



Oifig Tionscadail Gréasán na Mórlánaí Bus

Quality Bus Network Project Office

PROJECT:

Dublin City Cycle Scheme "dublinbikes"

DOCUMENT:

Stage 3 Road Safety Audit

DATE:

November 2009

Halcrow Barry

Oifig Tionscadail Gréasán na Mórlánaí Bus**Quality Bus Network Project Office**

Dublin City Cycle Scheme “dublinbikes”

Stage 3 Road Safety Audit

Contents amendment record

This document has been issued and amended as follows:

Issue	Revision	Description	Date	Signed
Y9105 - DOC002	Draft	Stage 3 RSA	02/11/09	M. Deegan M. Vereker D. Hurley
Y9105 - DOC002	Final	Stage 3 RSA	10/11/09	M. Deegan M. Vereker D. Hurley

TABLE OF CONTENTS

TABLE OF CONTENTS	II
1.0 INTRODUCTION	1
2.0 ITEMS RAISED AS PART OF THE STAGE 3 AUDIT	2
2.1 Site 1 (1B) Chatham Street	2
2.2 Site 2 (2A) Blessington Street	2
2.3 Site 3 (3) Bolton Street	2
2.4 Site 4 (4) Greek Street	3
2.5 Site 5 (5B) Charlemont Place	4
2.6 Site 6 (6A) Christchurch Place	4
2.7 Site 7 (7A) High Street	5
2.8 Site 8 (8) Custom House Quay	5
2.9 Site 9 (9B) Exchequer Street	6
2.10 Site 10 (10) Dame Street	6
2.11 Site 11 (11) Earlsfort Terrace	7
2.12 Site 12 (12) Eccles Street	7
2.13 Site 13 (13) Fitzwilliam Square West	8
2.14 Site 14 (14A) Fownes Street Upper	8
2.15 Site 15 (15B) Hardwicke Street	9
2.16 Site 16 (16A) Georges Quay	10
2.17 Site 17 (17) Golden Lane	11
2.18 Site 18 (18) Grantham Street	11
2.19 Site 19 (20) Herbert Place	12
2.20 Site 20 (21) James Street East	12
2.21 Site 21 (22A) Leinster Street South	12
2.22 Site 22 (23C) Townsend Street	13
2.23 Site 23 (23D) Custom House Quay	13
2.24 Site 24 (24C) Cathal Brugha Street	15
2.25 Site 25 (25A) Merrion Square East	15
2.26 Site 26 (26) Merrion Square West	15
2.27 Site 27 (27B) Molesworth Street	16
2.28 Site 28 (28A) Mountjoy Square West	16
2.29 Site 29 (29) Ormond Quay Upper	17
2.30 Site 30 (30A) Parnell Square North	18
2.31 Site 31 (31) Parnell Street	19
2.32 Site 32 (32) Pearse Street	20
2.33 Site 33 (33A) Princes Street / O'Connell Street	21
2.34 Site 34 (34) Portobello Harbour	21
2.35 Site 35 (35C) Smithfield	22
2.36 Site 36 (36) – St. Stephens Green East	23
2.37 Site 37 (37) St. Stephens Green South	24
2.38 Site 38 (38) Talbot Street	25
2.39 Site 39 (39B) Wilton Terrace	26
2.40 Site 40 (40B) Jarvis Street	26
3.0 AUDIT TEAM STATEMENT	27

1.0 INTRODUCTION

This report results from a Stage 3 Road Safety Audit of the Dublin City Cycle Scheme network, dublinbikes, at 40 different city centre locations. The Audit has been designed and executed to include an assessment of the design, operation and servicing of the cycle station sites.

The audit has been prepared in accordance with Part 2 NRA HD 19/09 Road Safety Audits dated January 2009.

The Audit Team has examined and reported on only the road safety implications of the scheme and has not examined or verified the compliance of the design to any other criteria.

The Audit Team was as follows:

MJ Deegan Team Leader	BEng (Hons) MSc CEng MICE Associate Director JB Barry & Partners Ltd Monastery Road, Clondalkin, Dublin 22.
M Vereker Team Member	BE, MSc, CEng, MIEI Senior Engineer JB Barry & Partners Ltd Monastery Road, Clondalkin, Dublin 22.
D Hurley Team Member	BA BAI MIEI Senior Engineer JB Barry & Partners Ltd Monastery Road, Clondalkin, Dublin 22.

