consulting engineers

NRB

Traffic & Transport Assessment

of

Proposed Petrol Filling Station at Liffey Valley

on behalf of

Certa

DRAFT ISSUE

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APPENDICES

1.0 EXECUTIVE SUMMARY

The main body of this Transportation Assessment Report was previously prepared for a Petrol Filling Station (PFS) on the subject site in Liffey Valley, an application which was subsequently granted planning permission in tandem with the now-constructed Tesco Store. Clearly, PFS developments generate no, or negligible volumes of new or additional traffic. The previous application on the site was granted planning permission and the subject application represents a very similar, almost identical, traffic generator profile. The remainder of this report is as previously submitted.

This Traffic and Transport Assessment Report (TTA) assesses the impact of the development of a 4-pump Petrol Filling Station (PFS) on a site located at Liffey Valley, Clondalkin, Dublin. The site is to be developed by Certa as an unmanned PFS similar to others in operation.

The site is located on lands immediately to the north of the existing B&Q Store in Liffey Valley, on lands specifically set aside for this purpose.

The site was identified for this proposed use in early discussions with South Dublin County Council regarding the adjacent Tesco development, and indeed an access to the site off the proposed new roundabout was incorporated into the Tesco Store Layout plans.

This Report has been prepared to address the traffic/road impact of the development. It should be noted that, notwithstanding the detailed additional assessment contained within this report, the impact of traffic associated with a PFS was already considered in the assessment of the impact of the traffic associated with the Tesco store. The Tesco store application was assessed with Traffic Quantification based on the comparison-TRICS Database. 80% of the stores originally used for quantifying the traffic associated with the original Tesco Store application contained a PFS within the count information.

The proposed development will be accessed for entering vehicles via the consented new roundabout junction to the northeast of B&Q. A left-out only exit will be facilitated onto the proposed link roads between the two roundabouts. In this regard, there is no significant alteration proposed to the already consented roads to facilitate the development of the site as a PFS.

The layout and design has been checked using the TRACK software package to ensure that it is completely accessible by articulated refuelling trucks.

We have included the effect of the proposed Tesco Store traffic in addition to the traffic associated with the consented LV Extension application (SDCC Ref SD 12A/0226).

We have prepared a detailed, robust, and comprehensive assessment of the impact of the worst-case development traffic on the local roads and junctions. For the critical N4 Slip roads and the critical St Loman's Road junction, the impact of the PFS traffic is far below the IHT and TII-recommended threshold levels requiring further assessment. In this regard the proposed PFS is considered to have a negligible impact on these junctions.

We have reviewed the local provision of PFSes in the Quarryvale/Fonthill, Ballyowen and Irishtown areas and we are not aware of any similar rest and refuelling facility in this local area for local motorists, without a requirement for a very significant journey diversion in order to find a suitable facility. In this regard we believe that the petrol filling station is well placed to be of significant local benefit to both motorists and local residents. A map showing the approximate locations of adjacent filling stations is included as ***Appendix B***.

2.0 INTRODUCTION

2.1 This TTA Report has been prepared by NRB Consulting Engineers Ltd on behalf of Certa. It addresses traffic and access considerations of a proposed 4 pump (8-stand) Petrol Filling Station (PFS) with normal ancillary internal filling station uses and services (small services shop), on a dedicated site in Liffey Valley. The location of the proposed development site showing the roads context is shown in Fig. 2.1 below.

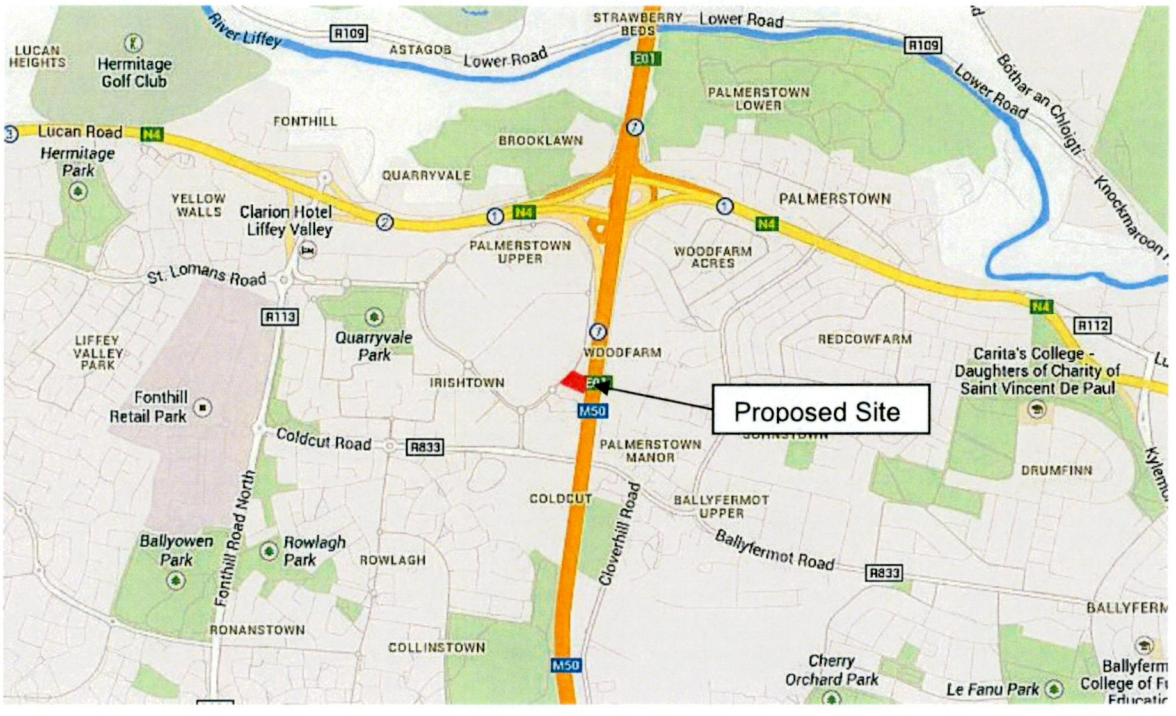

Figure 2.1: Location of Proposed PFS Development – Liffey Valley

2.2 A layout plan showing the proposed internal arrangement of the facility and it's configuration in relation to the local roads is included in ***Appendix A***. This drawing shows how the facility is proposed to be accessed via the improved road network, as consented by both SDCC and An Bord Pleanála in their grant of planning for the proposed Tesco foodstore in Liffey Valley (Application Ref ABP PI 06S.240473 and SDCC Ref SD 12A/0014). It should be noted that the "spur" for vehicular access to the site off the new roundabout was granted by both SDCC and ABP under the foodstore consent.

2.3 The assessment of the Traffic/Transportation impact of the PFS on the surrounding road network has been based on the following sources of information and industry accepted practices:

- Site visits,
- Traffic Surveys undertaken in 2013 (as part of application Ref SD 12A/0226 – LV West Extension),
- Trip Rate Information Computer System (TRICS) as well as trip generation information obtained from traffic surveys undertaken at PFS sites throughout Ireland, and based on the maximum possible through-put at a PFS,
- Our wide experience in designing and constructing similar facilities of this nature
- Operator experience and research in managing a PFS to ensure efficiency,
- The National Roads Authority (TII) "Traffic and Transport Guidelines", (TTA Guidelines),
- TII Project Appraisal Guidelines, Unit 5.5 Link-Based Traffic Growth Forecasting (for assessing future year traffic volumes),
- The SDCC and ABP decisions on the previous application(s),
- A Scoping Study document for this study, prepared and submitted to SDCC (included as ***Appendix C***).

2.4 Very significant road improvements to all local road junctions are proposed to be completed (and are so-conditioned in Planning) to facilitate the opening of the proposed Tesco Foodstore and also the recently granted (by SDCC) Liffey Valley West Extension.

2.5 This TTA examines the following:

- The internal design and operation of the development proposal,
- Accessibility, and the linkage between the site and the adjacent local roads,
- Assessment of the impact of the proposed development on the nearby junctions and in particular the critical Loman's Road junction at the 'entry' to Liffey Valley and also the main N4 Junction,
- A threshold Assessment has been undertaken to establish the absolute worst-case increase in traffic associated with the scheme.

2.6 This Report has been prepared in accordance with the requirements of The Institution of Highways and Transportation "Guidelines for Traffic Impact Assessment" and the TII's "Traffic & Transport Assessment Guidelines". These are the professional Guidelines used to assess the impact of developments on public roads. The layout drawing showing the access and internal operation of the proposed PFS was provided to SDCC for agreement, with copy of our Scoping Study in September 2013.

3.0 RECEIVING ENVIRONMENT

LOCATION

3.1 The site is located immediately adjacent the existing B&Q in Liffey Valley and opposite the site for the proposed Tesco Foodstore, that was recently granted permission by An Bord Pleanála (Ref ABP PI 06S.240473).

3.2 ***Appendix A*** includes a drawing showing the proposed site layout and its context and configuration in relation to existing and proposed new road network in the area.

SITE CONTEXT, SITE OBSERVATIONS

3.3 The proposal consists of the provision of a high quality 4 pump petrol filling station together with the ancillary and supporting services on site (wash/fuel & air etc). In terms of site content, the proposed development meets the highest standards in terms of content, accessibility, and parking provision to serve the needs of customers.

3.4 The facility will be of benefit to the wider area, but it is expected that the vast majority of car trips to the facility (in excess of 90% in our experience) will be linked with visits to other elements within Liffey Valley (in simple terms, it is most unusual for any driver to undertake a primary home-destination trip for the purposes of re-fuelling a car).

3.5 We are not aware of any similar rest and refuelling facility in very close proximity for existing neighbourhoods of Quarryvale, Fonthill, Liffey Valley, Ballyowen and Irishtown without a requirement for a significant diversion of journey.

3.6 It should be pointed out that in the assessment of the traffic associated with the proposed foodstore, the Traffic Generation calculations were undertaken based on the TRICS Database (Trip Rate Information Computer System). Details of the TRICS Sites used for comparison and for calculating the Traffic Generation characteristics of the foodstore are included as ***Appendix D***. A review of the 5 sites used as a comparison reveals that 4 out of 5 of these sites have a PFS already included in the count. This means in effect that the impact traffic associated with the opening of a PFS on the site has already been considered under the previous foodstore application.

3.7 Notwithstanding the above we have nonetheless undertaken a new and thorough fresh assessment of the PFS within this report in order to provide an onerous assessment.

4.0 TRIP GENERATION, ASSESSMENT YEARS, ASSIGNMENT & DISTRIBUTION

4.1 The TTA considers the traffic impact of the proposed 4-pump (8 stand) PFS. We have undertaken an assessment of the maximum possible quantity of traffic it will generate during the weekday PM Peak Hour, assigned this to the local roads in addition to existing traffic volumes and committed traffic volumes associated with the Tesco Foodstore and LV West Extension and assessed the impact. It should be noted that it is considered that the weekday PM Peak hour represents the most critical period in the assessment of the development. During the weekday AM Peak hour there are very low volumes of background traffic within the retail development environment of Liffey Valley.

4.2 The traffic generation of the site has been based on the maximum possible through-put of a Filling Station of this nature, with supporting information based on TRICS and surveys of existing filling Stations in order to prove the robustness of the approach (also bearing in mind that the Tesco foodstore application TA already contained traffic information which included the effect of the proposed PFS).

4.3 The '*Trip Rate Information Computer System*' (TRICS) database provides information on trip generation characteristics of a range of development types. TRICS is established in Ireland and contains information on arrival and departure rates for a range of differing types and sizes of development. However, TRICS contains limited information in relation to PFSes in Ireland and we have therefore also included previously commissioned Traffic Survey data of similar Filling Stations throughout Ireland in order to confirm the robustness of our approach. An assessment using TRICS would provide a trip rate of approximately 20 car trips (2-way per hour per stand, each pump having 2 stands or sides). The comparison TRICS Information is included as ***Appendix D***.

4.4 We have also included as ***Appendix E*** the traffic survey data collected at similar PFS Developments throughout Ireland. This survey revealed that the average Traffic Generation of these PFSes is ~18 car trips per stand (2-way), with the maximum observed being ~24 car trips per stand (2 way).

4.5 We have based our assessment on a Traffic Generation Rate of 30 Trips Per Stand (being the theoretical maximum possible through put of a PFS assuming absolutely no delay, and with the filling station operating at capacity at all times).

4.6 A comparison of the Trip Rate used for the PFS at Liffey Valley and the supporting data is included below as Table 4.1.

Table 4.1: Worst Case Peak Hour Traffic Generated By Proposed Development

Traffic Generation – Data Source	Trip Rate (PCU's) 2-Way	Resulting Traffic Flow Weekday 5-6pm For LV PFS
Rate/Data Used in our Assessment	**30/Stand**	**360**
TRICS Database Computed Rate*	**~20/Stand**	**240**
Survey of Tesco Ireland PFSes**	**~18/Stand**	**216**

**Based on TRICS 2010(b) V6 ** As Measured at Existing PFS Sites in Ireland &*

4.7 The traffic generation calculations are included as ***Appendix G***.

Design Years/Traffic Growth

4.8 We have used Traffic Data contained within the Atkins Study submitted with the LV West Development Application in order to establish appropriate baseline Traffic Flows. This data includes the effects of both the Tesco Foodstore Application and the LV West Development Application. The detailed network trip distribution is as shown in ***Appendix G.*** The overall traffic generation for the proposed development as well as the network traffic has been used as the basis for junction threshold analysis.

4.9 For the purposes of this TA only, it is assumed that the year of opening of the PFS development is 2015 (and it is considered that the scheme will proceed within a short timeframe to allow this to happen). Notwithstanding this, any small 1-3 year variation with regard to year of opening will not have any significant detrimental effect on the conclusions of this study or the available capacity within any of the assessed junctions.

4.10 Traffic growth factors for future year assessments were calculated from the TII Project Appraisal Guidelines (Unit 5.5 Link-Based Traffic Growth Forecasting), in accordance with accepted methodology.

Assignment & Distribution

4.11 In assigning traffic to any road network, account generally needs to be taken of the various trip types as set out below:

- Primary New Trips – single purpose trips (home-development-home) that did not exist on the network prior to the opening of the new development,
- Primary Transfer Trips – existing single purpose trips previously made to other destinations but transfer to the new development when open,
- Non-Primary Diverted Trips – existing multi-purpose (linked) trips, that deviate from their normal route to visit the new development on the way to another destination, and
- Non-Primary Pass-By Trips – existing multi-purpose (linked) trips that visit the new development without having to make a significant diversion from their existing route.

4.12 In the case of a petrol station being introduced in close proximity to a busy retail destination and road network, it is accepted in practice that the vast majority if not all trips will be existing trips already on the local roads that divert their trip slightly to visit the facility (the introduction of a petrol station does not in itself result in any new traffic on the road network). In the case of the petrol station at Liffey Valley, we consider that the majority of trips (>90%) will consist of Non-Primary & Pass-By/Diverted Trips.

4.13 Notwithstanding the above we have assigned the traffic to the roads on the basis that 50% of the Traffic is New/Primary traffic, to provide an onerous assessment of the impact upon critical junctions.

4.14 Traffic has been assigned to the road network using simple hand assignment techniques, with the assignment as used previously in assessing the foodstore application. Any minor alterations to the traffic generation, assignment or distribution are considered very unlikely to affect the conclusions of our study. The network trip distribution is as shown in ***Appendix G.***

4.15 It is noteworthy that the result of the assignment is that 20% of the "new" traffic comes from the direction of the N4. The junction of the N4 is in excess of 2km from the proposed PFS in Liffey Valley, and we consider that it is extremely unlikely that anything near this level of traffic will divert from the N4 to visit a PFS so remote from the route (a visit to the Tesco PFS would result in a roundtrip diversion of 4km at peak hour). So, in this regard, the impact of the proposed PFS on the N4 junction is considered likely to have been over-stated in this Report. We have included as ***Appendix B*** a scanned map showing existing PFS locations. We suggest that it is impractical and improbable that any significant number of commuters will divert when there are easily accessible alternatives available.

5.0 TRAFFIC IMPACT

5.1 The Institution of Highways and Transportation (IHT) Guidelines for Traffic Impact Assessment and the TII's Traffic and Transport Assessment Guidelines sets out a mechanism for assessment of developments of this nature. Part of this process requires a Threshold Assessment of the impact on the local roads to be provided in order to determine whether further, more detailed modelling and assessment of particular critical junctions is necessary.

5.2 The professional guidance referenced above sets out specific increases in traffic volume associated with new development, which, if breeched, requires further detailed analysis to be undertaken. The recommendation is that, if the expected increase is 5% for networks that are considered heavily trafficked or congested, then further analysis is warranted. In this regard, we have undertaken specific assessment of the impact upon critical junctions and links, with particular emphasis on the critical national road junction.

5.3 The consented site access/Entry arrangement consists of a consented 30m diameter Roundabout with 2 number 2-way arms and an exit only arm serving the filling station for entering vehicles. In this regard, we have undertaken detailed TII Approved ARCADY simulation modelling of the operation of the proposed junction (included as ***Appendix I***) and, as expected, this confirms that the proposed junction will operate without any capacity or delays whatsoever with the consented and proposed developments fully operational. The modelled max Ratio of Flow to Capacity reaches 0.3 during the chosen design year 2025 (which, as expected, is well below the acceptable level of 0.85). It should be noted that the results confirm that the demand is way below capacity and any minor alteration to model geometry inputs will have no impact whatsoever on the results. A summary of the Arcady Results for the opening year 2015 and the chosen design year 2025 are included below as Table 5.1.

Table 5.1: Consented/Proposed Roundabout Entry to PFS Site – ARCADY Results

Modelled Scenario	Traffic Stream	Period Mean Max Q (PCUs)	Max RFC
2015 PM Peak	Arm A	<1	0.15
	Arm B	<1	0.22
2025 PM Peak	Arm A	<1	0.2
	Arm B	<1	0.3

Arm A is the LV Spine Road (West)
Arm B is the LV Spine Road (North)
Arm C is the Entry Only PFS Access

5.4 We have included as ***Appendix H*** the results of the network Threshold Assessment undertaken in accordance with the agreed Scoping Study, and in accordance with the TII's Traffic & Transportation Assessment Guidelines. It should be noted that the assessment we have undertaken is extreme and robust for a host of reasons previously identified in this report. In the case of the network in the vicinity of the site, the following are the anticipated worst-case increases in peak hour traffic on key junctions and links; -

- **Site Access** – Junction Designed & Consented to Facilitate the Development, with capacity analysis for Opening Year and Design Year confirming adequacy.
- **Coldcut Road Traffic Signal Junction** – The worst-case weekday PM Peak Hour Traffic Increase at the Junction is predicted to be 2.7%. This is way below the TII & Institution of Highways & transportation Guidance Threshold in traffic increase of 5% above which further assessment is required. The impact of the PFS traffic is therefore considered to be negligible.
- **St Loman's Rd junction/N4 Link** - The worst-case weekday PM Peak Hour Traffic Increase on the Link to the N4 is predicted to be 0.85%. Again, this is way below the TII & Institution of Highways & transportation Guidance Threshold in traffic increase of 5% above which further assessment is required. The impact of the PFS traffic on the N4 is therefore considered to be negligible (and this is unsurprising given the >2km distance from the N4 to the PFS).

5.5 It should be noted that there can be a day-to-day variation of up to 10% in observed traffic volumes on any road network, and this reinforces the view that the worst case predicted traffic increases associated with the PFS development are negligible and insignificant.

Threshold Assessment – With Tesco Foodstore (& W/O LV West Extension)

5.6 Notwithstanding the assessment above that considers both Tesco and the LV West Extension operational, we are conscious that there remains a possibility that ABP may not decide to grant permission for the proposed LV West extension. In this regard, we have undertaken an assessment of the impact of the PFS traffic with just the Tesco Foodstore in operation. The following are the anticipated worst-case increases in peak hour traffic on the key junctions and links; -

- **Coldcut Road Traffic Signal Junction** - The worst-case weekday PM Peak Hour Traffic Increase at the Junction is predicted to be 3%. This is way below the TII & Institution of Highways & transportation Guidance Threshold in traffic increase of 5%

above which further assessment is required. The impact of the PFS traffic is therefore considered to be negligible.

- **St Loman's Rd Junction/N4 Link** - The worst-case weekday PM Peak Hour Traffic Increase on the Link to the N4 is predicted to be 0.87%. Again, this is way below the TII & Institution of Highways & transportation Guidance Threshold in traffic increase of 5% above which further assessment is required. The impact of the PFS traffic on the N4 is therefore considered to be negligible (and this is unsurprising given the >2km distance from the N4 to the PFS).

5.7 As can be seen from the above analysis, and the Threshold Assessment, the PFS is considered to have a negligible and unnoticeable impact on traffic conditions on the road network.

6.0 CONCLUSION

6.1 This Transportation Assessment Report deals with the traffic/transport issues associated with the development of a proposed Certa unmanned petrol filling station (PFS) in Liffey Valley, on a site specifically set aside for this purpose with a consented access arrangement already agreed. The site for the PFS is adjacent to the existing B&Q and is to the south of the consented Tesco foodstore.

6.2 We have followed the National Roads Authority (now TII) guidelines in the assessment of the impact of the proposed development, and the assessment follows the agreed methodology as set out in the Scoping Study (& layout plan) issued to SDCC in advance of completing this Report. The Traffic Generation rates, and methodology used to assess the impact of the PFS have previously been accepted by Local Authorities and An Bord Pleanála in the determination of similar Tesco PFS applications.

6.3 The impact of the traffic associated with the proposed development has been assessed based on already submitted/approved.

6.4 It has been demonstrated in this report that the operation of the proposed development will have an absolutely negligible and unnoticeable impact on the operation of the road network in the area. The impact of the PFS on the N4 (some 2km away) and the critical Liffey Valley/N4 junction will similarly be negligible.

6.5 The detailed modelling and threshold analysis contained within this report confirms our assessment in this regard.

6.6 We conclude that the proposed development is not expected to have any adverse impact whatsoever, in terms of traffic capacity or safety, on the surrounding road network.

APPENDICES - CONTENT

A	Proposed Development - Access Layout, Tracking and Internal Arrangement
B	Map Showing Approximate Location of Adjacent Filling Stations
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F	Traffic Survey Information – Existing Tesco Filling Stations
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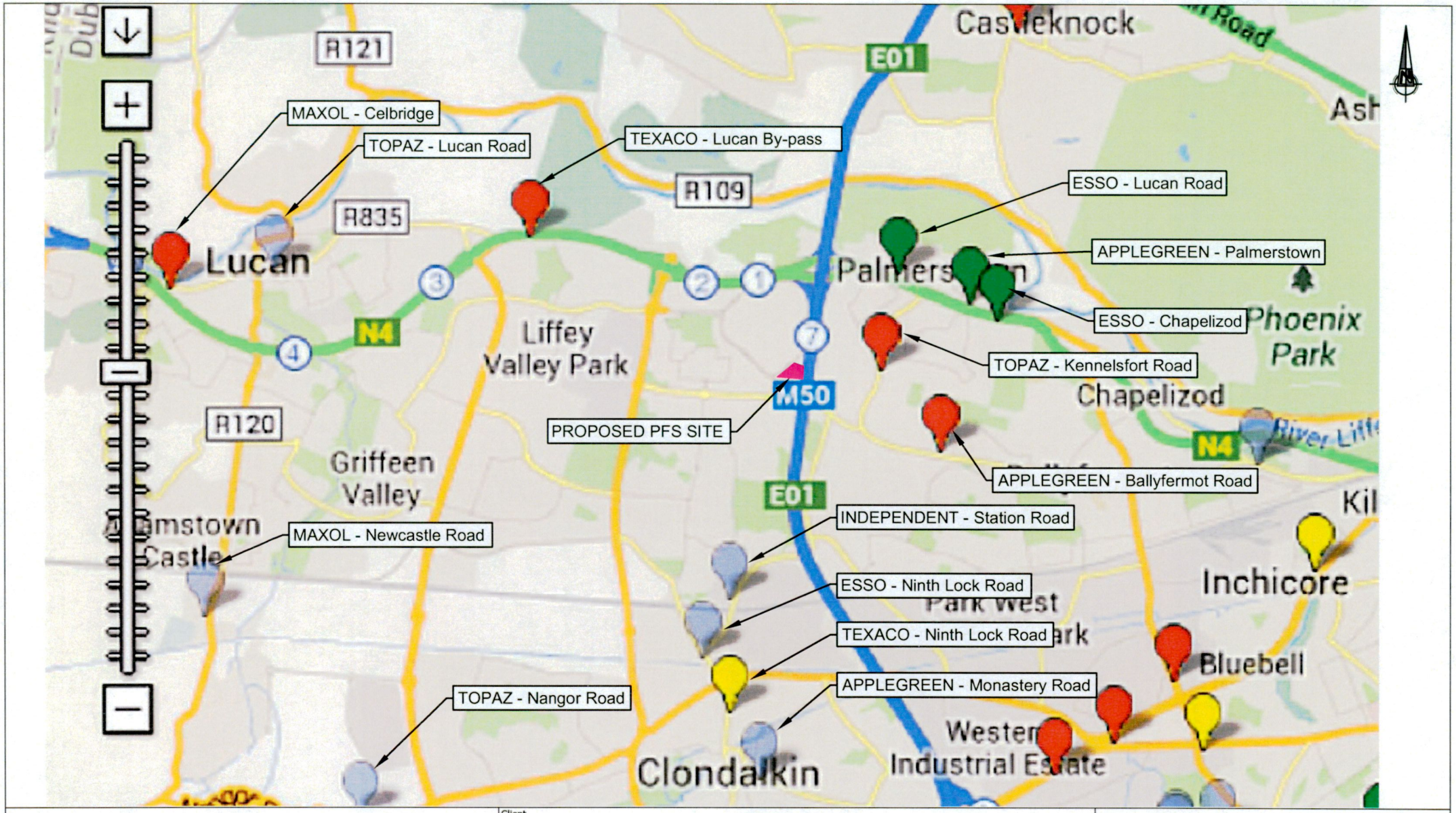
I	ARCADY Analysis Results – Access Roundabout

APPENDIX A

Proposed PFS;- Site Layout,
Swept Path Assessment & Forecourt Capacity.

APPENDIX B

Map Showing Locations of Adjacent PFSes



This drawing is based upon Google Mapping and www.pumps.ie. NRB Consulting Engineers Ltd shall not be liable for any inaccuracies or deficiencies.

REV	DATE	AMENDMENTS	DRAWN	CHK	APP

Project No.	Drawing No.	Scale @ A4
13-027	NRB-TA-005	n.t.s.

Date	Drawn	Checked	Approved	Rev
5-Sep-13	PB			-

Client: TESCO

Project: Liffey Valley Petrol Filling Station

Title: Existing Petrol Filling Station Locations

Purpose of Issue: ☐ Draft ☐ Information ☐ Approval ☐ As Built ☐ Tender ☐ Construction

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APPENDIX C

Scoping Study Submitted to SDCC

Scoping Study
Liffey Valley PFS
(Submitted to & Approved By SDCC (By Email Dated 2nd Sept 2013))

In accordance with the recommendations contained within the NRA's Traffic & Transportation Assessment Guidelines (and the IHT Traffic Impact Assessment Guidelines), this Scoping Study Sets out the Parameters for preparation of the Transportation Assessment Report (TA, formerly Traffic Impact Assessment) for the proposed 6 pump Petrol Filling Station (PFS) associated with the Tesco development in Liffey Valley.

The site was previously identified for this purpose in the preparation of the development plans for the Tesco site. It is also noteworthy that the assessment of the traffic for the Tesco application included sites from TRICS that contained Petrol Filling Stations in the Traffic Surveys (80% of the sites selected had a PFS included). In this regard, the Traffic associated with the now-proposed PFS has really already been taken into consideration in assessing the impact of the Tesco store under the previous store application.

Notwithstanding this we will nonetheless be preparing a TA, for complete robustness. We have attached the site layout plan showing the proposal for the site, in terms of multi modal accessibility.

The TA Report will be based on the following information and analysis; -

1. Weekday AM and PM classified turning movement information for the local road network established from recent applications.
2. The background traffic data will be factored to appropriate opening year (2014) and design year (10 year after opening, 2024) based on the normal standard (NRA Project Appraisal Guidelines, Unit 5.5 Link-Based Traffic Growth Forecasting).
3. Traffic associated with recent planning consents (Tesco and Liffey Valley Extension ("Pennys"?)) will be added to the background traffic data. Where necessary, this information will be extracted from the publicly available SDCC files on line (with the source referenced and credited in the Reports).
4. The assessment of PFS Traffic will be based on the maximum throughput of a PFS per hour (backed up by data from TRICS, and with information on Traffic Survey Data from other Tesco PFSes in Ireland).
5. Assignment of Traffic will be based on the established agreed Trip Distribution patterns for the Tesco Store (also taking account of the location of existing PFS facilities).
6. We will undertake a Threshold Assessment of the affected Liffey Valley Junctions, in accordance with the NRA TTA Guideline recommendations (including the critical St Lomans Rd junction). This assessment will be based on the cumulative effect of the committed Tesco Store Traffic AND the proposed LV Extension (Pennys application).
7. We will provide detailed capacity assessment of any junctions where projected increases in traffic are considered unacceptable (acknowledging the "critical" nature of junctions).
8. We will include detailed Swept Path Assessment Drawings.
9. All of this information will be included in a bound TA report to accompany the application.

If you have any comments or require further information to be included in the TA Report please contact us as soon as possible.

Thank you for your assistance.

APPENDIX D

Foodstore Application - TRICS Data
(Note 80% of these contain a PFS in the counts)

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
Category : A - FOOD SUPERSTORE

VEHICLES

Selected regions and areas:

05	**EAST MIDLANDS**		
	NT	NOTTINGHAMSHIRE	2 days
06	**WEST MIDLANDS**		
	ST	STAFFORDSHIRE	1 days
08	**NORTH WEST**		
	LC	LANCASHIRE	1 days
09	**NORTH**		
	CB	CUMBRIA	1 days

Filtering Stage 2 selection:

Parameter: Gross floor area
Range: 7710 to 10076 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/00 to 14/06/08

Selected survey days:

Friday	5 days

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

Selected Locations:

Town Centre	1
Suburban Area (PPS6 Out of Centre)	3
Edge of Town	1

Selected Location Sub Categories:

Residential Zone	3
Built-Up Zone	2

Filtering Stage 4 selection:

Use Class:

A1	5 days

Population within 1 mile:

10,001 to 15,000	1 days
15,001 to 20,000	2 days
20,001 to 25,000	1 days
25,001 to 50,000	1 days

Population within 5 miles:

50,001	to 75,000	1 days
75,001	to 100,000	1 days
125,001	to 250,000	2 days
250,001	to 500,000	1 days

Car Ownership within 5 miles:

0.6 to 1.0	4 days

Petrol Filling Station:

Excluded from count or no filling station	1 days
Included in the survey count	4 days

Travel Plan:

Not Known	4 days
No	1 days

LIST OF SITES relevant to selection parameters

1 **CB-01-A-04** **MORRISONS, CARLISLE** **CUMBRIA**
KINGSTOWN ROAD

CARLISLE
Total Gross floor area: 7800 sqm
Survey date: FRIDAY *31/10/03* *Survey Type: MANUAL*

2 **LC-01-A-17** **MORRISONS, BLACKBURN** **LANCASHIRE**
SALFORD STREET

BLACKBURN
Total Gross floor area: 9223 sqm
Survey date: FRIDAY *19/05/00* *Survey Type: MANUAL*

3 **NT-01-A-01** **ASDA, NOTTINGHAM** **NOTTINGHAMSHIRE**
LOUGHBOROUGH ROAD
WEST BRIDGFORD
NOTTINGHAM
Total Gross floor area: 10076 sqm
Survey date: FRIDAY *30/06/00* *Survey Type: MANUAL*

4 **NT-01-A-02** **ASDA, MANSFIELD** **NOTTINGHAMSHIRE**
OLD MILL LANE
FOREST TOWN
MANSFIELD
Total Gross floor area: 8081 sqm
Survey date: FRIDAY *08/12/00* *Survey Type: MANUAL*

5 **ST-01-A-01** **ASDA, STAFFORD** **STAFFORDSHIRE**
QUEENSWAY

STAFFORD
Total Gross floor area: 7897 sqm
Survey date: FRIDAY *14/07/00* *Survey Type: MANUAL*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE

VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00	1	10076	0.030	1	10076	0.318	1	10076	0.348
01:00 - 02:00	0	0	0.000	0	0	0.000	0	0	0.000
02:00 - 03:00	0	0	0.000	0	0	0.000	0	0	0.000
03:00 - 04:00	0	0	0.000	0	0	0.000	0	0	0.000
04:00 - 05:00	0	0	0.000	0	0	0.000	0	0	0.000
05:00 - 06:00	0	0	0.000	0	0	0.000	0	0	0.000
06:00 - 07:00	0	0	0.000	0	0	0.000	0	0	0.000
07:00 - 08:00	2	8987	0.807	2	8987	0.373	2	8987	1.180
08:00 - 09:00	5	8615	2.974	5	8615	1.353	5	8615	4.327
09:00 - 10:00	5	8615	4.777	5	8615	2.923	5	8615	7.700
10:00 - 11:00	5	8615	4.887	5	8615	4.144	5	8615	9.031
11:00 - 12:00	5	8615	4.875	5	8615	4.949	5	8615	9.824
12:00 - 13:00	5	8615	5.230	5	8615	5.239	5	8615	10.469
13:00 - 14:00	5	8615	5.121	5	8615	5.082	5	8615	10.203
14:00 - 15:00	5	8615	5.256	5	8615	5.460	5	8615	10.716
15:00 - 16:00	5	8615	5.058	5	8615	5.165	5	8615	10.223
16:00 - 17:00	5	8615	5.337	5	8615	5.425	5	8615	10.762
17:00 - 18:00	**5**	**8615**	**5.381**	**5**	**8615**	**5.634**	**5**	**8615**	**11.015**
18:00 - 19:00	5	8615	4.657	5	8615	5.279	5	8615	9.936
19:00 - 20:00	5	8615	3.169	5	8615	4.441	5	8615	7.610
20:00 - 21:00	4	8464	2.526	4	8464	3.509	4	8464	6.035
21:00 - 22:00	4	8464	1.495	4	8464	2.266	4	8464	3.761
22:00 - 23:00	3	8685	0.403	3	8685	1.017	3	8685	1.420
23:00 - 24:00	1	10076	0.357	1	10076	0.695	1	10076	1.052
Total Rates:			62.340			63.272			125.612

Parameter summary

Trip rate parameter range selected:	7710 - 10076 (units: sqm)
Survey date date range:	01/01/00 - 14/06/08
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

APPENDIX E

TRICS Information – Petrol Filling Stations

Weekday ROI Sites Surveyed

TRIP RATE for FOOD & DRINK/D - FAST FOOD - DRIVE THROUGH
Calculation Factor : 100sqm
Count Type : Vehicles

	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
Time Range	0	0	0	0	0	0	0	0	0
00:00-01:00	0	0	0	0	0	0	0	0	0
01:00-02:00	0	0	0	0	0	0	0	0	0
02:00-03:00	0	0	0	0	0	0	0	0	0
03:00-04:00	0	0	0	0	0	0	0	0	0
04:00-05:00	0	0	0	0	0	0	0	0	0
05:00-06:00	0	0	0	0	0	0	0	0	0
06:00-07:00	1	380	2.105	1	380	1.579	1	380	3.684
07:00-08:00	1	380	4.211	1	380	2.895	1	380	7.106
08:00-09:00	2	415	2.651	2	415	2.53	2	415	5.181
09:00-10:00	2	415	4.096	2	415	3.614	2	415	7.71
10:00-11:00	2	415	4.337	2	415	3.735	2	415	8.072
11:00-12:00	2	415	6.145	2	415	5.904	2	415	12.049
12:00-13:00	2	415	11.446	2	415	9.398	2	415	20.844
13:00-14:00	2	415	15.181	2	415	16.363	2	415	31.544
14:00-15:00	2	415	13.375	2	415	14.096	2	415	27.471
15:00-16:00	2	415	14.217	2	415	12.651	2	415	26.868
16:00-17:00	2	415	11.446	2	415	11.566	2	415	23.012
17:00-18:00	**2**	**415**	**10.241**	**2**	**415**	**10**	**2**	**415**	**20.241**
18:00-19:00	2	415	12.892	2	415	13.012	2	415	25.904
19:00-20:00	2	415	10.241	2	415	11.566	2	415	21.807
20:00-21:00	2	415	7.108	2	415	8.333	2	415	15.441
21:00-22:00	2	415	9.518	2	415	8.554	2	415	18.072
22:00-23:00	1	450	2	1	450	2.687	1	450	4.687
23:00-24:00	1	450	0	1	450	0.667	1	450	0.667
Daily Trip Rate			141.21			139.15			276.676

TRIP RATE CALCULATION SELECTION PARAMETERS

Land Use : 06 - HOTEL FOOD & DRINK
Category : D - FAST FOOD - DRIVE THROUGH
VEHICLES

Selected Regions and Areas :

12	CONNAUGHT		
	CS	SLIGO	1 days
14	LEINSTER		
	KD	KILDARE	1 days

Filtering Stage 2 Selection :

Parameters: Gross Floor Area
Range : 380 to 450 (units: sqm)

Public Transport Provision : Include all Surveys

Date Range: 01/01/03 to 20/10/10

Selected Survey days :

Tuesday	2 days

Selected Survey Types :

Manual Count	2 days
Directional ATC Count	0 days

Selected Locations :

Edge of Town	1
Neighbourhood Centre (PPS6 Local Centre)	1

Selected Location Sub Categories :

Retail Zone	2

Filtering Stage 3 Selection :

Use Class :

A5	2 days

Population within 1 mile :

5,001 to 10,000	2 days

Population within 5 miles :

5,001 to 25,000	1 days
50,001 to 75,000	1 days

Car ownership within 5 miles :

1.1 to 1.5	2 days

Travel Plan :

No	2 days

LIST OF SITES relevant to selection parameters

1	CS-06-D-01	MCDONALDS SLIGO		SLIGO
	PEARSE ROAD			
	SLIGO RETAIL PARK			
	SLIGO			
	Edge of Town			
	Retail Zone			
	Total Gross Floor Area :		450 sqm	
	Survey date : TUESDAY		21/10/10	*Survey Type* : Manual
2	KD-06-D-01	MCDONALDS MAYNOOTH		KILDARE
	DUBLIN ROAD			
	MAYNOOTH			
	Neighbourhood Centre (PPS6 Local Centre)			
	Retail Zone			
	Total Gross Floor Area :		380 sqm	
	Survey date : TUESDAY		19/10/10	*Survey Type* : Manual

APPENDIX F

Traffic Survey Information – Existing Irish Tesco PFSes

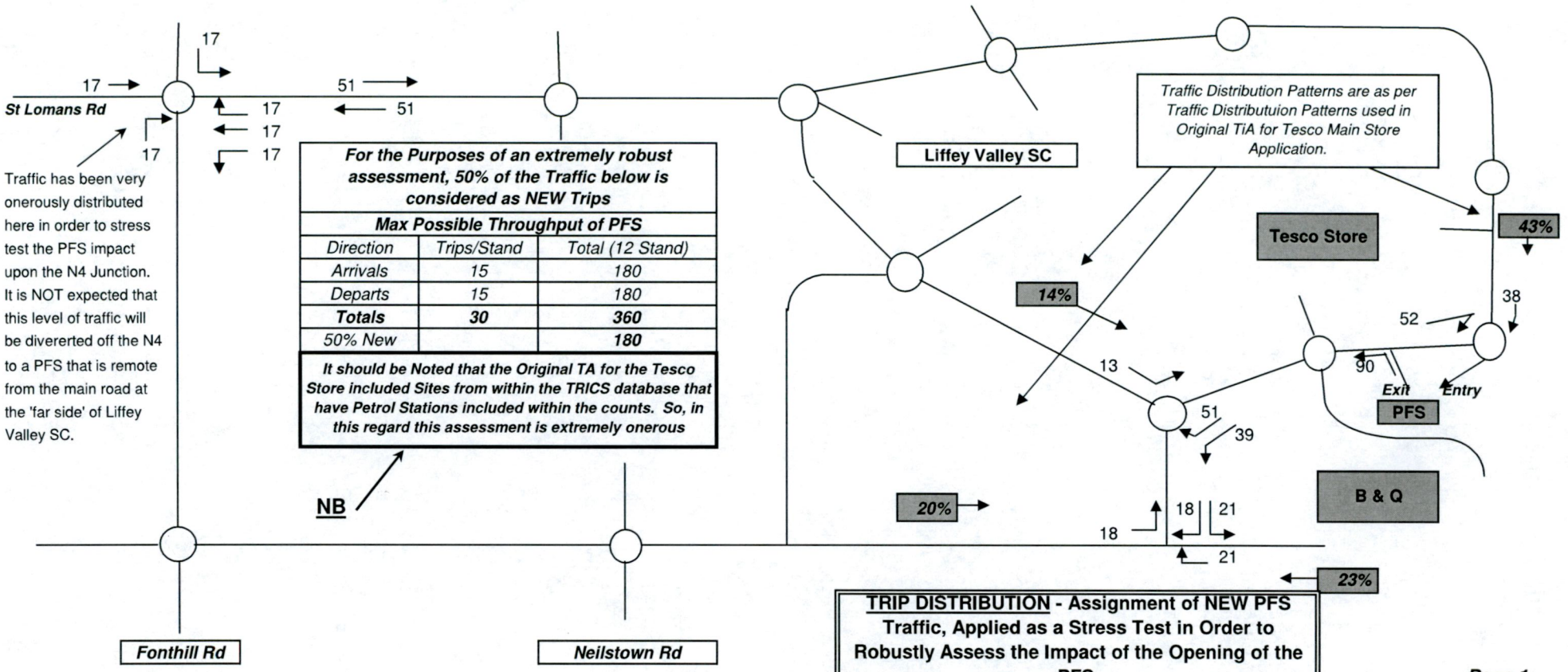
PFS Site	Total Arrivals: Weekday PM Peak Hour* (17:00-18:00)	Total Departures: Weekday PM Peak Hour* (17:00-18:00)	Total Arrivals and Departures: Weekday PM Peak Hour* (17:00-18:00)	No. Pumps	No. Filling Bays+	Average Trip Rate per filling bay: Arrivals	Average Trip Rate per filling bay: Departures	Average Trip Rate per filling bay: Total
Clarehall	124	112	236	6	12	10.33	9.33	19.67
Clearwater	121	72	193	6	12	10.08	6.00	16.08
Claremorris	70	60	130	6	12	5.83	5.00	10.83
Maynooth	118	86	204	6	12	9.83	7.17	17.00
Ardkeen	104	86	190	4	8	13.00	10.75	23.75
Arklow	82	81	163	6	12	6.83	6.75	13.58
Clonmel	88	83	171	6	12	7.33	6.92	14.25
Killarney	98	101	199	4	8	12.25	12.63	24.88
Mullingar	100	103	203	6	12	8.33	8.58	16.92
New Ross	113	110	223	6	12	9.42	9.17	18.58
Tullamore	113	117	230	6	12	9.42	9.75	19.17
Average	***103***	***92***	***195***	***6***	***11***	***9.33***	***8.37***	***17.70***

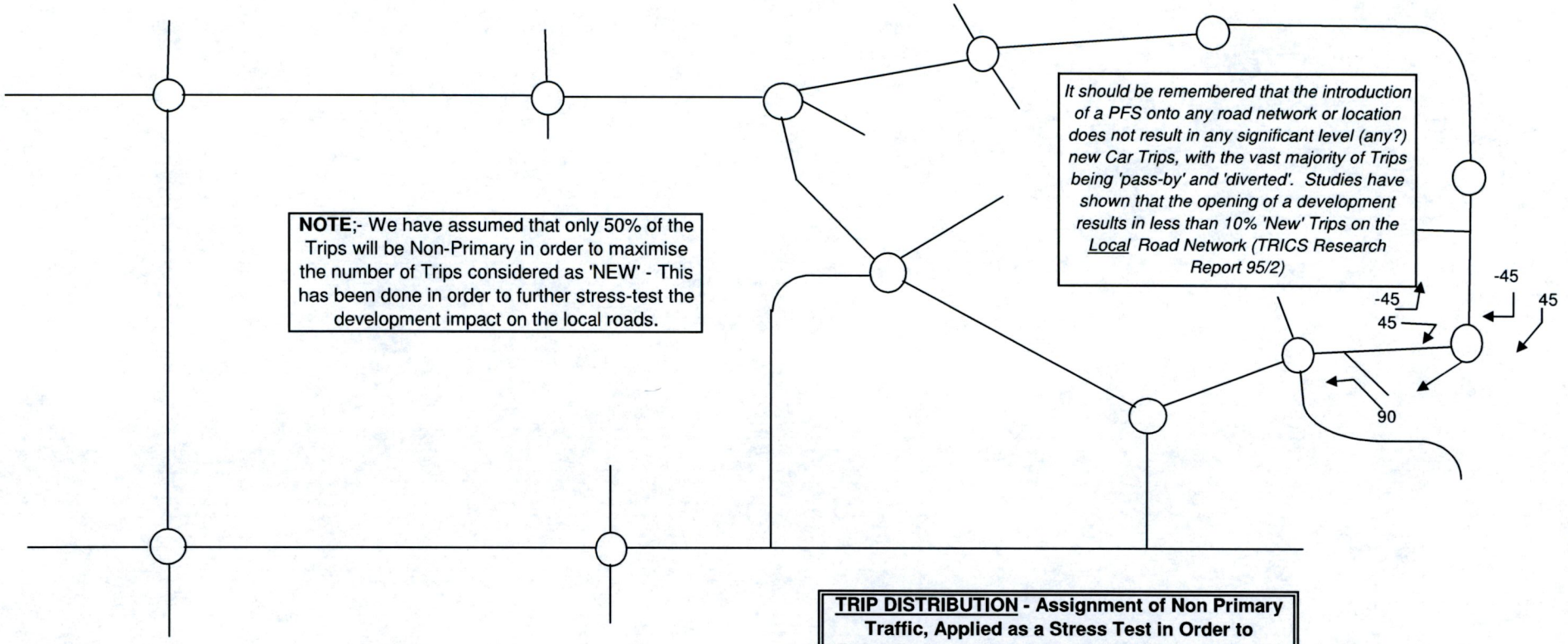
Survey Of Tesco Filling Stations - For Comparison with TRICS - Liffey Valley PFS

NB - this indicates that the appropriate Average is <18 car trips per bay, and we have used a figure of 30 trips in our assessment, further underlining the robust approach

APPENDIX G

Trip Generation, Distribution & Traffic Flow Diagrams

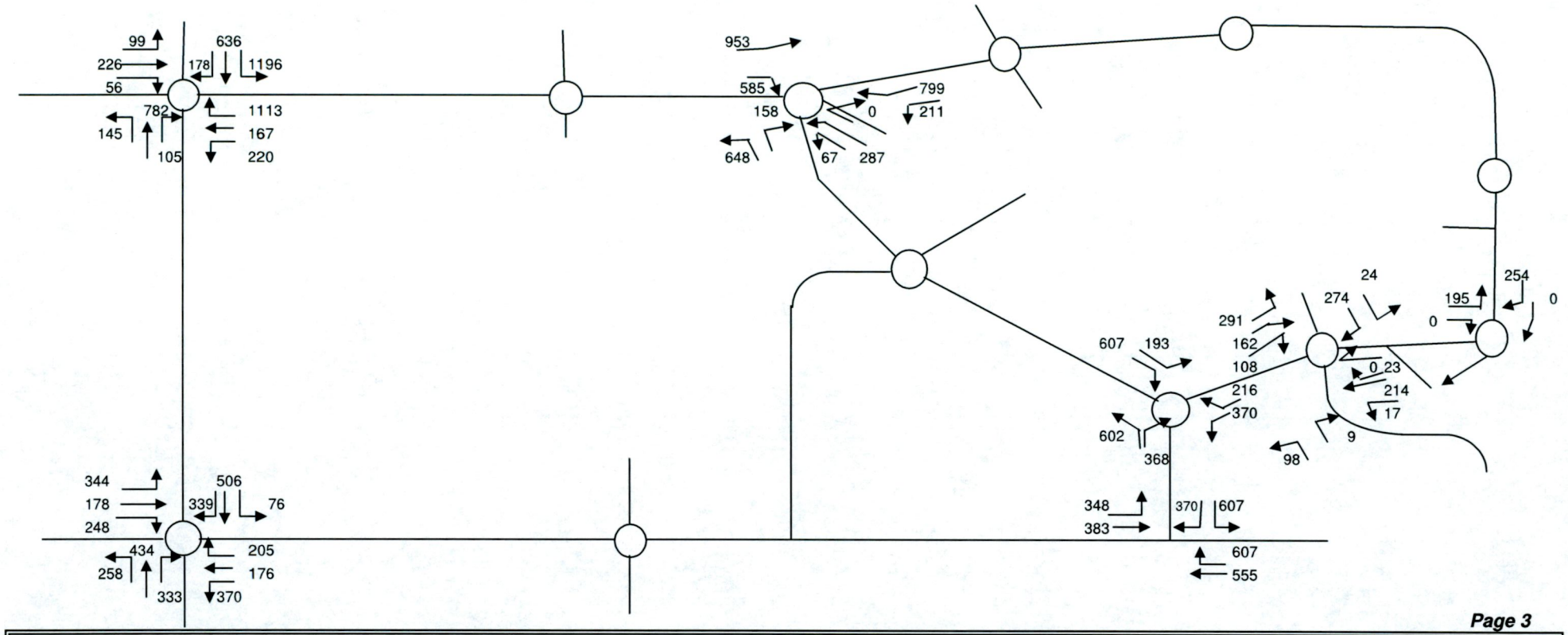

17
17
St Lomans Rd
17
17
17
17
51
51
Traffic has been very onerously distributed here in order to stress test the PFS impact upon the N4 Junction. It is NOT expected that this level of traffic will be divererted off the N4 to a PFS that is remote from the main road at the 'far side' of Liffey Valley SC.
For the Purposes of an extremely robust assessment, 50% of the Traffic below is considered as NEW Trips
Max Possible Throughput of PFS
Direction | Trips/Stand | Total (12 Stand)
Arrivals | 15 | 180
Departs | 15 | 180
Totals | 30 | 360
50% New | | 180
It should be Noted that the Original TA for the Tesco Store included Sites from within the TRICS database that have Petrol Stations included within the counts. So, in this regard this assessment is extremely onerous
NB
Fonthill Rd
Neilstown Rd
Liffey Valley SC
Traffic Distribution Patterns are as per Traffic Distributuion Patterns used in Original TiA for Tesco Main Store Application.
Tesco Store
43%
38
52
14%
13
90
Exit
Entry
PFS
51
39
20%
18
18
21
21
B & Q
23%
TRIP DISTRIBUTION - Assignment of NEW PFS Traffic, Applied as a Stress Test in Order to Robustly Assess the Impact of the Opening of the PFS.



It should be remembered that the introduction of a PFS onto any road network or location does not result in any significant level (any?) new Car Trips, with the vast majority of Trips being 'pass-by' and 'diverted'. Studies have shown that the opening of a development results in less than 10% 'New' Trips on the Local Road Network (TRICS Research Report 95/2)

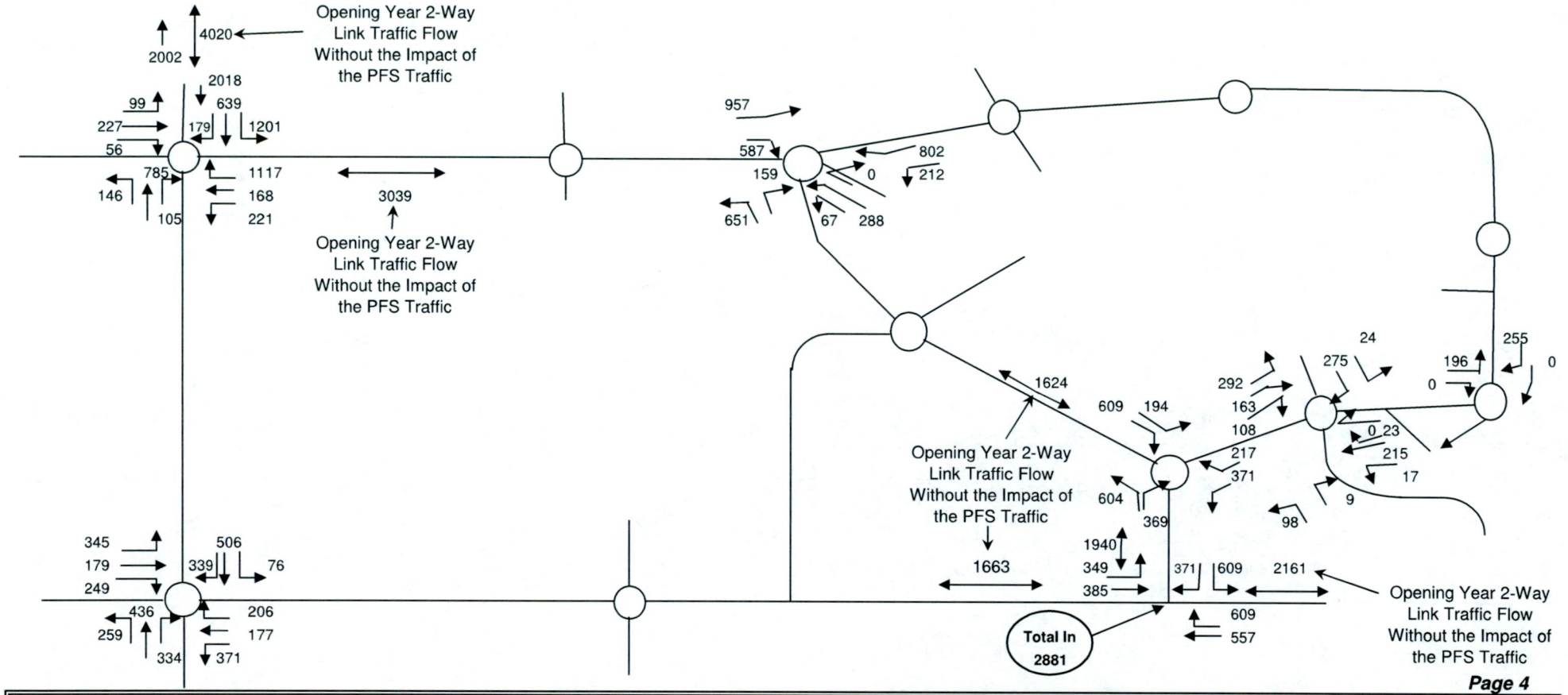
NOTE;- We have assumed that only 50% of the Trips will be Non-Primary in order to maximise the number of Trips considered as 'NEW' - This has been done in order to further stress-test the development impact on the local roads.

TRIP DISTRIBUTION - Assignment of Non Primary Traffic, Applied as a Stress Test in Order to Robustly Assess the Impact of the Opening of the PFS.



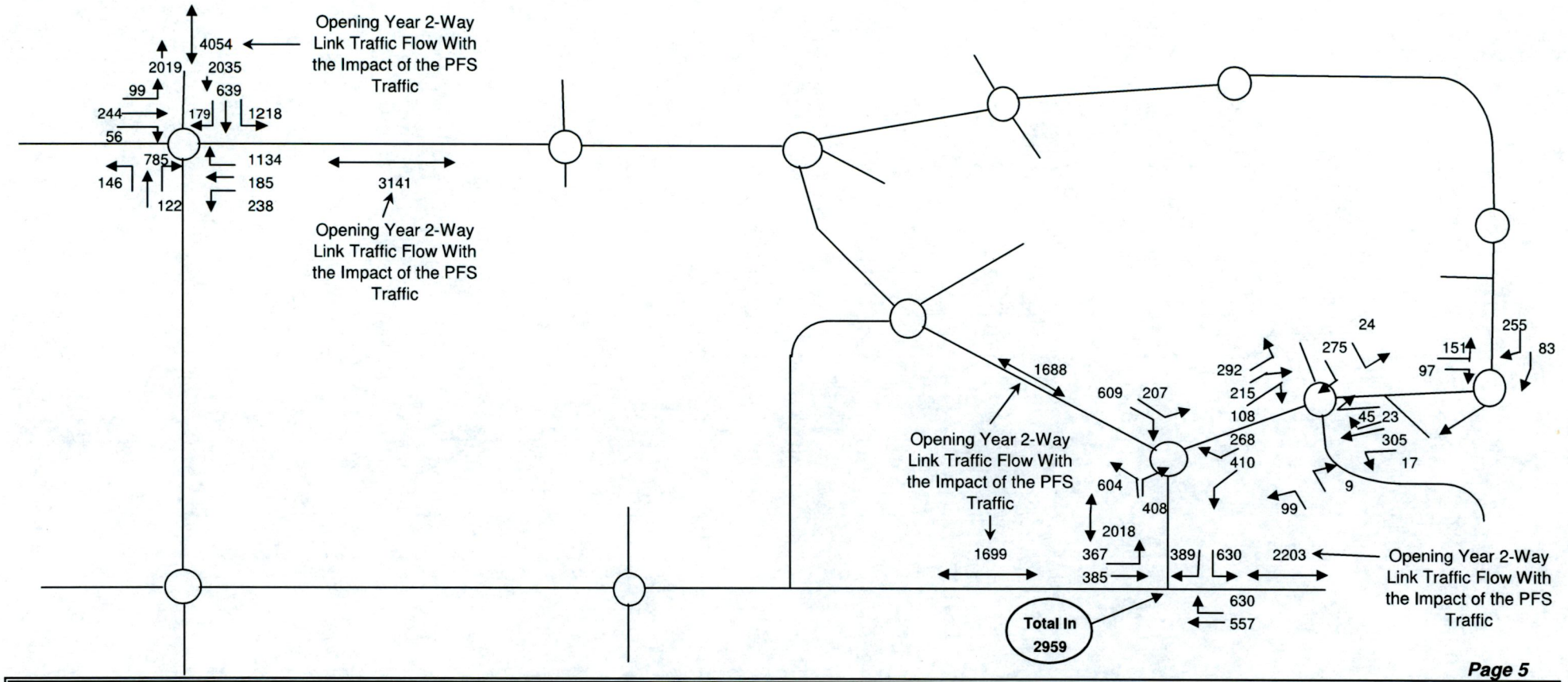
Page 3

Baseline Traffic 2014, Weekday PM Peak Hour (With Tesco Foodstore AND LV Extension (Application Ref SD12A/0226)) - Traffic Figures as Produced in the Atkins Response to the SDCC RFi on the LV Extension Application (Ref., Figure 9: Traffic Flow Diagram - with LVSC West End + Tesco - 2014 (Friday))



Page 4

Opening Year Traffic 2015, Weekday PM Peak Hour (With Tesco Foodstore AND LV Extension (Application Ref SD12A/0226)) - Traffic Figures as Produced in the Atkins Response to the SDCC RFi on the LV Extension Application - Factored to Year of Opening 2015 based on NRA Design Guidance (Project Appraisal Guidelines, Unit 5.5 Link-Based Traffic Growth Forecasting) **WITHOUT PFS**

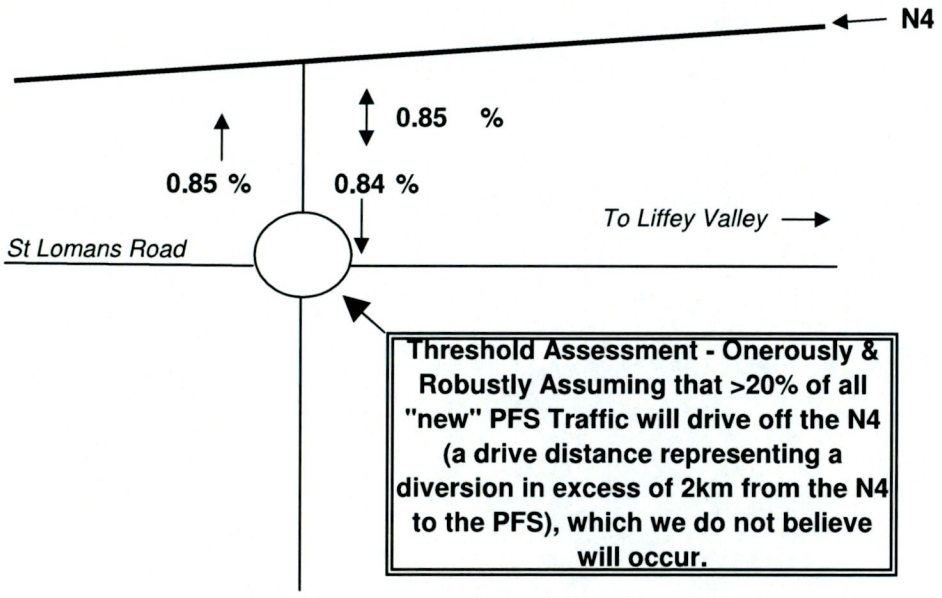


Opening Year Traffic 2015, Weekday PM Peak Hour (With Tesco Foodstore AND LV Extension (Application Ref SD12A/0226)) - Traffic Figures as Produced in the Atkins Response to the SDCC RFi on the LV Extension Application - Factored to Year of Opening 2015 based on NRA Design Guidance (Project Appraisal Guidelines, Unit 5.5 Link-Based Traffic Growth Forecasting) **WITH PFS - ROBUST ONEROUS ANALYSIS**

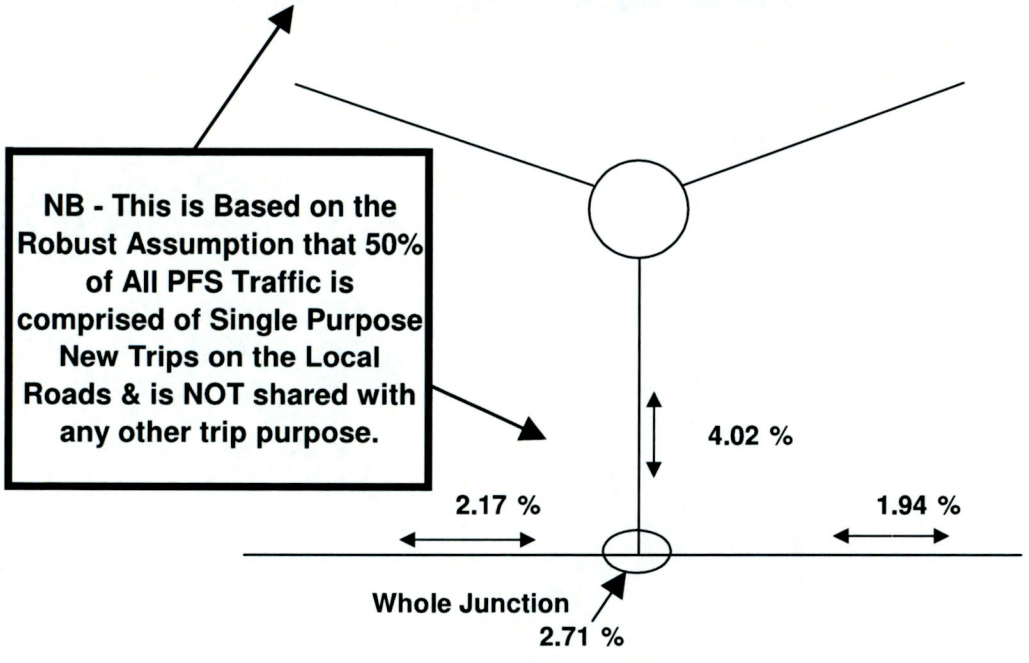
NRB consulting engineers

APPENDIX H

Threshold Assessment - Results

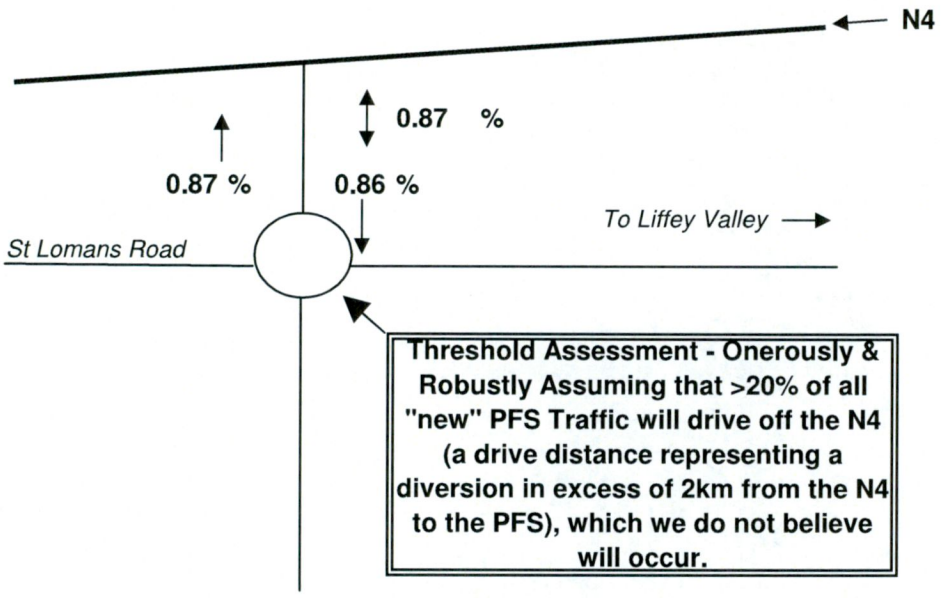


Weekday PM Peak Hour 1700-1800 Worst Case Traffic Increases at the St Lomans Road Junction (Weekday AM Peak will show very similar Results)

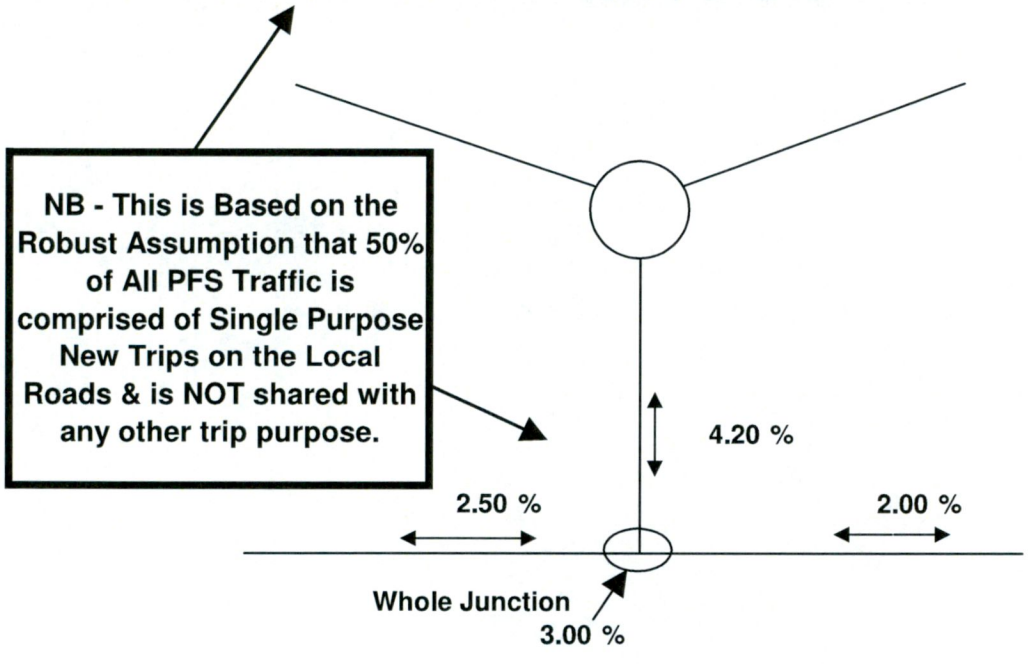


Weekday PM Peak Hour 1700-1800 Worst Case Traffic Increases at Coldcut Road Signals (Weekday AM Peak will show very similar Results)

THRESHOLD IMPACT
(With Both Tesco Foodstore & LV West Extension)



Weekday PM Peak Hour 1700-1800 Worst Case Traffic Increases at the St Lomans Road Junction (Weekday AM Peak will show very similar Results)



Weekday PM Peak Hour 1700-1800 Worst Case Traffic Increases at Coldcut Road Signals (Weekday AM Peak will show very similar Results)

THRESHOLD IMPACT

(With the Tesco Foodstore BUT W/O The LV West Extension)

NRB consulting engineers

APPENDIX i

ARCADY Results
PFS Access Roundabout

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 4.0 (FEBRUARY 2006)

For sales and distribution information,
program advice and maintenance, contact:

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RG40 3GA,UK

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Email: softwarebureau@trl.co.uk
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Run with file:-
"n:\01 Projects\2013\13-027 Liffey Valley PFS\Calculations\Arcadys\2015 PFS Rndabout Wk Day PM Peak.vai"
(drive-on-the-left) at 09:46:04 on Thursday, 5 September 2013

.FILE PROPERTIES
****

RUN TITLE: PFS Entry RndAbt LV PFS 2015
LOCATION: 13-027
DATE: 05/09/13
CLIENT: Tesci Irerland
ENUMERATOR: Eoin [NRB-003]
JOB NUMBER: 13-027
STATUS: TIA
DESCRIPTION: 2015 Weekday PM Peak with PFS (Robust Assessment)

.INPUT DATA
****
ARM A - LV Link West
ARM B - LV Link North
ARM C - PFS Entry

.GEOMETRIC DATA

ARM C IS JUNCTION EXIT ONLY

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI

```
(DEG)  I  SLOPE  I INTERCEPT (PCU/MIN) I

-------------------------------------------------------------------------------
----------------------------------------
 I ARM A I    4.50   I     6.50   I    14.00   I    12.00   I   30.00   I
10.0     I  0.699  I       30.748        I
 I ARM B I    4.50   I     6.00   I    12.00   I    12.00   I   30.00   I
10.0     I  0.680  I       29.171        I

-------------------------------------------------------------------------------
----------------------------------------

 V = approach half-width       L = effective flare length            D =
inscribed circle diameter
 E = entry width               R = entry radius                      PHI = entry
angle


.TRAFFIC DEMAND DATA
 -------------------

(Only sets included in the current run are shown)

.------------------------
 I ARM I FLOW SCALE(%) I
 ------------------------
 I A   I      100      I
 I B   I      100      I
 I C   I      100      I
 ------------------------


.TIME PERIOD BEGINS 16.45 AND ENDS 18.15
.LENGTH OF TIME PERIOD  -  90   MINUTES.
 LENGTH OF TIME SEGMENT -  15   MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA


 DEMAND SET TITLE: PFS Entry RndAbt LV PFS 2015
 ------------------------------------------------------------------------------
 I       I   NUMBER OF MINUTES FROM START WHEN    I   RATE OF FLOW (VEH/MIN) I
 I  ARM  I FLOW STARTS I TOP OF PEAK I FLOW STOPS I BEFORE I AT TOP  I AFTER I
 I       I   TO RISE   I  IS REACHED IFALLING   I  PEAK  I OF PEAK I PEAK  I
 ------------------------------------------------------------------------------
 I ARM A I     15.00   I     45.00   I    75.00   I  3.10  I   4.65  I  3.10 I
 I ARM B I     15.00   I     45.00   I    75.00   I  4.22  I   6.34  I  4.22 I
 ------------------------------------------------------------------------------


 DEMAND SET TITLE: PFS Entry RndAbt LV PFS 2015
.-------------------------------------------------------
 I                    I         TURNING PROPORTIONS       I
 I                    I         TURNING COUNTS (VEH/HR)   I
 I                    I        (PERCENTAGE OF H.V.S)      I
 I                    ------------------------------------
 I        TIME        I FROM/TO I  ARM A I  ARM B I  ARM C I
 -------------------------------------------------------
 I   16.45 - 18.15    I         I        I        I        I
 I                    I  ARM A  I  0.000 I  0.609 I  0.391 I
 I                    I         I    0.0 I  151.0 I   97.0 I
 I                    I         I (  0.0)I (  2.0)I (  0.0)I
 I                    I         I        I        I        I
 I                    I  ARM B  I  0.754 I  0.000 I  0.246 I
 I                    I         I  255.0 I    0.0 I   83.0 I
 I                    I         I (  2.0)I (  0.0)I (  0.0)I
 I                    I         I        I        I        I
 -------------------------------------------------------
```

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

I TIME SEGMENT)	DEMAND TIME SEGMENT)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME	AVERAGE DELAY PER ARRIVING	I
I 16.45-17.00										I
I ARM A	3.10	30.38	0.102		0.0	0.1	1.7	0.04		I
I ARM B	4.22	27.93	0.151		0.0	0.2	2.6	0.04		I
I										I

I TIME SEGMENT)	DEMAND TIME SEGMENT)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME	AVERAGE DELAY PER ARRIVING	I
I 17.00-17.15										I
I ARM A	3.70	30.38	0.122		0.1	0.1	2.1	0.04		I
I ARM B	5.05	27.77	0.182		0.2	0.2	3.3	0.04		I
I										I

I TIME SEGMENT)	DEMAND TIME SEGMENT)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME	AVERAGE DELAY PER ARRIVING	I
I 17.15-17.30										I
I ARM A	4.53	30.38	0.149		0.1	0.2	2.6	0.04		I
I ARM B	6.18	27.55	0.224		0.2	0.3	4.3	0.05		I
I										I

I TIME SEGMENT)	DEMAND TIME SEGMENT)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME	GEOMETRIC DELAY (VEH.MIN/	AVERAGE DELAY PER ARRIVING	I
I										

```
SEGMENT)  TIME SEGMENT)     VEHICLE (MIN) I
 I 17.30-17.45
                                      I
 I ARM A        4.53     30.38   0.149                    0.2    0.2        2.6
                       0.04      I
 I ARM B        6.18     27.55   0.224                    0.3    0.3        4.3
                       0.05      I
 I
                                      I

--------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------
----------------------------------

 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END        DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I          (VEH/MIN) (VEH/MIN) CAPACITY      FLOW    QUEUE  QUEUE    (VEH.MIN/
   (VEH.MIN/        PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)   TIME
SEGMENT)  TIME SEGMENT)     VEHICLE (MIN) I
 I 17.45-18.00
                                      I
 I ARM A        3.70     30.38   0.122                    0.2    0.1        2.1
                       0.04      I
 I ARM B        5.05     27.77   0.182                    0.3    0.2        3.4
                       0.04      I
 I
                                      I

--------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------
----------------------------------

 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END        DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I          (VEH/MIN) (VEH/MIN) CAPACITY      FLOW    QUEUE  QUEUE    (VEH.MIN/
   (VEH.MIN/        PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)   TIME
SEGMENT)  TIME SEGMENT)     VEHICLE (MIN) I
 I 18.00-18.15
                                      I
 I ARM A        3.10     30.38   0.102                    0.1    0.1        1.7
                       0.04      I
 I ARM B        4.22     27.92   0.151                    0.2    0.2        2.7
                       0.04      I
 I
                                      I

--------------------------------------------------------------------------------
----------------------------------

.QUEUE AT ARM A
 --------------

  TIME SEGMENT   NO. OF
   ENDING       VEHICLES
                IN QUEUE

   17.00          0.1
   17.15          0.1
   17.30          0.2
   17.45          0.2
   18.00          0.1
   18.15          0.1


.QUEUE AT ARM B
 --------------
```

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.2
17.15	0.2
17.30	0.3
17.45	0.3
18.00	0.2
18.15	0.2

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	340.1	226.7	12.8	0.04	12.8	0.04
B	463.5	309.0	20.6	0.04	20.6	0.04
ALL	803.5	535.7	33.4	0.04	33.4	0.04

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

A R C A D Y 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 4.0 (FEBRUARY 2006)

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Email: softwarebureau@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"n:\01 Projects\2013\13-027 Liffey Valley PFS\Calculations\Arcadys\2025 PFS Rndabout Wk Day PM Peak.vai"
(drive-on-the-left) at 09:48:29 on Thursday, 5 September 2013

.FILE PROPERTIES
****

RUN TITLE: PFS Entry RndAbt LV PFS 2025
LOCATION: 13-027
DATE: 05/09/13
CLIENT: Tesci Irerland
ENUMERATOR: Eoin [NRB-003]
JOB NUMBER: 13-027
STATUS: TIA
DESCRIPTION: 2025 Weekday PM Peak with PFS (Robust Assessment)

.INPUT DATA
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ARM A - LV Link West
ARM B - LV Link North
ARM C - PFS Entry

.GEOMETRIC DATA

ARM C IS JUNCTION EXIT ONLY

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI

(DEG)	SLOPE	INTERCEPT (PCU/MIN)			
ARM A	4.50	6.50	14.00	12.00	30.00
10.0	0.699	30.748			
ARM B	4.50	6.00	12.00	12.00	30.00
10.0	0.680	29.171			

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

(Only sets included in the current run are shown)

ARM	FLOW SCALE(%)
A	100
B	100
C	100

.TIME PERIOD BEGINS 16.45 AND ENDS 18.15
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

DEMAND SET TITLE: PFS Entry RndAbt LV PFS 2015

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS IFALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	3.50	5.25	3.50
ARM B	15.00	45.00	75.00	4.64	6.96	4.64

DEMAND SET TITLE: PFS Entry RndAbt LV PFS 2015

TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (VEH/HR) / (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.614	0.386
		0.0	172.0	108.0
		(0.0)	(2.0)	(0.0)
	ARM B	0.755	0.000	0.245
		280.0	0.0	91.0
		(2.0)	(0.0)	(0.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

I TIME SEGMENT)	DEMAND TIME SEGMENT)	CAPACITY VEHICLE (MIN)	DEMAND/ (RFC)	PEDESTRIAN (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME	GEOMETRIC DELAY (VEH.MIN/ PER ARRIVING	AVERAGE DELAY I
I 16.45-17.00									
I ARM A	3.50	30.37	0.115		0.0	0.1	1.9	0.04	I
I ARM B	4.64	27.83	0.167		0.0	0.2	2.9	0.04	I
I									I

I TIME SEGMENT)	DEMAND TIME SEGMENT)	CAPACITY VEHICLE (MIN)	DEMAND/ (RFC)	PEDESTRIAN (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME	GEOMETRIC DELAY (VEH.MIN/ PER ARRIVING	AVERAGE DELAY I
I 17.00-17.15									
I ARM A	4.18	30.37	0.138		0.1	0.2	2.4	0.04	I
I ARM B	5.54	27.66	0.200		0.2	0.2	3.7	0.05	I
I									I

I TIME SEGMENT)	DEMAND TIME SEGMENT)	CAPACITY VEHICLE (MIN)	DEMAND/ (RFC)	PEDESTRIAN (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME	GEOMETRIC DELAY (VEH.MIN/ PER ARRIVING	AVERAGE DELAY I
I 17.15-17.30									
I ARM A	5.12	30.37	0.169		0.2	0.2	3.0	0.04	I
I ARM B	6.78	27.42	0.247		0.2	0.3	4.8	0.05	I
I									I

I TIME SEGMENT)	DEMAND TIME SEGMENT)	CAPACITY VEHICLE (MIN)	DEMAND/ (RFC)	PEDESTRIAN (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME	GEOMETRIC DELAY (VEH.MIN/ PER ARRIVING	AVERAGE DELAY I

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SEGMENT)  TIME SEGMENT)     VEHICLE (MIN) I
 I 17.30-17.45
                                          I
 I ARM A        5.12      30.37   0.169                      0.2     0.2          3.0
                        0.04      I
 I ARM B        6.78      27.42   0.247                      0.3     0.3          4.9
                        0.05      I
 I
                                          I

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 I  TIME       DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END        DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I          (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/       PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)   TIME
SEGMENT)  TIME SEGMENT)     VEHICLE (MIN) I
 I 17.45-18.00
                                          I
 I ARM A        4.18      30.37   0.138                      0.2     0.2          2.4
                        0.04      I
 I ARM B        5.54      27.65   0.200                      0.3     0.3          3.8
                        0.05      I
 I
                                          I

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 I  TIME       DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END        DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I          (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/       PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)   TIME
SEGMENT)  TIME SEGMENT)     VEHICLE (MIN) I
 I 18.00-18.15
                                          I
 I ARM A        3.50      30.37   0.115                      0.2     0.1          2.0
                        0.04      I
 I ARM B        4.64      27.83   0.167                      0.3     0.2          3.0
                        0.04      I
 I
                                          I

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.QUEUE AT ARM A
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  TIME SEGMENT   NO. OF
   ENDING       VEHICLES
                IN QUEUE

   17.00           0.1
   17.15           0.2
   17.30           0.2
   17.45           0.2
   18.00           0.2
   18.15           0.1


.QUEUE AT ARM B
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TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.2
17.15	0.2
17.30	0.3
17.45	0.3
18.00	0.3
18.15	0.2

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	383.9	256.0	14.7	0.04	14.7	0.04
B	508.7	339.1	23.3	0.05	23.3	0.05
ALL	892.7	595.1	38.0	0.04	38.0	0.04

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB