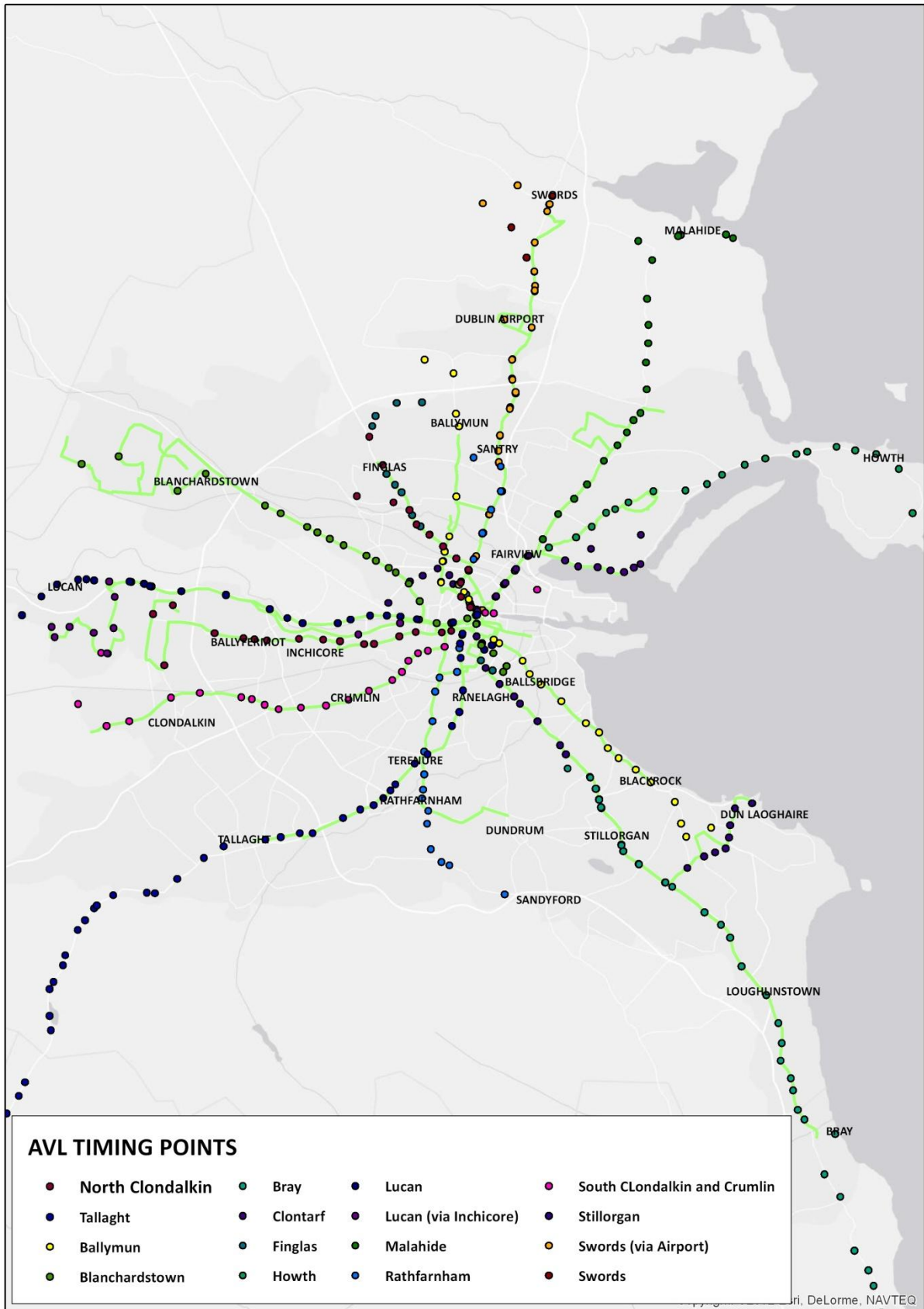
4. Be operated by low-floored vehicles
5. Maintain a distinct appearance compared with other bus services
6. Be operated by air conditioned buses

D) Network Performance

The impact of the QBC on the route, and on the adjacent network must be assessed.

- Assess and quantify the effects of the QBC on all modes.
- Use appropriate modelling and analytical methods to assess the before and after impacts of the QBC on all modes.
- Further measure the effectiveness of the QBC by reference to the following performance indicators:
 - Passenger journey totals.
 - Bus occupancy levels.
 - Cost effectiveness.
 - Service reliability.
 - Passenger satisfaction levels.
 - Bus lane infringement levels.
 - Accident levels on QBC.
 - Effects on property values & businesses.
 - Effectiveness of accessibility for mobility impaired persons.

Appendix 2



Appendix 3

No	Stop from	Stop to	Scheduled	Std.dev.	Sample size	Avg
1	Ongar Road Junction Hansfield Road (ONGAR02)	Hartstow n Road St. Ciaran's Church (HTWNHT01)	00:15:00	00:03:55	1,180	00:15:17
2	Hartstow n Road St. Ciaran's Church (HTWNHT01)	Clonsilla Road Junction Coolmine Road (CSLACW01)	00:14:50	00:03:15	527	00:15:35
3	Clonsilla Road Junction Coolmine Road (CSLACW01)	Blanchardstow n Main Junction Clonsilla Road (BSWNGD01)	00:03:30	00:01:39	536	00:04:22
4	Blanchardstow n Main Junction Clonsilla Road (BSWNGD01)	Navan Road Junction Morgan's Place (BSWNVL03)	00:06:30	00:01:14	536	00:06:38
5	Navan Road Junction Morgan's Place (BSWNVL03)	Navan Road Phoenix Park Railw ay Station (NAV NRS01)	00:01:00	00:00:12	536	00:00:48
6	Navan Road Phoenix Park Railw ay Station (NAV NRS01)	Navan Road Opposite Old Race Course (PNEXRC01)	00:01:00	00:00:21	1,725	00:00:47
7	Navan Road Opposite Old Race Course (PNEXRC01)	Navan Road Junction Kempton Avenue (ASTRBT01)	00:01:30	00:00:26	1,735	00:01:18
8	Navan Road Junction Kempton Avenue (ASTRBT01)	Navan Road Junction Ashtow n Grove (NAV NVH01)	00:01:00	00:00:24	1,736	00:01:20
9	Navan Road Junction Ashtow n Grove (NAV NVH01)	Navan Road Junction Kinvara Avenue (NAV NBR03)	00:01:00	00:00:27	1,737	00:01:19
10	Navan Road Junction Kinvara Avenue (NAV NBR03)	Navan Road Junction Nephin Road (NAV NGS01)	00:02:00	00:00:31	1,738	00:02:06
11	Navan Road Junction Nephin Road (NAV NGS01)	Navan Road Junction Skreen Road (NAV NEE01)	00:01:00	00:00:14	1,737	00:00:50
12	Navan Road Junction Skreen Road (NAV NEE01)	Old Cabra Road Cabra Cross (CABRAX01)	00:01:30	00:00:35	1,736	00:01:45
13	Old Cabra Road Cabra Cross (CABRAX01)	Old Cabra Road Railw ay Bridge (OCBRRD01)	00:01:00	00:00:12	1,726	00:00:45
14	Old Cabra Road Railw ay Bridge (OCBRRD01)	Prussia Street Junction North Circular Road (PRUSHC01)	00:02:00	00:00:46	1,721	00:02:10
15	Prussia Street Junction North Circular Road (PRUSHC01)	Manor Street Stanhope Street Convent (STBTER01)	00:02:00	00:00:47	1,722	00:02:17
16	Manor Street Stanhope Street Convent (STBTER01)	Arran Quay Junction Church Street (ARANQY01)	00:04:30	00:00:55	1,712	00:04:37
17	Arran Quay Junction Church Street (ARANQY01)	Bachelors Walk Low er Liffey Street (Stop EP) (BWALK-EP)	00:04:00	00:01:01	1,716	00:04:30
18	Bachelors Walk Low er Liffey Street (Stop EP) (BWALK-EP)	College Street Trinity College (Stop CY) (CLLWL-CY)	00:05:30	00:03:09	1,655	00:05:08
19	College Street Trinity College (Stop CY) (CLLWL-CY)	Kildare Street Archbishop Statue (Stop SC) (KDST-SC)	00:03:30	00:00:49	1,621	00:04:38
20	Kildare Street Archbishop Statue (Stop SC) (KDST-SC)	Low er Baggot Street Opposite Low er Pembroke Street (LWBGST02)	00:02:00	00:00:36	1,620	00:02:16
21	Low er Baggot Street Opposite Low er Pembroke Street (LWBGST02)	Upper Baggot Street Junction Mespil Road (BGOTBG02)	00:03:20	00:01:12	1,609	00:02:59
22	Upper Baggot Street Junction Mespil Road (BGOTBG02)	Burlington Road Junction Mespil Road (BNROAD01)	00:02:00	00:05:14	436	00:03:58

6:00:00..6:59:59	7:00:00..7:59:59	8:00:00..8:59:59	9:00:00..9:59:59	10:00:00..10:59:59	11:00:00..11:59:59	12:00:00..12:59:59	13:00:00..13:59:59
00:11:38	00:13:06	00:17:47	00:16:49	00:14:50	00:15:20	00:16:11	00:15:14
00:11:27	00:14:20	00:19:59	00:15:57	00:15:38	00:15:40	00:17:19	00:18:19
00:03:00	00:03:48	00:05:44	00:05:10	00:04:22	00:05:38	00:05:25	00:05:11
00:05:20	00:06:12	00:07:20	00:06:30	00:06:51	00:06:50	00:08:03	00:07:13
00:00:38	00:01:01	00:01:11	00:00:56	00:00:45	00:00:51	00:00:46	00:00:48
00:00:39	00:01:03	00:01:04	00:00:50	00:00:44	00:00:43	00:00:43	00:00:42
00:01:20	00:01:46	00:01:51	00:01:32	00:01:25	00:01:24	00:01:25	00:01:24
00:00:57	00:01:31	00:01:38	00:01:27	00:01:25	00:01:28	00:01:21	00:01:28
00:00:59	00:01:31	00:01:36	00:01:25	00:01:22	00:01:21	00:01:16	00:01:30
00:01:25	00:02:14	00:02:55	00:02:40	00:02:17	00:02:19	00:02:14	00:02:17
00:00:37	00:00:53	00:01:04	00:00:57	00:00:52	00:00:52	00:00:50	00:00:50
00:01:15	00:01:52	00:02:12	00:02:10	00:02:12	00:02:21	00:02:22	00:02:08
00:00:29	00:00:48	00:00:53	00:00:59	00:00:49	00:00:50	00:00:47	00:00:47
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00:01:18	00:02:07	00:03:10	00:02:28	00:01:59	00:02:06	00:02:06	00:02:02
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00:02:54	00:03:49	00:05:35	00:05:13	00:04:37	00:04:23	00:04:37	00:04:44
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00:01:27	00:01:58	00:02:52	00:02:27	00:02:17	00:02:17	00:02:24	00:02:20
00:01:56	00:02:49	00:04:01	00:03:30	00:03:07	00:03:02	00:03:05	00:03:16
00:01:28	00:05:46	00:03:47	00:03:21	00:05:15	00:03:28	00:03:38	00:03:29

14:00:00..14:59:59	15:00:00..15:59:59	16:00:00..16:59:59	17:00:00..17:59:59	18:00:00..18:59:59
00:15:54	00:15:12	00:16:38	00:17:39	00:15:53
00:18:09	00:18:16	00:19:43	00:23:10	00:17:09
00:06:06	00:05:12	00:04:36	00:05:01	00:03:29
00:07:58	00:07:47	00:07:22	00:07:33	00:06:42
00:00:45	00:00:43	00:00:45	00:00:48	00:00:42
00:00:44	00:00:43	00:00:43	00:00:50	00:00:46
00:01:22	00:01:19	00:01:31	00:01:41	00:01:30
00:01:25	00:01:23	00:01:27	00:01:22	00:01:20
00:01:18	00:01:20	00:01:28	00:01:26	00:01:21
00:02:24	00:02:20	00:02:18	00:02:15	00:02:12
00:00:51	00:00:50	00:00:49	00:00:55	00:00:48
00:02:15	00:02:28	00:02:14	00:02:35	00:02:29
00:00:49	00:00:48	00:00:49	00:00:47	00:00:43
00:01:57	00:01:56	00:01:53	00:01:58	00:01:50
00:02:01	00:01:59	00:02:04	00:02:05	00:01:56
00:04:44	00:04:28	00:04:17	00:04:33	00:04:28
00:04:29	00:04:20	00:05:05	00:05:40	00:05:00
00:05:05	00:07:33	00:05:50	00:06:38	00:06:29
00:05:18	00:05:31	00:05:39	00:06:21	00:06:02
00:02:20	00:02:12	00:02:26	00:02:42	00:02:29
00:03:13	00:02:50	00:03:30	00:05:29	00:04:04
00:04:50	00:05:05	00:06:11	00:03:11	00:03:12

Appendix 4