The audit was carried out between Thursday 22nd October 2009 and Monday 2nd November 2009.

The team leader and team members carried out the day time and night time site inspections on Thursday 22nd October. Weather conditions during the site inspections were wet and overcast. Road surfaces were generally wet.

Accident data for road infrastructure at the 40 dublinbikes stations was not made available to the audit team.

In terms of referencing and identification, each site has been identified by its Public Site number, followed in brackets “()” by the previous QBNPO Site number.

2.0 ITEMS RAISED AS PART OF THE STAGE 3 AUDIT

2.1 Site 1 (1B) Chatham Street

2.1.1 Problem

Due to the proximity of the cycle stand termination with the adjacent junction, there remains insufficient space for a vehicle to address the Stop line without crossing into the opposing traffic lane. This could result in head on type vehicle conflicts.



Recommendation

Provide sufficient road space to allow a vehicle to address the Stop line without crossing into the opposing traffic lane.

2.2 Site 2 (2A) Blessington Street

No issues identified.



2.3 Site 3 (3) Bolton Street

2.3.1 Problem

The bollards located either side of the existing cycle path present obstructions which could be struck by cyclists and/or visually impaired pedestrians.



Recommendation

Mount/fit reflective material on the bollards to provide a high level of visual contrast with their immediate surroundings. This will serve to highlight the bollards presence to cyclists and visually impaired road users.

2.4 Site 4 (4) Greek Street

2.4.1 Problem

Service vehicles which park directly adjacent to the cycle station on Greek Street could block the one-way traffic stream, leading to queue blocking at the junction of Chancery Street / Greek Street.



Recommendation

Service vehicles should not be permitted to park adjacent to the cycle station on Greek Street.

2.4.2

Problem

The adjacent advisory cycle track markings are worn and difficult for motorists to see. This could result in conflicts between vehicular traffic and cyclists.

Recommendation

Replace/renew the adjacent advisory cycle track markings.

2.5

Site 5 (5B) Charlemont Place

2.5.1

Problem

An existing manhole lid is positioned on Charlemont Place directly at the point of exit from the cycle station. Manhole covers in the road can cause problems for two wheelers, as the grip between the cast iron cover and the bicycle's tyres can be less than that of the surrounding road surface. This could cause a bicycle's tyres to slip or skid, leading to the risk of injury for a cyclist.



Recommendation

Relocate the manhole cover away from the cycle station exit point. If this is not possible then replace it either with a recess manhole cover in-filled with wearing course or a manhole cover with a high friction surface.

2.6

Site 6 (6A) Christchurch Place

2.6.1

Problem

Service vehicles which park directly adjacent to the cycle station on Christchurch Place or at the junction of Christchurch Place/ Castle Street could serve to impede the safe passage of both vehicular traffic and vulnerable road users.



Recommendation

Ensure that service vehicles do not park directly adjacent to the cycle station on Christchurch Place or at the one-way junction of Christchurch Place/ Castle Street.

2.7

Site 7 (7A) High Street

No issues identified.



2.8

Site 8 (8) Custom House Quay

2.8.1

Problem

In close proximity to the cycle station, a signal controlled pedestrian crossing services footfall bound to/from Sean O' Casey Bridge as it crosses Custom House Quay.

The potential remains for service vehicles to block the pedestrian crossing or block forward visibility to the pedestrian crossing and its traffic signals. This could result in conflict between vulnerable road users and vehicular traffic.



Recommendation

Ensure that service vehicles are not permitted to stop in such a position which blocks the pedestrian crossing or limits forward visibility to the pedestrian crossing point and/or the crossings traffic signals.

2.9 Site 9 (9B) Exchequer Street

2.9.1 Problem

There is a risk that a service vehicle parked on Exchequer Street (which is one-way) adjacent to the cycle station will cause a traffic obstruction.



Recommendation

Ensure that service vehicles do not park in such a manner which impedes the safe progression of vulnerable road users and also vehicular traffic.

2.10 Site 10 (10) Dame Street

No issues identified.



2.11 Site 11 (11) Earlsfort Terrace

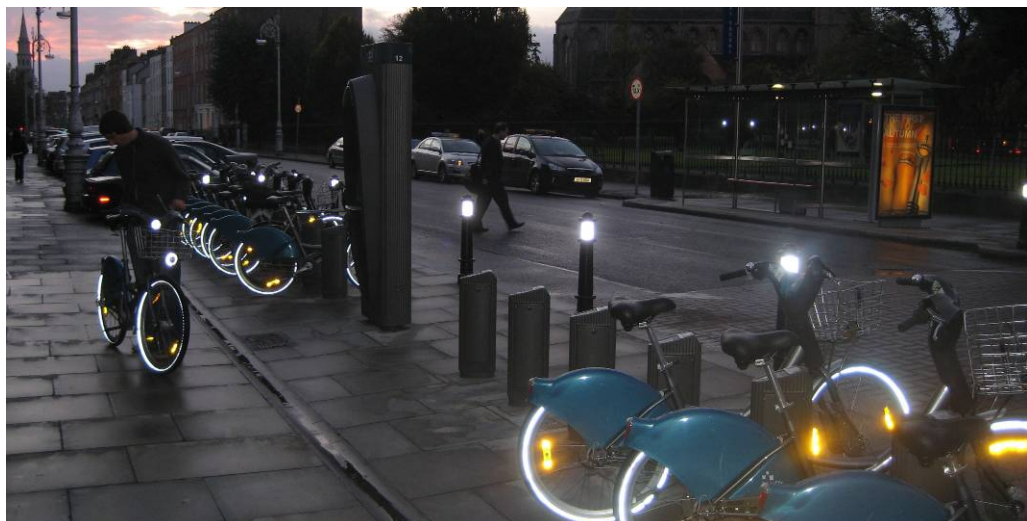
No issues identified.



2.12 Site 12 (12) Eccles Street

2.12.1 Problem

Service vehicle parking at the Berkeley Road junction may obstruct the raised platform, forcing traffic turning from Berkeley Road onto Eccles Street into the opposing lane resulting in potential vehicle conflicts and forcing mobility impaired road users to negotiate the raised kerbs either side of the platform resulting in potential trips/falls.



Recommendation

Ensure that service vehicles do not obstruct the raised platform at the Berkeley Road junction.

2.13 Site 13 (13) Fitzwilliam Square West

2.13.1 Problem

During the night time visit, the area surrounding the cycle station appeared to be adequately lit, however the Auditor noted that the bourse itself was overshadowed by an overhanging tree.



Recommendation

Cut back the branches of the tree to ensure the entire station is adequately lit at night.

2.13.2 Problem

The footpath at the cycle station location has a raised section which creates a step between the footpath and the road pavement. This could potentially create a trip hazard for partially sighted road users.

Recommendation

Highlight the presence of the potential trip hazard by applying a contrasting colour to the nosing of the step.

2.14 Site 14 (14A) Fownes Street Upper

2.14.1 Problem

Service vehicles parked on Fownes Street Upper in close proximity to the Dame Street junction will cause a traffic obstruction on Fownes Street Upper.



Recommendation

Ensure service vehicles do not park within 20 metres of the junction of Dame Street and Fownes Street Upper.

2.15 Site 15 (15B) Hardwicke Street

2.15.1 Problem

The existing 'arrow' road marking directs vehicles travelling north east along Hardwicke Street into the cycle station build out.



Recommendation

Remove or relocate the arrow marking.

2.15.2

Problem

The cycle station has encroached into the existing in-bound running traffic lane, yet the lane markings have not been amended. Inbound motorists are forced into the oncoming lane resulting in possible conflicts with other motorists or cyclists.



Recommendation

Reallocate the lane provision for opposing traffic streams to allow for the presence of the cycle station.

2.15.3

Problem

The nearest public lighting column was not operational at the time of the night visit, leaving the station in total darkness. This could lead to personal security and safety issues at night time.

Recommendation

Ensure the public lighting column is repaired.

2.16

Site 16 (16A) Georges Quay

2.16.1

Problem

Service vehicles parked on Georges Quay are at risk of rear end shunting by traffic moving southbound over the Talbot Memorial Bridge turning right onto Georges Quay.



Recommendation

Ensure that service vehicles are not permitted to stop within 20 metres of the pedestrian crossing point on Georges Quay which immediately precedes the cycle station.

2.17 Site 17 (17) Golden Lane

No issues identified.



2.18 Site 18 (18) Grantham Street

2.18.1 Problem

The provision of the on street cycle station has resulted in a narrowing of the road carriageway to accommodate two-way traffic movements at the T-junction of Grantham Street / Camden Street Lower as well as cyclist movements to and from the cycle station.

The new lane configuration means traffic travelling from Camden Street Lower onto Grantham Street is forced to cross the central white traffic lane line with risk of conflict with traffic approaching the T-junction on Grantham Street or cyclists at the cycle station.



Recommendation

Consideration should be given to removing a number of the on-street parking spaces along the northern side of Grantham Street opposite the cycle station in order to provide adequate space for two-way traffic movements and access to the cycle station.

2.18.2 Problem

A service vehicle parked on Grantham Street directly adjacent to the station will cause a traffic obstruction.

Recommendation

Service vehicles should not be permitted to park on Grantham Street directly adjacent to the cycle station or in a position which limits visibility and traffic movement at the adjacent junction.

2.19 Site 19 (20) Herbert Place

No issues identified.

2.20 Site 20 (21) James Street East

2.20.1 Problem

Dublinbikes users may cycle the wrong direction into one-way traffic leaving the station.



Recommendation

Provide warning signage and a directional arrow marking on road to advise cyclists of the one-way regulation.

2.21 Site 21 (22A) Leinster Street South

2.21.1 Problem

The kerb build-out and 500mm buffer zone adjacent to the cycle station has resulted in a reduction of the width of the adjacent road carriageway. No carriageway lane markings are provided to delineate the two eastbound traffic lanes. There is a risk that eastbound vehicles, while vying for road space, may inadvertently strike a cyclist withdrawing a bicycle from the station.



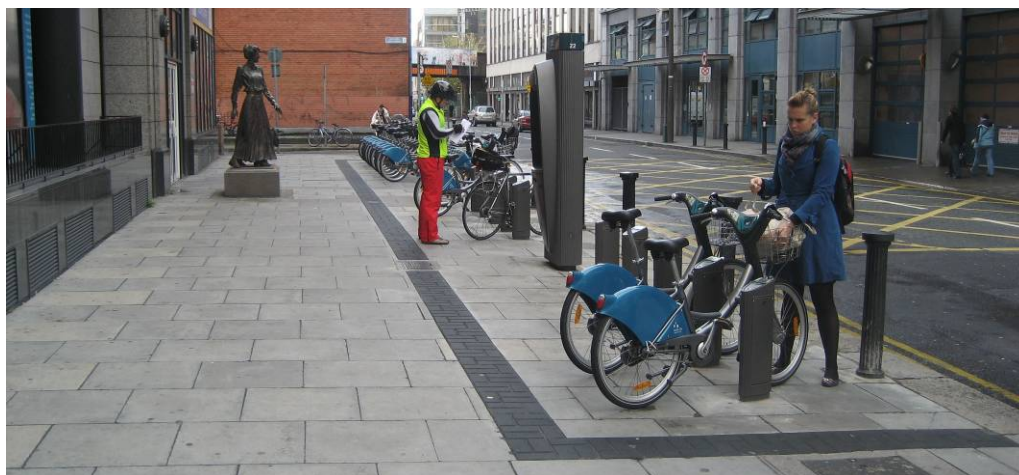
Recommendation

Lane marking should be provided on the carriageway adjacent to the cycle station to promote good lane discipline.

2.22 Site 22 (23C) Townsend Street

2.22.1 Problem

Service vehicles could obstruct vehicular access and egress from the Fire Station which is situated immediately opposite the proposed cycle station.



Recommendation

Ensure that service vehicles do not obstruct vehicular access and egress from the Fire Station. In this regard, service vehicles should not be permitted to stop within the yellow box junction in front of the Fire Station doors.

2.23 Site 23 (23D) Custom House Quay

2.23.1 Problem

The traffic bollards are difficult to identify, particularly for partially sighted road users and in low light and night time conditions.

**Recommendation**

Mount/fit reflective material on the bollards to provide a high level of visual contrast with their immediate surroundings. This will serve to highlight the bollards presence to cyclists and visually impaired road users.

2.23.2**Problem**

The night time site visit noted that the cycle station was dimly lit due to the proximity of the station to the overhead DART rail line and the position of existing public lighting on the opposite side of Custom House Quay. Poor public lighting in this location could lead to personal security and safety issues at night time as well as exacerbating the problem identified previously.

Recommendation

Carry out a public lighting assessment at the station and provide additional public lighting if deemed necessary.

2.23.3**Problem**

There is a risk that a service vehicle parked on Custom House Quay between Butt Bridge and the cycle station will impede driver visibility to the station placing cyclists at risk of conflict with vehicular traffic.

Recommendation

Service vehicles should not park adjacent to the kerb line on Custom House Quay between Butt Bridge and the cycle station. Service vehicles should park east of the cycle station to provide clear visibility to cyclists at the station.

2.24 Site 24 (24C) Cathal Brugha Street

No issues identified.



2.25 Site 25 (25A) Merrion Square East

No issues identified.



2.26 Site 26 (26) Merrion Square West

2.26.1 Problem

Service vehicles parked adjacent to the cycle station limit inter-visibility between southbound traffic and pedestrians waiting to cross Merrion Square West at the refuge island provided. This could result in conflict between vehicles and vulnerable road users.



Recommendation

Ensure that service vehicles do not park in a position which obstructs visibility to pedestrian crossing points.

2.27

Site 27 (27B) Molesworth Street

No issues identified.



2.28

Site 28 (28A) Mountjoy Square West

2.28.1

Problem

The 145 Bus service was observed to turn right from Gardiner Place onto Mountjoy Square West and was unable to stop within the new bus stop markings due to their proximity to the junction.



Recommendation

Adjust the position of the bus stop to permit bus access as intended.

2.28.2

Comment

The Bus Stop pole and sign was not erected at the time of the site visit.

2.29

Site 29 (29) Ormond Quay Upper

2.29.1

Problem

The traffic island separating the cycle station from the bus lane and general traffic on the Quays has been constructed in line with the adjacent kerb line with the result that the island is skewed at an angle in relation to the adjacent traffic stream. This leaves the leading edge of the pedestrian crossing build-out exposed to vehicle strike and could also lead to a conflict between emerging cyclists or pedestrians and vehicles.



Recommendation

The traffic island should be in-filled/extended (see yellow shading) in line with the edge of the adjacent bus lane.

2.29.2

Problem

After cyclists leave the cycle station and rejoin the carriageway, there is little room before the traffic signals for cyclists to cross over to the offside lane to negotiate the right turn across Grattan Bridge.



Recommendation

Provide an advance stop line which will allow cyclists to enter the carriageway during the red stage of the signal phasing when traffic is stopped.

2.30

Site 30 (30A) Parnell Square North

2.30.1

Problem

Parnell Square North and Parnell Square West operate as a one-way system. Cyclists, particularly those who are new to the locale and are not familiar with the one-way system may inadvertently cycle against the flow of traffic resulting in conflict with vehicles.



Recommendation

Additional signage or road markings aimed at informing cyclists should be provided to direct cyclists in relation to the one-way system at this location.

2.31 Site 31 (31) Parnell Street

2.31.1 Problem

The site visit noted a number of uneven, loose, and missing block pavers within the cycle station footpath forming trip hazards for cycle station users.

**Recommendation**

Remove all potential trip hazards.

2.32 Site 32 (32) Pearse Street**2.32.1 Problem**

It was noted during the night time visit that the site was well lit, however this was largely due to light spill from the adjacent Trinity College buildings. It was also noted during the site visit that existing public lighting lamp heads were either missing or not yet installed in the vicinity of the cycle station. For continuity reasons, the illumination of cycle stations should not be dependent on private sources. Poor lighting could lead to personal security and safety issues at night time.



Recommendation

Ensure public lighting is provided to illuminate the proposed cycle station at night time.

2.33

Site 33 (33A) Princes Street / O'Connell Street

No issues identified.



2.34

Site 34 (34) Portobello Harbour

2.34.1

Problem

There is an absence of contrasting delineation around the cycle station within the public plaza to distinguish the station from the plaza area. This could cause difficulty for partially sighted pedestrians, particularly when the station is depleted of bicycles.



Recommendation

The cycle station should be clearly delineated from the public plaza by employing the use of colour contrasting materials.

2.34.2

Problem

There is a contradiction in the road markings placed on Richmond Row adjacent to the cycle station. There are 'NO ENTRY' markings prescribed on the road carriageway in the southbound direction towards the canal indicating that Richmond Row is one way in the northbound direction whilst there are 'YIELD' markings placed in the northbound traffic lane outside Portobello College directing traffic to yield to traffic travelling from the north.

This contradiction will cause confusion for cyclists and motorists alike with resulting risk of conflict.



Richmond Row looking north



Richmond Row looking south

Recommendation

Road markings and the intention with respect to traffic movements on Richmond Row in the vicinity of the cycle station should be amended and clarified on site.

2.35

Site 35 (35C) Smithfield

2.35.1

Problem

The cycle station, in particular the station bourne, was observed to be dimly lit at night time. Poor public lighting in this location could lead to personal security and safety issues at night time.



Recommendation

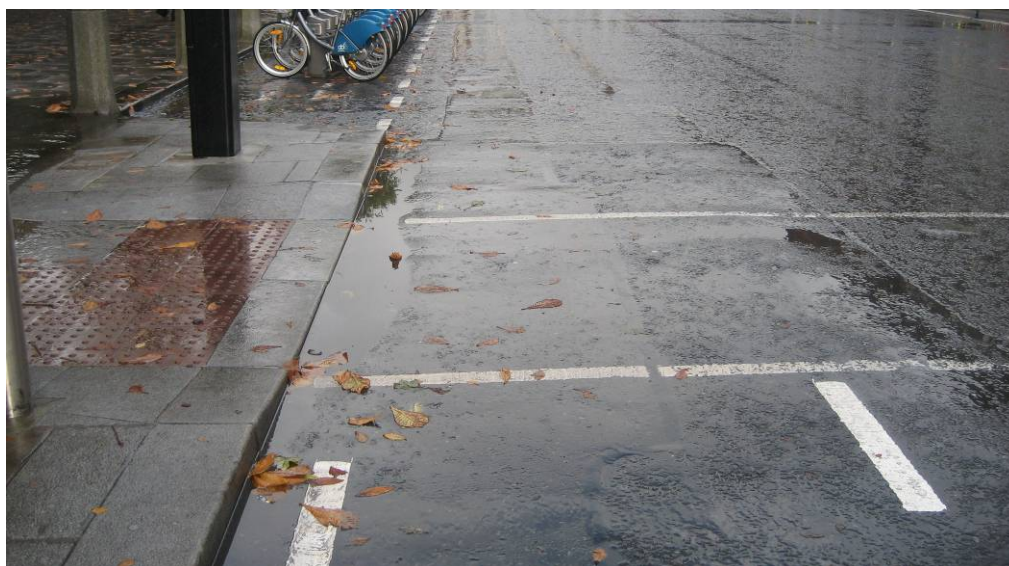
Carry out a public lighting assessment at the station and consider the provision of additional public lighting at the station if deemed necessary.

2.36 Site 36 (36) – St. Stephens Green East

2.36.1 Problem

The existing cycle lane markings, which serve to provide a buffer between the proposed cycle station and the adjacent vehicular traffic stream, end abruptly upstream of the cycle station. Drivers may not be alerted to the facilities location.





Recommendation

Replace the cycle lane markings adjacent to the cycle station or provide a buffer zone using line markings.

2.36.2

Problem

Service vehicles parked upstream from the cycle station could block visibility to the adjacent pedestrian crossing.

Recommendation

Ensure that service vehicles are not permitted to stop in such a position which blocks the pedestrian crossing or limits forward visibility to the pedestrian crossing point and/or the crossings traffic signals.

2.36.3

Problem

During and immediately after rainfall, water was observed to pond in the vicinity of the pedestrian crossing point (see image associated with 2.36.1). This could cause inconvenience and pose a risk to vulnerable road users, particularly in the event that the standing water freezes.

Recommendation

Adjust the channel levels to mitigate against the risk of standing water.

2.37

Site 37 (37) St. Stephens Green South

2.37.1

Problem

Recent road works have compromised the adjacent cycle lane markings. The reinstatement works are poor, being left proud of the surrounding pavement surface which could result in loss of control type accidents for cyclists.



Recommendation

Improve the surface finish of the reinstatement works and replace cycle lane markings and logo at this location.

2.38

Site 38 (38) Talbot Street

2.38.1

Problem

Standing water was observed in proximity to the new buffer island which could cause inconvenience to station users and pose a slip hazard in freezing temperatures.





Recommendation

Carry out remedial drainage works to eliminate the occurrence of standing water.

2.39 Site 39 (39B) Wilton Terrace

No issues identified.

2.40 Site 40 (40B) Jervis Street

No issues identified.

3.0 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and documents listed in the appendices to this report.

The examination and subsequent report was made with the sole purpose of identifying any features of the scheme that could be removed or modified in order to improve the safety of the proposals.


The problems identified have been noted in this report together with associated safety improvement suggestions, which we recommend should be studied for implementation.

No one on the Audit Team has been involved in any way with the initial scheme design.

Audit Team Leader

Name: MJ Deegan BEng(Hons) MSc CEng MICE

Position: Associate Director
Organisation: JB Barry & Partners Ltd
Address: Dolcain House,
Monastery Road,
Clondalkin,
Dublin 22.

Signed: 
Dated: 2nd November 2009



Audit Team Member

Name: M Vereker BE MSc CEng MIEI

Position: Senior Engineer
Organisation: J B Barry & Partners Ltd
Address: Dolcain House,
Monastery Road,
Clondalkin,
Dublin 22.

Signed: 
Dated: 2nd November 2009



Audit Team Member

Name: D Hurley BA BAI MIEI

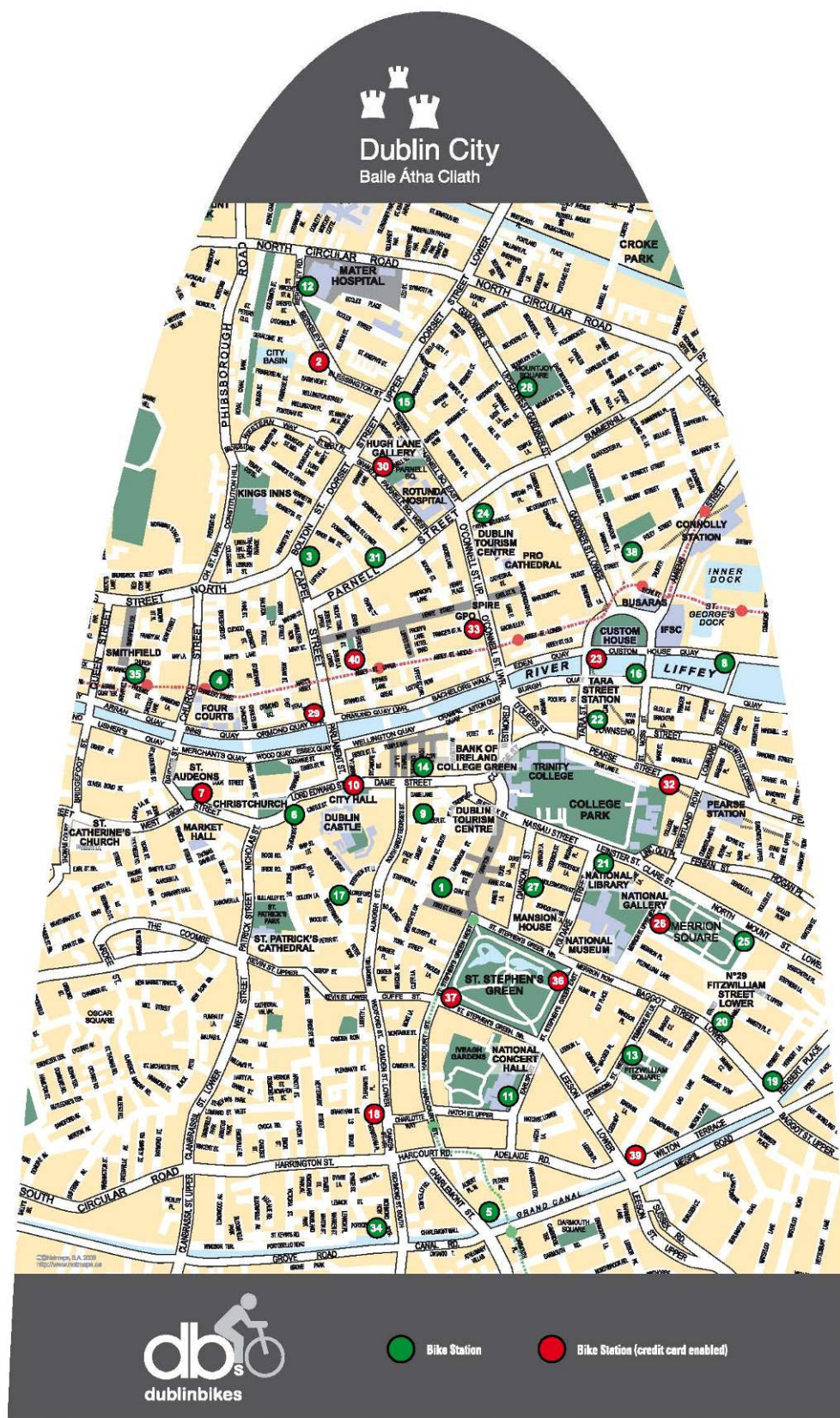
Position: Senior Engineer
Organisation: J B Barry & Partners Ltd
Address: Dolcain House,
Monastery Road,
Clondalkin,
Dublin 22.

Signed: 

Dated: 2nd November 2009
The logo for JB Barry & Partners, featuring a stylized blue 'B' with a green dot, followed by the text 'BARRY & PARTNERS' in a serif font.

APPENDIX A

Site Location Plan



APPENDIX B

List of Drawings and Documents Supplied with Audit Brief:

Drawings

Drawing No.	Rev	Title	Scale
		Dublinbikes Map (web PDF)	N/A
T-QBN-189-SDD-900- 001 to 003	A	DCCS Standard Detail Drawings	1:100
Jpeg Image		Custom House Quay Photomontage	N/A

Documents

- T-QBN -189 List of Sites

APPENDIX C

Road Safety Audit Feedback Form

ROAD SAFETY AUDIT FEEDBACK FORM

Scheme: Dublin City Cycle Scheme “dublinbikes”

Audit Stage: Stage 3

Date Audit Completed: 2nd November 2009

Paragraph No. in Safety Audit Report	Site Name	Public Site No.	QBNPO Site No.	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Alternative measures (describe)	Alternative Measures accepted by Auditors (yes/no)	Signed off by DWG Members
2.1.1	Chatham Street	1	1B					
2.3.1	Bolton Street	3	3					
2.4.1	Greek Street	4	4					
2.4.2	Greek Street	4	4					
2.5.1	Charlemont Place	5	5B					
2.6.1	Christchurch Place	6	6A					
2.8.1	Custom House Quay	8	8					
2.9.1	Exchequer Street	9	9B					
2.12.1	Eccles Street	12	12					
2.13.1	Fitzwilliam Sq West	13	13					
2.13.2	Fitzwilliam Sq West	13	13					
2.14.1	Fownes St Upper	14	14A					
2.15.1	Hardwicke Street	15	15B					
2.15.2	Hardwicke Street	15	15B					
2.15.3	Hardwicke Street	15	15B					
2.16.1	Georges Quay	16	16A					
2.18.1	Grantham Street	18	18					
2.18.2	Grantham Street	18	18					
2.20.1	James St East	20	21					
2.21.1	Leinster St South	21	22A					
2.22.1	Townsend Street	22	23C					
2.23.1	Custom House Quay	23	23D					

[illegible]

Signed:	DCC Planning Department _____	Jason Frehill, Executive Planner
	DCC Traffic Division _____	Niall Gormley, Senior Executive Engineer
	DCC QBN Project Office _____ (obo Design Working Group)	Padraig McNulty, Senior QBN Engineer
	JCDecaux _____	Nick Robert, Technical Director

Date...

Please complete and return to safety auditor.

Safety Audit

Signed off:	Audit Team Leader
--------------------	--------------------------

Date: