TRANSPORT ASSESSMENT

Panda Waste Facility, Ballymount

December 2023

SYSTRA

DOCUMENT CONTROL SHEET

IDENTIFICATION TABLE	
Client/Project owner	Starrus Eco Holdings Ltd
Project	Panda Waste Facility, Ballymount
Study	Transport Assessment
Type of document	Report
Date	06/12/2023
Reference number	IE01T23B01 – SCO1
Number of pages	66

APPROVAL

Version	Name		Position	Date	Modifications
R002	Author	Glen Moon	Principal	30/11/2023	Planning Issue
	Checked by	Steven Livingstone	Associate Director	06/12/2023	
	Approved by	Steven Livingstone	Associate Director	06/12/2023	

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1 Overview

1.1.1 Systra Ltd (SYSTRA) has been commissioned by Starrus Eco Holdings Ltd (SEHL) to provide transport and highways advice in relation to the proposed redevelopment of the existing multi-processing facility at Panda Waste, which is located on Ballymount Road Upper, in the Ballymount area of Dublin.

1.1.2 As shown in **Figure 1**, the 1.17ha site is located to the east of the M50, between Junctions 9 and 10. The Ballymount area is primarily occupied by industrial estates and business parks, with the nearest residential areas to the site being located on the eastern side of the M50, and to the south-east of the R838.

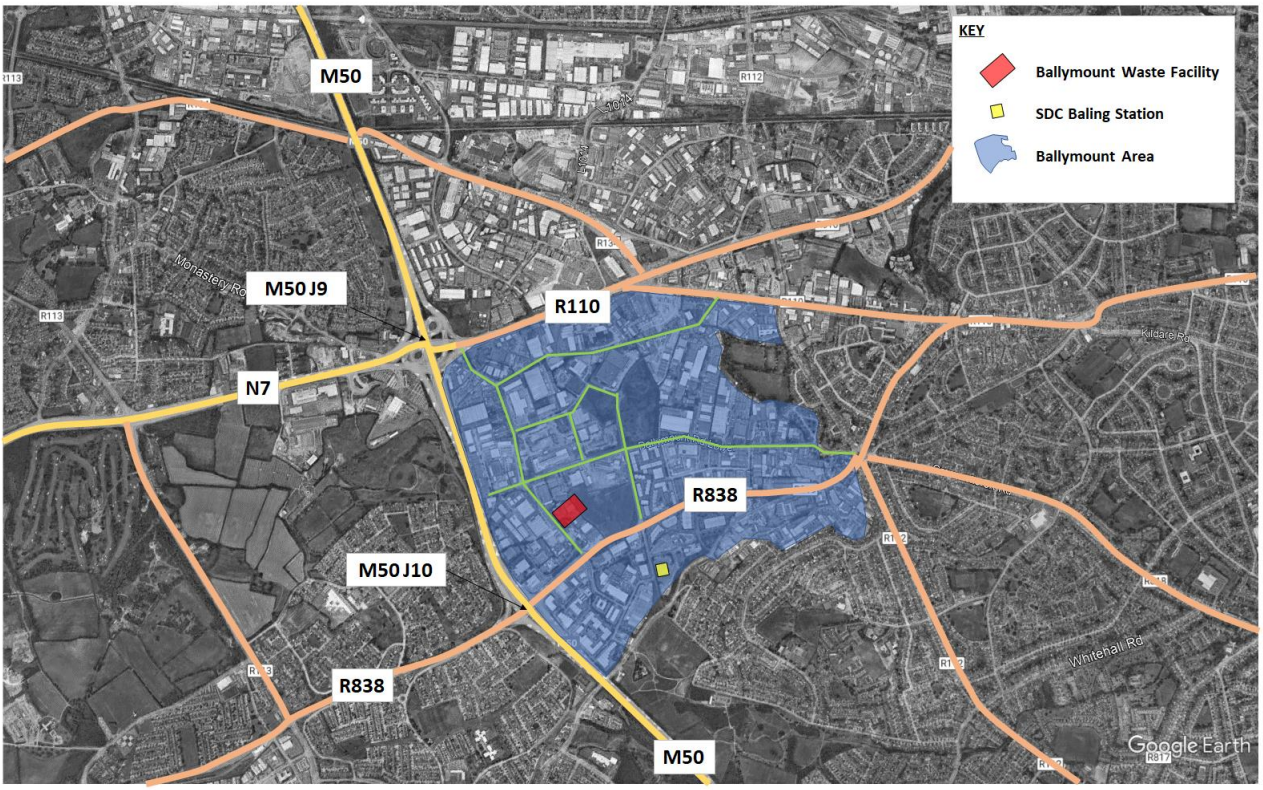


Figure 1. Site Location

1.1.3 The facility currently operates 24/7, and processes 150,000 tonnes of waste per year, as permitted by its current EPA Licence. Under the proposals, the existing buildings on the site would be demolished, and replaced with a new building which would be capable of doubling this capacity.

1.1.4 As soon as the new facility is operational, the activites at the nearby Ballymount Civic Amenity Baling Station will be transferred to the site. The Baling Station currently processes in the region of c.190,000 tonnes of municipal solid waste. The overall effect of this change is shown in **Table 1**.

Table 1. Annual Tonnage

Facility	Tonnes waste / yr	
	Existing Situation	Future Situation
PANDA Facility	150,000	350,000
Ballymount Civic Amenity Baling Station	190,000	
TOTAL	**340,000**	**350,000**

1.1.5 **Table 1** shows that, taking both facilities into account, the amount of annual waste processed within the Ballymount area will be very similar.

1.1.6 The overall effect of the development will be to consolidate the operations of the existing Panda facility and Baling Station into one site. The overall number of HGV movements in the Ballymount area will be similar to those experienced at present, but there will be a redistribution of trips from Calmount Road to the north of Ballymount Road Upper, onto Ballymount Road Upper itself. This is shown in **Figure 2**.

Figure 2. Primary traffic effects

1.1.7 The following documents have been produced by SYSTRA to support the application:

- A Transport Assessment incorporating a Mobility Management Plan.
- A Traffic and Transport Chapter as part of the Environmental Impact Assessment Report (EIAR).
- An Outline Construction Traffic Management Plan (CTMP)

1.1.8 This Transport Assessment identifies the transport impacts of the proposals, and sets out how these impacts will be managed and mitigated.

1.2 Scoping

1.2.1 SYSTRA has consulted with South Dublin County Council's (SCCC) Roads Forward Planning team on the scope and requirements of this Transport Assessment. The main points to emerge from consultation were:

- SDCC requested that the site access junction should be made as pedestrian friendly as it can be, and incorporate a refuge island if possible. The proposed final design has been remodelled, with a formal bellmouth being added, and dropped kerbs and tactile paving included. A refuge island was considered, but it was not possible to find a suitable design that would be able to safely accommodate HGV movements.
- A separate pedestrian entrance into the site should be provided. This has been incorporated into the design, with a separate gate providing access to the site offices.
- The proposals should complement / not conflict with the City Edge project. This is considered in **Section 2.4**.
- The traffic impact, and redistribution effects, should be considered with the TA.

1.3 Policy and Guidance

1.3.1 This TA has generally been undertaken in accordance with the guidance contained within the following documents:

- Project Ireland 2040: National Planning Framework (NPF).
- Project Ireland 2040: National Investment Framework for Transport in Ireland (NIFTI).
- Climate Action Plan 2023 (CAP).
- Design Manual for Urban Roads and Streets 2018 (DMURS).
- Dublin City Development Plan 2022-2028.
- Greater Dublin Area Transport Strategy 2022-2042.
- South Dublin County Development Plan 2022-2028 (SDCDP).
- 'The City Edge Project: A Transformative Initiative for Dublin City' (https://cityedge.ie/)

1.4 Report Structure

1.4.1 Following this introductory chapter, the report will be structured as follows:

- **Chapter 2** – Considers the existing transport network.
- **Chapter 3** – Presents traffic survey results.
- **Chapter 4** – Describes the operation of the existing facility.
- **Chapter 5** – Discusses the proposed development.
- **Chapter 6** – Assesses the travel demand from the expanded facility.
- **Chapter 7** – Assesses the traffic impact of the development.
- **Chapter 8 -** Presented a Mobility Management Plan for the site.
- **Chapter 9** – Provides a summary and conclusions.

2. TRANSPORT BASELINE

2.1 Introduction

2.1.1 This section sets out the transport baseline in the area, and considers pedestrian and cycling infrastructure, public transport services and the local road network.

2.2 Pedestrian, Cycle and Bus Infrastructure

2.2.1 The pedestrian network, and the closest bus stops in in the vicinity of the site, are shown in **Figure 3**.

Figure 3. Pedestrian Infrastructure and Bus Services

2.2.2 Footpaths are present on both sides of Ballymount Road Upper, between Calmount Road and Ballymount Road Lower. **Figure 4** indicates the general characteristics of these footpaths, looking from the area of the site towards the two bus stops, which are located 120m to the north-west of the site access junction.

Figure 4. Footpaths and Bus Stops on Ballymount Road Upper

2.2.3 The footpaths on both sides of the road are less than 1.8m in width (the minimum specified in DMURS), but in SYSTRA's opinion are able to adequately accommodate the low levels of pedestrian activity on Ballymount Road Upper.

2.2.4 There are numerous entrances to businesses along Ballymount Road Upper. Where footpaths cross these entrances, dropped kerbs are typically present, but there is no tactile paving.

2.2.5 There are formal, but uncontrolled, pedestrian crossing points at both the Ballymount Road Upper / Ballymount Lower roundabout, and the Calmount Road / Ballymount Road Upper gyratory.

2.2.6 As shown in **Figure 3**, the nearest bus stops to the site are located 120m to the north-west of the site entrance. These simple pole stops are served by the Tallaght – Ringsend Rd 56A bus service, which operates in both directions along this route. During the week, the service runs between 06:30 and midnight, at a frequency of ~75 minutes.

2.2.7 Cycle facilites in the area are shown in **Figure 5**.

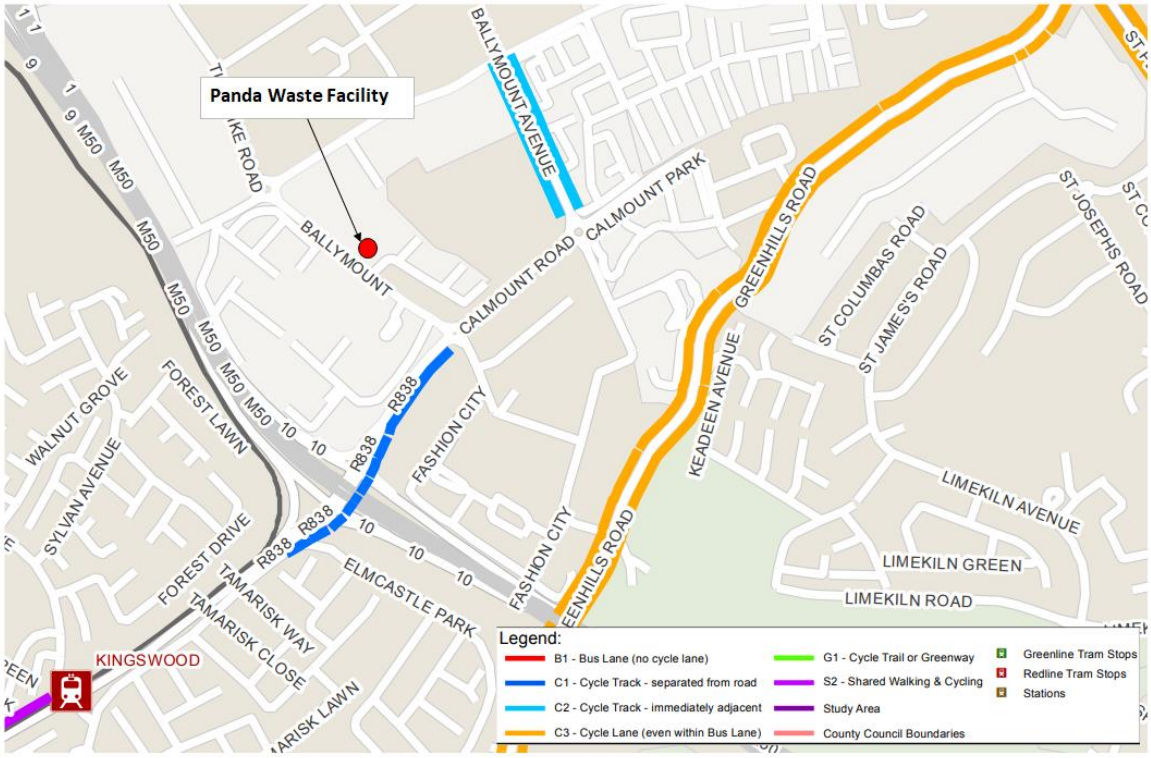


Figure 5. Current cycle facilities

2.2.8 Cycle facilities in the area are currently limited to cycle lanes in both directions along Greenhill Road, and a short section of southbound cycle track along Calmount Road in the vicinity of the N50.

2.2.9 The proposed 'Greenhills to City Centre' Bus Connects Scheme would greatly improve bus and cycle connections in the area. This would incorporate a new link connecting Greenills Road with Calmount Road (via Calmount Avenue).

2.2.10 The CBC route would become a key corridor for new bus services and cycle movements beween Tallaght and the City Centre.

2.3 Road Network

2.3.1 The road network in the vicinity of the site is shown in **Figure 6**.

Figure 6. Road Network

2.3.2 The M50 passes within 500m of the site. This National Road forms a loop around the west of Dublin from north to south, and joins each of the major radial routes including the M1, M2, M3, M4, N7 and N11. From the site, Junction 10 of the M50 is accessed via Ballymount Road Upper, and then Calmount Road.

2.3.3 Calmount Road runs north-east from M50 J10. Between M50 J10 and Ballymount Road Upper, Calmount Road has two lanes in either direction, and a speed limit of 60km/h. To the north of Ballymount Road Upper, Calmount Road is a single carriageway.

2.3.4 Calmount Road ends in a dead-end 600m to the north-east of Ballymount Avenue, meaning that the route to the city centre from the site is via Calmount Road, Ballymount Avenue, and then Ballymount Road Lower.

2.3.5 The site is located on Ballymount Road Upper, which connects Calmount Road with Ballymount Road Lower. It is a single carriageway road with a speed limit of 60km/h, which provides access to numerous businesses that are located on both sides of the road.

2.3.6 The Calmount Road / Ballymount Road Upper junction is a non-signalised roundabout where the geometry does not allow east to west movemments onto Ballymount Road Upper, as shown in **Figure 7**.

Figure 7. Calmount Road / Ballymount Road Upper Roundabout

2.3.7 Yellow hatched markings are in place on the eastern side of the roundabout, which prevent traffic queuing southbound on Calmount Road from blocking west to east movements across the junction on Ballymount Road Upper.

2.3.8 The Ballymount Road Upper / Ballymount Road Lower / Turnpike Road roundabout is located at the western end of Ballymount Road Upper. It is a four-arm priority roundabout, with each entry arm comprising a single lane plus flare, as shown in **Figure 8**.

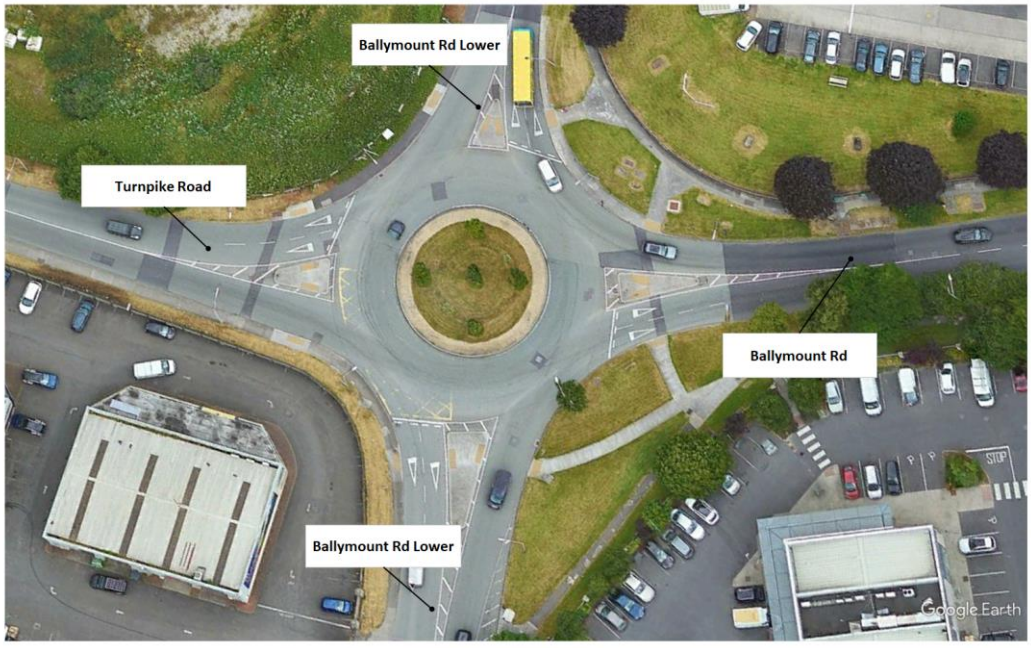


Figure 8. Ballymount Road Upper / Lower / Turnpike Road Roundabout

2.4 City Edge Project

2.4.1 The City Edge Project is a joint project that has been undertaken by SDCC and Dublin City Council (DCC). It is described as a 'transformative initiative' that aims to re-imagine the Naas Road, Ballymount and Park West areas at the western edge of Dublin City.

2.4.2 The overall aim of the project is to create a new urban quarter, with the potential for 40,000 new homes and 75,000 jobs, making it one of the largest regeneration schemes in Europe.

2.4.3 A Strategic Framework has been prepared setting out a high-level strategy for the future development. The strategy identifies that the City Edge area is well served by public transport – the Luas, the Kildare Railway Line and frequent bus services as well as regional and national roads, but recognises that there is scope to significantly improve active and public transport infrastructure including:

- New rail and Luas stations.
- New bus routes.
- New cycle lanes to support the existing and future population.

2.4.4 The following elements are of direct relevance to the Panda development:

- An on-street cycle facility is proposed on Ballymount Road Upper. No further detail on this has yet been developed.

2.4.5 At the time of writing, the City Edge project is at an early stage, but the proposed Panda development is consistent with the framework that is proposed, which foresees an intensification of the area between Ballymount Avenue and the M50, which contains the Panda site. The development of the potential on-street cycle facility will not be affected by the proposed development.

2.5 Summary

2.5.1 The baseline review has identified the following key points:

- There is a reasonable standard of pedestrian infrastructure in the local area, which in SYSTRA's opinion is able to adequately accommodate the low levels of pedestrian activity on Ballymount Road Upper.
- The nearest bus stops are located within 120m of the site entrance. During the week, the 56A bus service runs between Tallaght and Ringsend at a frequency of ~75 minutes during the week.
- Cycle facilities in the area are currently limited to cycle lanes in both directions along Greenhill Road, and a short section of southbound cycle track along Calmount Road in the vicinity of the N50.
- The proposed 'Greenhills to City Centre' Bus Connects Scheme will greatly improve bus and cycle connections in the area, and would become a key corridor for new bus services and cycle movements between Tallaght and the City Centre.
- The site enjoys excellent access to the strategic road network, being located within 700m of Junction 10 of the M50.
- The route to the city centre from the site is via Calmount Road, Ballymount Avenue, and then Ballymount Road Lower.

3. TRAFFIC SURVEYS

3.1.1 SYSTRA commissioned classified Junction Turning Count (JTC) surveys at the following junctions:

- The R838 Calmount Road / Ballymount Road Upper roundabout;
- The site access junction on Ballymount Road Upper; and
- The Ballymount Road Upper / Ballymount Road Lower roundabout.

3.1.2 The surveys were carried out on Wednesday 27th September, between 07:00 and 19:00. The recorded peak hours were:

- AM peak: 08:00 – 09:00;
- Interpeak: 12:15 – 13:15; and
- PM peak: 16:00 – 17:00.

3.1.3 A full set out turning diagrams in included in **Appendix A**.

3.1.4 The AM peak hour was the busiest recorded period on Ballymount Road Upper, with southbound and northbound flows of 211 pcu and 987 pcu respectively passing the site entrance.

3.1.5 HGV flows across the network were 8.5% in the AM peak, 12.3% in the interpeak, and 6.5% in the PM peak hour.

3.1.6 In addition to the JTC surveys, an Automatic Traffic Counter (ATC) was in place for a 7-day period, located on Calmount Road to the south of the Ballymount Road Upper roundabout.

3.1.7 **Figure 9** shows the recorded traffic volumes (two-way) on each survey day.

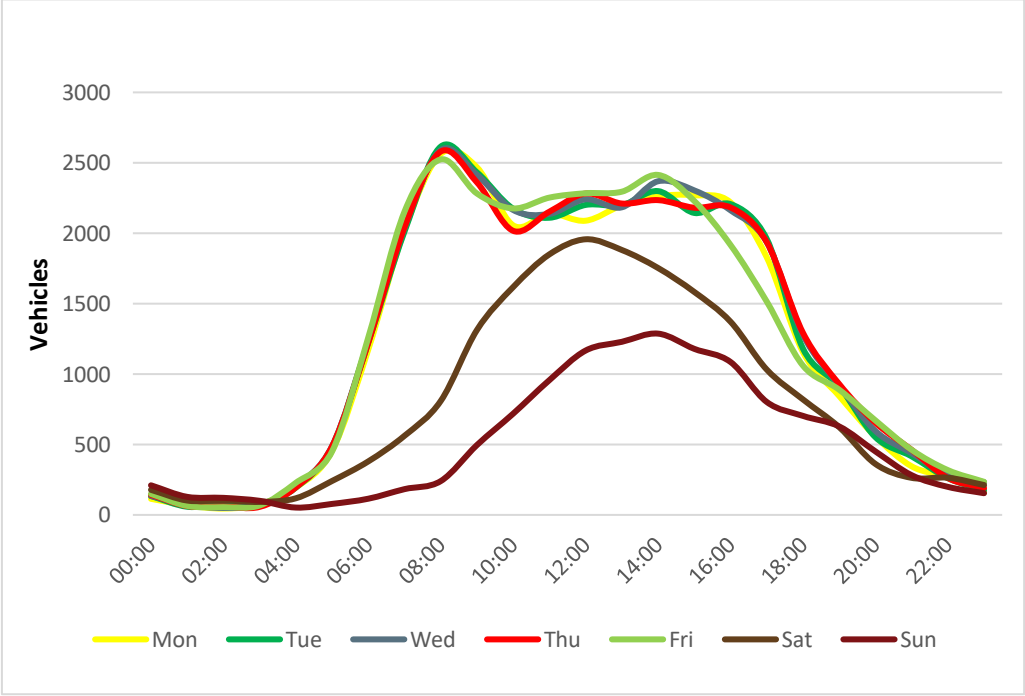


Figure 9. Recorded hourly traffic volumes by day on Calmount Road

3.1.1 **Figure 10** shows that during the week, traffic volumes peak between 08:00 and 09:00, then remain steady during the day until 17:00, reducing after this time.

3.1.2 The ATC data was used to check that traffic flows on Wednesday 27th September (the day of the JTC surveys) were representative of the other recorded weekdays, and also to calculate a factor to convert recorded 12-hour traffic flows to 24-hour AADF flows, for use in the EIAR assessment.

4. THE EXISTING FACILITY

Figure 10. Existing Facility

4.1.1 The existing facility comprises:

- A one-storey waste processing building, with a floor area of ~1,600sqm
- A two-storey office building, with a floor area of ~700sqm.
- A 77-space car park.

4.2 Staff Travel

4.2.1 Prior to 2022, the following were employed at the Panda facility:

- ~50 office staff, who were typically on site between 08:30 and 09:30.
- ~45 processing facility staff, who covered the site 24/7, operating on a three-shift rota with ~15 staff being on site at any one time.

4.2.2 In 2023, the office staff were relocated to other sites in Dublin, meaning that only the processing staff are currently based on the site.

4.2.3 The majority of staff currently travel by car. Over the course of the 12hr survey (07:00 – 19:00), a total of 41 inbound and 69 outbound Car / LGV movements were recorded. The imbalance between inbound and outbound movements is due to the surveys not capturing the arrival of the night shift after 19:00.

Table 2. Existing Staff / Visitor Vehicle Trips

Hour starting	Cars, LGV, MC	
	In	Out
07:00	12	1
08:00	10	4
09:00	4	2
10:00	1	4
11:00	2	5
12:00	2	6
13:00	5	6
14:00	3	6
15:00	1	9
16:00	2	14
17:00	0	7
18:00	0	5
TOTAL	**42**	**69**

4.2.4 Arriving and departing vehicles were spread relatively evenly over the 12-hr survey period, with slight peaks (of 21 vehicles) in both the morning (07:00 - 09:00) and evening (16:00 - 18:00).

4.3 Waste Operations

4.3.1 Information provided by SEHL from July 2023, which was a typical month on site, shows that on average there were 335 daily two-way HGV movements to and from the site, as shown in **Table 3**, Most deliveries to the site are by 25 tonne HGVs.

Table 3. Daily Recorded HGV movements (July 2023)

Day	Date	In	Out	Total
Mon	17/07/2023	169	169	338
Tue	18/07/2023	160	160	320
Wed	19/07/2023	176	176	352
Thu	20/07/2023	173	173	346
Fri	21/07/2023	162	162	324
Mon	24/07/2023	160	160	320
Tue	25/07/2023	166	166	332
Wed	26/07/2023	169	169	338
Thu	27/07/2023	177	177	354
Fri	28/07/2023	161	161	322
Average Weekday		**167**	**167**	**335**

4.3.2 **Table 3** shows that there are an average of 167 inbound HGV deliveries on a typical weekday, resulting in 335 two-way trips.

4.3.3 Loading and unloading times vary depending upon the type of vehicle, and the materials that are being transported. A bulker vehicle typically takes 10 minutes to unload, and 20 minutes to load, whilst a typical HGV / skip vehicle can be unloaded in 2 minutes, and loaded in 5

minutes. However, all HGVs arriving at the site depart within the hour. Similarly, HGVs arriving to pick up a load will be loaded and depart within the same hour that they arrive.

4.3.4 **Figure 11** shows the recorded combined inbound and outbound profile of HGV trips to and from the site.

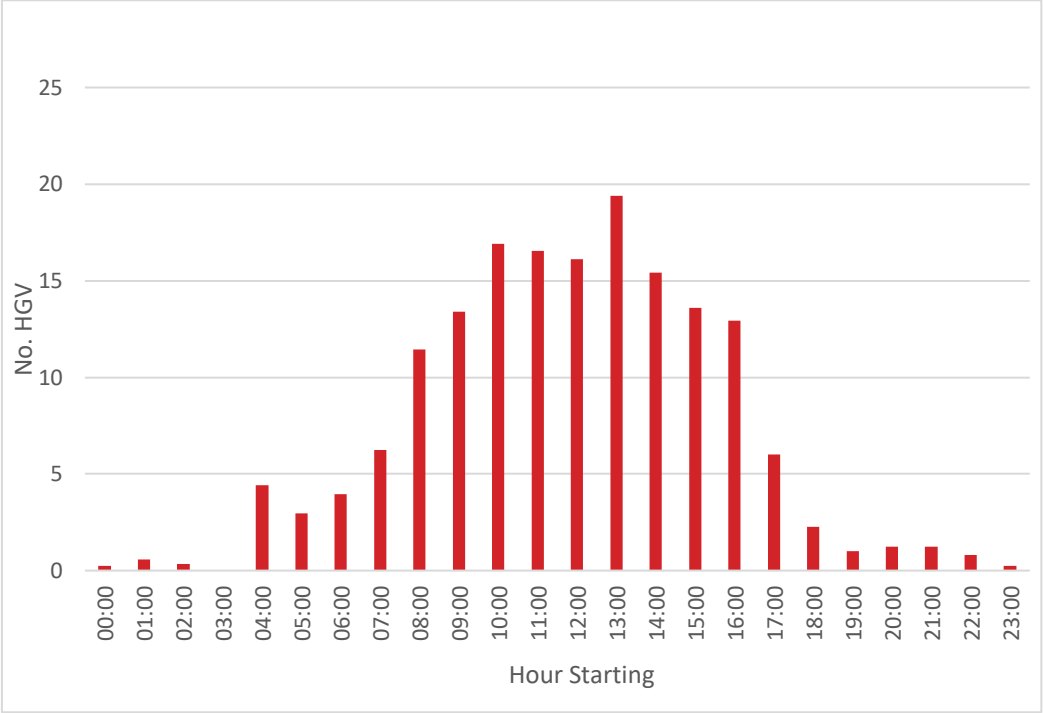


Figure 11. Existing profile of HGV trips (July 2023)

4.3.5 **Figure 14** shows that the peak period for HGV deliveries to and from the site is between 10:00 and 15:00, which is outside traditional road network peak hours. Noticeable HGV activity on the site commences around 04:00, and tails off after 17:00.

4.3.6 In terms of the distribution of HGV trips:

- 50% arrived from Ballymount Road Upper to the north of the development, and 50% from the south.
- 70% turned left on departure, and headed towards Calmount Road and the M50.
- 30% turned right on departure, and headed towards Ballymount Road Lower and Turnpike Road.

5. THE PROPOSED DEVELOPMENT

5.1 Proposed Site Layout

5.1.1 The proposals would increase the tonnage of waste processed from 150,000 tonnes to 350,000 tonnes per year. This will require the redevelopment and modernisation of the facility, to enable it to deliver this increased throughput.

5.1.2 The proposed site layout is shown in **Figure 12**. A larger site plan is included in **Appendix B**.

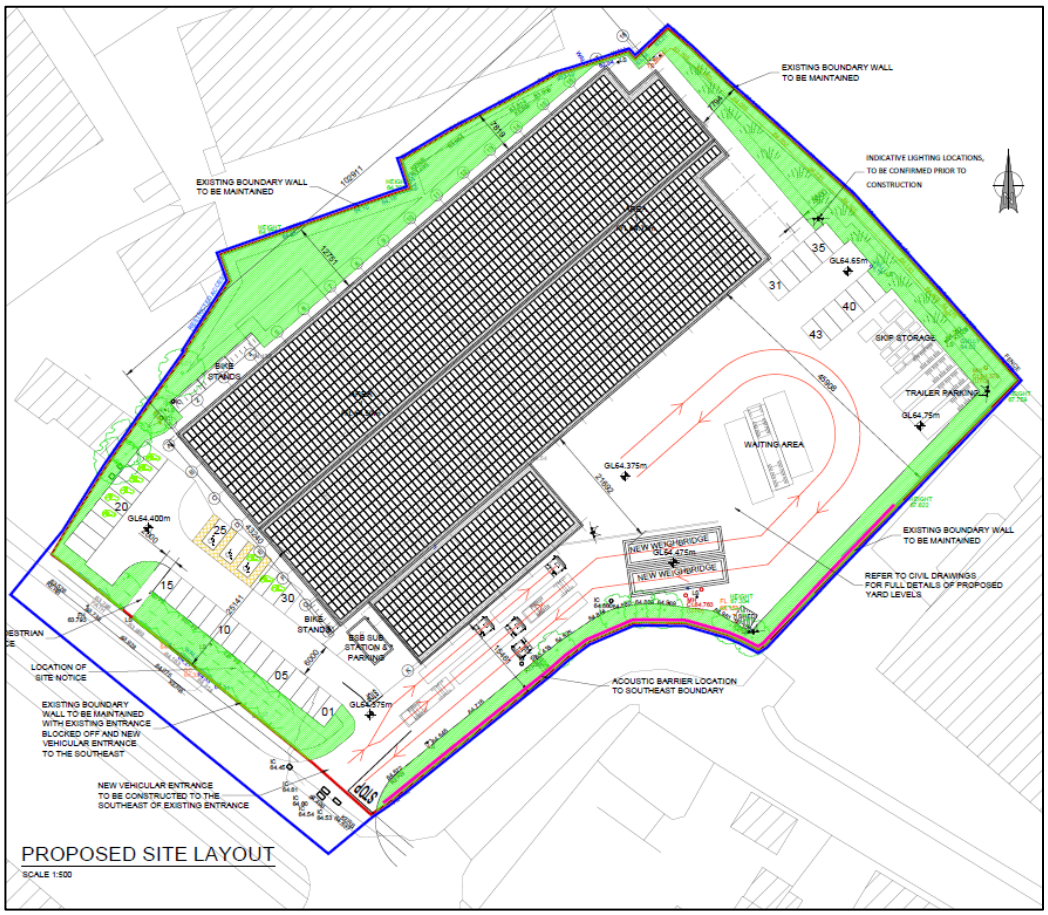


Figure 12. Proposed Layout

5.1.3 The development will consist of:

- Demolition of all existing buildings on the site.
- Construction of a 4,710 sqm one-storey material recovery building, which will include an ancillary administration reception office, a canteen, WCs, and storage space.

5.1.4 As soon as the new facility is operational, the activites at the nearby Ballymount Civic Amenity Baling Station will be transferred to the site. The Baling Station currently processes in the region of 190,000 tonnes of municipal solid waste.

5.1.5 Taking the changes at both facilities into account, the amount of waste processed within the Ballymount area will be very similar.

5.1.6 The overall effect of the development will be to consolidate the operations of the existing Panda facility and Baling Station into one site. The overall number of HGV movements in the Ballymount area will be similar to those experienced at present, but there will be a redistribution of trips from Calmount Road to the north of Ballymount Road Upper, onto Ballymount Road Upper itself.

5.2 Site Access

5.2.1 A relocated access junction onto Ballymount Road Upper will be provided, and will be used by all vehicles accessing the site.Turning space is provided within the site to allow HGVs to enter and leave in a forward gear. Swept paths are shown in **Appendix D**. Visibility splays showing junction visibility, and visibility for drivers over the footway, are also included in **Appendix D**.

5.2.2 A separate pedestrian and cycle access into the site will be provided further to the north on Ballymount Road Upper. This will provide a safe entry and exist point for staff and visitors.

5.3 Waste Operations

5.3.1 All waste deliveries to and from the site will be coordinated by the transport manager, and arrive on a pre-determined schedule. This allows the site to operate smoothly, and ensures that demands can be managed throughout the day.

5.3.2 HGVs will enter the yard via the access junction. For bulk waste vehicles, three loading / unloading bays will be provided within the site. If no loading bays are free, then the vehicles will wait in one of the three marked spaces. Typical turnaround time for these vehicles will be between 6-20 minutes.

5.3.3 Skip vehicles will unload at different locations within the shed building, depending upon what type of materials they are transporting. Typical turnaround time for these vehicles will be between 2-8 minutes.

5.4 Staff numbers

5.4.1 There will be 20 staff employed on site, who will be split between production, cleaning and maintenance roles. It is expected that 10 people will be on site at any one time.

5.5 Hours of Operation / Shift Times

5.5.1 The site will operate in two main shifts:

- 6am – 3pm
- 3pm – midnight

5.5.2 Between midnight and 6am maintenance and cleaning will be carried out on site, and occasional deliveries may be received during this period.

5.6 Parking Provision

5.6.1 SDCC's County Development Plan (CDP) sets out maximum parking standards for different development types. There is no specific rate specified for a waste facility such as proposed. In the absence of this, the parking rate for 'Warehousing' has been applied to the development. Table 12.25 of the CDP states that for Warehousing in Zone 1, a maximum of

1 parking space per 100m^2 shall be provided, which would equate to 47 parkings paces for the 4,710m^2 facility.

5.6.2 In total, 43 car parking spaces would be provided, of which:

- Three would be disabled spaces, which is 5% of total parking spaces.
- Nine would be EV charging bays (including one of the above disabled spaces), which is 20% of the total parking spaces.

5.6.3 Twenty-four cycle parking spaces will be provided. These will be located in covered and secure bike stands outside the main warehouse entrance. SDCC's CDP requires a minimum of 1 long-term cycle space per 200m^2 GFA for Warehousing land uses, which equates to 24 spaces at the Panda facility.

6. DEVELOPMENT TRAVEL DEMAND

6.1 Staff Travel

6.1.1 The number of workers at the new facility, and their shift patterns, will be less than currently present on site. It is anticipated that just 10 staff members will be on site at any one time.

6.1.2 For the purposes of the traffic impact assessment, it has robustly been assumed that all staff members will arrive separately by car, which will create 10 inbound and 10 outbound vehicle trips across the full day, all of which will be outside peak network times, with the first shift arriving by 06:00 and departing at 15:00, and the second shift arriving for 15:00 and departing at midnight. All staff travelling to and from shifts will do so outside of 'traditional' network peak hours.

6.1.3 The accompanying Mobility Management Plan (MMP) aims to reduce the percentage of single-occupancy car trips, primarily in the short-term through the expansion of car-sharing within the business.

6.2 Waste Operations

6.2.1 The proposed development will have the capacity to process 350,000 tonnes of waste per year, just over double the current capacity. This will result in a proportionate increase of 133% in existing HGV movements to the site. The profile of deliveries will remain similar to present. **Table 4** shows the existing and future inbound profile and volume of HGV traffic on a typical weekday.

Table 4. Existing and Future HGV movements

Hour starting	Existing Inbound	Proposed Inbound
00:00	0	1
01:00	1	1
02:00	0	1
03:00	0	0
04:00	4	10
05:00	3	7
06:00	4	9
07:00	6	15
08:00	11	27
09:00	13	31
10:00	17	39
11:00	17	39
12:00	16	38
13:00	19	45
14:00	15	36
15:00	14	32
16:00	13	30
17:00	6	14
18:00	2	5
19:00	1	2
20:00	1	3
21:00	1	3
22:00	1	2
23:00	0	1
TOTAL	167	390

6.2.2 **Table 4** shows that with the development in place, there will be a total of 390 HGV arrivals (and therefore, departures), over the course of the 24-hour day. The busiest period for HGV trips is between 10:00 and 16:00, outside typical network peak hours.

6.2.3 Compared to current operations, in the AM (08:00 - 09:00) and PM (17:00 – 18:00) network peak hours, there will be 16 and 8 more more inbound HGV movements respectively, as a result of the development.

7. TRAFFIC IMPACT

7.1 Introduction

7.1.1 This section of the TA reports on the results of a threshold assessment, and subsequent junction capacity modelling exercise, which has assessed the impact of the development on the local road network. This considers:

- The percentage increase on road links as a result of the development;
- Existing junction performance;
- The number of vehicle trips generated by the development, and where these trips are likely to arrive from / travel to; and
- An allowance for background traffic growth.

7.2 Threshold Assessment

7.2.1 A threshold assessment on each of the links at the Calmount Road / Ballymount Road Upper junction, and the Ballymount Road Upper / Ballymount Road Lower junction was undertaken.

7.2.2 TII's 'Traffic and Transport Assessment Guidelines' (PE-PDV-02045, May 2014), state that a threshold approach should be used to establish the area of influence of the development. It states that, "*In general, the study area should include all road links and associated junctions where traffic to and from the development may be expected to exceed 10% of the existing traffic movements, or 5% in congested or other sensitive locations, including junctions with national roads*".

7.2.3 The Threshold Assessment **only takes into account the additional traffic generated by the proposed development compared to current operations**. Current operational traffic is captured in the baseline figures. The results of the Threshold Assessment are presented in **Table 5**.

Table 5. Threshold Assessment (Peak hours)

Link	% impact		
	AM	IP	PM
Turnpike Road	0.7%	0.9%	1.3%
Ballymount Rd Lower north of BRU	1.2%	1.5%	4.3%
Ballymount Rd Lower south of BRU	0.6%	0.3%	0.8%
Ballymount Rd Upper between BRL and Panda	1.9%	2.4%	5.3%
Ballymount Rd Upper between Panda and Calmount Rd	2.7%	4.1%	3.3%
Calmount Rd north of BRU	-1.2%	-1.5%	-0.5%
BRU east of Calmount Rd	0.0%	0.0%	0.1%
Calmount Rd south of BRU	0.5%	0.9%	0.8%

7.2.4 The assessment shows that the proposed development will lead increases of betweem 1.9% and 5.3% on Ballymout Road Upper in the AM, IP and PM peak hours. Projected increases on all other roads are less than 5%. Traffic flows on Calmount Road, north of Ballymount Road Upper, are expected to reduce due to traffic diverting from the existing Baler site.

7.2.5 Table 2.1 of the TII's 'Traffic and Transport Assessment Guidelines' states that a TA is required when traffic to and from the developmetn exceeds 10% of the traffic on an adjoining road, or 5% where congestion exists, or the location is sensitive. In this instance, given the high

volumes of traffic on Calmount Road and Balymount Road Upper, further capacity analysis has been undertaken at the the three key junctions on Ballymount Road Upper, as detailed in **Section 7.3**.

7.3 Modelled Junctions

7.3.1 The following junctions have been modelled:

- Calmount Road / Ballymount Road Upper roundabout.
- Ballymount Road Upper / Ballymount Road Lower / Turnpike Road roundabout.
- Ballymount Road Upper / Site Access junction.

7.4 Junction Assessment Software

7.4.1 Junctions v10 (ARCADY module), an industry-standard software package, has been used to test each priority junctions.

7.4.2 The modelling reports on the Ratio of Flow Capacity (RFC) and the maximum forecast queue for each arm of the roundabout.

7.4.3 The RFC of an arm of a junction is one of the principal factors in influencing queues and delays. General engineering design principles, as set out in DMRB, suggest that when assessing a priority junction or roundabout, RFC levels on a given arm of a junction should not exceed 0.85 in order for that arm to operate within its 'practical' capacity. Should the RFC level exceed 1.0 then the junction is considered to be operating above its 'theoretical' capacity.

7.4.4 When the performance of an arm exceeds 1.0 RFC, the subsequent queue and delay information increases exponentially. In these instances, queue and delay values should not be compared between scenarios, it is enough to identify that the junction is performing operating significantly over capacity.

7.5 Modelled Time Periods

7.5.1 The following peak hours have been assessed, as identified in the 2023 survey.

- AM Peak: 08:00 – 09:00;
- Inter-peak: 12:15 – 13:15; and
- PM Peak: 16:00 – 17:00.

7.6 Traffic Scenarios

7.6.1 Traffic flows have been calculated for the following scenarios:

- **Do Minimum 2025** (Year of Opening)
- Do Something 2025
- **Do Minimum 2030** (Year of Opening + 5)
- Do Something 2030
- **Do Minimum 2040** (Year of Opening + 15)
- Do Something 2040

Do Minimum Scenarios

7.6.2 The future year Do Minimum scenarios include Background traffic growth. Base 2023 traffic flows have been factored to future year flows using guidance set out in the 'Project Appraisal Guidelines for National Roads Unit 5.3', specifically Table 6.2 'Link Based Growth Rates' for Dublin. The following combined factors have been calculated, based upon Central Growth Rates:

- 2023 - 2026 (Year of Opening) – 1.03
- 2023 – 2030 (YoO + 5) – 1.10
- 2023 – 2040 (YoO + 15) – 1.15

Do Something Scenarios

7.6.3 The Do Something scenarios comprise the Do Minimum traffic flows, with the additional traffic from proposed development added. Traffic arriving or departing via Calmount Road has been modelled as diverting from the Baling Site (which the development would replace). Traffic arriving or departing vial Ballymount Road to the west of the site has been treated as new trips on the network.

7.6.4 Development traffic has been distributed onto the network using observed turning proportions. Turning diagrams are included in **Appendix A**.

7.7 Model Results

Calmount Road / Ballymount Road Upper roundabout

7.7.1 A full set out model files is included in **Appendix C**.

7.7.2 **Table 6** presents the modelled results for Calmount Road / Ballymount Road Upper roundabout.

Table 6. Calmount Rd / BRU roundabout results

Movement	AM peak hour (0800-0900)			Inter-peak hour (1215-1315)			PM peak hour (1600-1700)		
	Queue (pcu	Delay (s)	RFC	Queue (pcu)	Delay (s)	RFC	Queue (pcu)	Delay (s)	RFC
Base 2025									
Calmount Rd north	0.3	4.97	0.19	0.7	6.47	0.39	1.3	9.65	0.57
BRU east	0.3	3.63	0.21	0.8	5.97	0.43	1.6	10.65	0.61
Calmount Rd south	0	0.04	0.02	0	0.04	0.01	0	0.04	0.01
BRU west	0.6	10.04	0.33	1.4	9.51	0.56	2.2	11.11	0.68
Base 2025 + Dev									
Calmount Rd north	0.2	4.99	0.17	0.6	6.51	0.37	1.3	9.85	0.57
BRU east	0.3	3.68	0.22	0.8	6.16	0.44	1.6	11.05	0.62
Calmount Rd south	0	0.04	0.02	0	0.04	0.01	0	0.04	0.01
BRU west	0.8	11.23	0.41	1.9	11.31	0.63	2.5	12.4	0.71
Base 2030									
Calmount Rd north	0.3	5.27	0.2	0.8	7.21	0.44	1.8	11.99	0.63
BRU east	0.3	3.76	0.23	1	6.66	0.47	2.2	14.27	0.69
Calmount Rd south	0	0.04	0.03	0	0.04	0.01	0	0.04	0.01
BRU west	0.6	10.2	0.39	1.8	11.33	0.61	3	14.2	0.74
Base 2030 + dev									
Calmount Rd north	0.3	5.29	0.19	0.8	7.27	0.42	1.8	12.29	0.64
BRU east	0.3	3.82	0.23	1	6.91	0.48	2.3	14.99	0.7
Calmount Rd south	0	0.04	0.03	0	0.04	0.02	0	0.04	0.01
BRU west	0.9	11.69	0.47	2.5	13.92	0.69	3.6	16.33	0.78
Base 2040									
Calmount Rd north	0.3	5.58	0.22	0.9	7.88	0.47	2.2	14.37	0.68
BRU east	0.4	3.9	0.24	1.1	7.3	0.5	3	18.44	0.75
Calmount Rd south	0	0.04	0.03	0	0.04	0.02	0	0.04	0.01
BRU west	0.9	14.1	0.43	2.2	13.15	0.66	3.7	17.38	0.79
Base 2040 + Dev									
Calmount Rd north	0.3	5.6	0.2	0.9	7.96	0.45	2.2	14.72	0.68
BRU east	0.4	3.96	0.25	1.2	7.6	0.51	3.1	19.56	0.76
Calmount Rd south	0	0.04	0.03	0	0.04	0.02	0	0.04	0.01
BRU west	1.3	16.52	0.52	3.1	16.68	0.73	4.6	20.56	0.82

7.7.3 **Table 6** shows that the junction is expected to operate within capacity in each of the scenarios tested.

7.7.4 As shown by the slight increases in RFC in the '+ Dev' scenarios, the proposed development is predicted to have a very marginal impact on junction perfomance, and no mitigation is deemed to be required.

Ballymount Road Upper / Lower / Turnpike Road roundabout

Table 7 presents the modelled results for the Ballymount Road Upper / Lower / Turnpike Road roundabout

Table 7. BRU / BRL / Turnpike Rd roundabout results

Movement	AM peak hour (0800-0900)			Inter-peak hour (1215-1315)			PM peak hour (1600-1700)		
	Queue (pcu	Delay (s)	RFC	Queue (pcu)	Delay (s)	RFC	Queue (pcu)	Delay (s)	RFC
Base 2025									
BRL north	0.7	4.95	0.38	1.5	7.88	0.56	0.9	5.95	0.47
BRU	3	11.42	0.74	1.5	7.8	0.57	0.3	3.55	0.21
BRL south	0.3	4.95	0.2	0.4	4.82	0.25	0.3	3.46	0.21
Turnpike Rd	0.2	3.64	0.16	0.4	3.94	0.28	0.2	3.22	0.18
Base 2025 + Dev									
BRL north	0.7	5.18	0.4	1.7	8.63	0.6	1.1	6.49	0.51
BRU	3.2	11.83	0.75	1.6	7.97	0.58	0.4	3.73	0.25
BRL south	0.3	5.03	0.2	0.4	4.87	0.25	0.3	3.59	0.22
Turnpike Rd	0.2	3.69	0.17	0.4	4.03	0.29	0.2	3.31	0.19
Base 2030									
BRL north	0.7	4.93	0.41	1.8	9.04	0.61	1.1	6.66	0.51
BRU	4.2	14.98	0.81	1.9	9.13	0.62	0.3	3.79	0.22
BRL south	0.3	5.3	0.22	0.4	5.21	0.28	0.3	3.55	0.24
Turnpike Rd	0.2	3.35	0.17	0.5	4.15	0.3	0.2	3.31	0.19
Base 2030 + dev									
BRL north	0.8	5.53	0.43	2.1	10.02	0.65	1.3	7.29	0.55
BRU	4.6	16.35	0.82	2	9.37	0.63	0.4	3.99	0.26
BRL south	0.3	5.52	0.23	0.4	5.28	0.28	0.3	3.69	0.25
Turnpike Rd	0.2	3.83	0.18	0.5	4.25	0.31	0.3	3.4	0.2
Base 2040									
BRL north	0.8	5.56	0.43	2.1	10.16	0.65	1.2	7.14	0.53
BRU	5.9	20.51	0.85	2.2	10.49	0.66	0.4	3.94	0.24
BRL south	0.3	5.83	0.24	0.5	5.58	0.3	0.3	3.66	0.25
Turnpike Rd	0.3	3.93	0.18	0.5	4.34	0.32	0.3	3.38	0.2
Base 2040 + Dev									
BRL north	0.9	5.85	0.45	2.5	11.4	0.68	1.5	7.85	0.57
BRU	6.3	21.8	0.86	2.3	10.77	0.67	0.4	4.16	0.28
BRL south	0.4	5.95	0.25	0.5	5.65	0.3	0.4	3.81	0.26
Turnpike Rd	0.3	3.99	0.19	0.5	4.45	0.33	0.3	3.47	0.2

7.7.5 **Table 7** shows that the junction is expected to operate within capacity in each of the scenarios tested, with the exception of the AM Base 2040 and AM Base 2040 + Dev scenarios, where the Ballymount Road Upper arm is expected to operate just above Practical Capacity.

7.7.6 The results show that this slight over-capacity is almost wholly down to existing traffic and expected traffic growth, rather than the very marginal increases due to the development. Given that this is more than 15 years in the future, and that national and regional transport policy, such as the Climate Action Plan 2023, aims to reduce the volume of vehicle kilometres by 2030, SYSTRA deem that no mitigation is required.

7.7.7 The long-term City Edge project will address economic development and transport infrastructure and demand at a strategic level in the area, which wil identify a structured framework for any transport improvements that are required.

Ballymount Road Upper / Panda Site Access juinction

7.7.8 **Table 8** presents the modelled results for Ballymount Road Upper / Panda Site Access priority junction.

Table 8. Ballymount Road Upper / PANDA access results

Movement	AM peak hour (0800-0900)			Inter-peak hour (1215-1315)			PM peak hour (1600-1700)		
	Queue (pcu)	Delay (s)	RFC	Queue (pcu)	Delay (s)	RFC	Queue (pcu)	Delay (s)	RFC
Base 2025 + Dev									
Panda Exit LT	0.1	6.18	0.08	0.2	7.28	0.14	0.1	7.56	0.08
Panda Exit RT	0.1	12.33	0.05	0.1	12.9	0.05	0.2	11.73	0.14
BRU RT into Panda	0.3	3.41	0.13	0.3	4.18	0.13	0.1	5.28	0.05
Base 2030 + dev									
Panda Exit LT	0.1	6.23	0.08	0.2	7.42	0.14	0.1	7.75	0.08
Panda Exit RT	0.1	12.93	0.05	0.1	13.58	0.05	0.2	12.27	0.15
BRU RT into Panda	0.4	3.32	0.15	0.4	4.1	0.14	0.1	5.26	0.06
Base 2040 + Dev									
Panda Exit LT	0.1	6.26	0.08	0.2	7.5	0.14	0.1	7.88	0.08
Panda Exit RT	0.1	13.38	0.05	0.1	14.07	0.05	0.2	12.66	0.15
BRU RT into Panda	0.5	3.27	0.17	0.4	4.04	0.15	0.1	5.24	0.06

7.7.9 **Table 8** shows that the junction is expected to operate within capacity in the 2025, 2030 and 2040 future year scenarios.

7.8 Junction Modelling Conclusion

7.8.1 The junction modelling exercise has tested the key junctions on Ballymount Road Upper, which would experience the biggest changes in traffic flow as a result of the development. The results demonstrate that the proposed development will have a very marginal impact on traffic flows and junction performance, and no mitigation measures are required.

8. MOBILITY MANAGEMENT PLAN (MMP)

8.1 Introduction

8.1.1 As part of the proposals, Beauparc is committed to developing and implementing a Mobility Mangement Plan (MMP).

8.1.2 The overall aim of the MMP is to reduce the level of private car use by encouraging people to walk, cycle, use public transport, car share.

8.2 Targets

8.2.1 The target of the ATP is a 10% reduction in the number of single occupancy car trips to the site, to be achieved by 2024. This target applies to staff and visitors and will be achieved by increasing the mode share percentage of sustainable travel alternatives, primarily cycling, bus use and car sharing.

8.2.2 The target of the ATP has been agreed with Beauparc, and is considered to be realistic but challenging.

8.3 Proposed MMP Action Plan Measures

8.3.1 To achieve the MMP targets set out above, a number of measures have been identified. These are:

- Appointment a Mobility Manager.
- Provision of a Welcome Travel Pack for residents.
- The provision of clear pedestrian and cycle signage and maps throughout the site, showing travel times to key destinations
- The provision of space for two bike hire hubs on the site.
- Measures to encourage Public Transport use, including liaising with local bus operators regarding bus scheduling, routes and school travel.

8.4 Mobility Manager

8.4.1 A Mobility Manager will be appointed to deliver the MMP. The role involves being the main point of contact for travel information, promotion and improvements, and the coordination and monitoring of the agreed measures.

8.5 MMP Actions

8.5.1 **Table 9** sets out the Actions which will be implemented at the site over the next five years. The Actions are intended to work in tandem with any infrastructure measures proposed as part of the expansion programme in order to deliver the targeted reduction in single occupancy vehicle trips of 10%.

Table 9. MMP Actions

	ACTION	DESCRIPTION
	Governance	
1	Appointment of a Mobility Manager (MM)	A TPC will be appointed in Q2 2024.
2	Transport Working Group (TWG)	Meetings will commence in 2024, prior to opening of the new facility. A suitable budget will need to be allocated to the implementation of the MMP and its associated measures.
	Reducing the Need to Travel	
3	Investigate Business Travel	Commencing in 2024, The MM will, in conjunction with staff and management, will look at business travel measures such as pool cars to assess what would work well for the business and staff.
4	Promote 'agile' working	Commencing in 2024 the TPC will explore the opportunities to promote 'agile' working within the company.
5	IT infrastructure	In 2024 the TPC will seek to reduce the need for unnecessary business trips through promoting video / teleconferencing and promoting shared business travel, where applicable.
	Active Travel	
6	Travel Options Noticeboard	The MM will provide active travel information in a prominent location. This will include bus timetable information and material, promoting the health, social and economic benefits of walking and cycling This should be in place for opening of the new facility.
7	Journey sharing	The MM will seek to introduce a journey-sharing scheme, so it is possible for staff to share walking, cycling and public transport trips also. This should be in place for opening of the new facility.
8	Cycle parking, shower & changing facilities	The introduction of infrastructure at the site should be undertaken as part of the redevelopment plans and should be in place for opening of the new facility.
9	Cycle to Work Scheme	In 2024, the MM will discuss with the Senior Management Team the possibility of introducing a Cycle-to-Work scheme for staff. The target date for scheme introduction would be the start of the 2025/6 financial year.
10	Travel Ticket Loan Scheme	In 2024, the TPC will discuss with the Senior Management Team the possibility of introducing a Travel Ticket Loan scheme for staff. The scheme would be rolled out in 2025 if approved.

ACTION		DESCRIPTION
Managing Car Use		
11	Car sharing scheme.	In 2024 the TPC will introduce a car sharing scheme for staff either as a bespoke Beaupark scheme or through the promotion of a third party provider's scheme. Subsequent reviews will consider the effectiveness of the scheme and opportunities for providing dedicated car sharing spaces.
Strategic Communications		
12	Contact details	In order to field questions from staff and visitors, contact details for the identified TPC will be established and promoted. Contact details will be provided as soon as the TPC is appointed.
13	Website	In 2024, the corporate website should be updated to include up to date information on accessing the site by a range of transport modes. The website should include a statement encouraging visitors to travel by sustainable modes wherever possible.
14	Staff recruitment & Induction	In 2024 the MM will ensure that information regarding the MMP and the travel options available are communicated during recruitment of new staff.
15	Staff manual	In 2024 the MM will review the staff manual to ensure it supports the Aims, Targets and Actions of the MMP

8.6 MMP Monitoring and Review

8.6.1 This section sets out the monitoring strategy for the Mobility Management Plan. The monitoring strategy is important for assessing how effectively the MMP has been in achieving its aim, objectives and targets. It can help identify measures that are not meeting objectives and reallocate resources accordingly.

8.6.2 An MMP is a continuous and evolving document requiring monitoring, review and revision to ensure that it remains relevant.

Travel Survey

8.6.3 It is recommended that a travel survey of employees is undertaken six months prior to the completion of the new facility. The results of the survey will identify baseline travel patterns in terms of modes used and the sustainable transport modes which require encouragement through the MMP measures.

8.6.4 The results of the survey will be used to inform the development of the finalised MMP targets and measures. The survey is designed to identify the distribution and mode share of trips from the development. The survey will also identify people's willingness and ability to try new modes, and what barriers they may face in making Smarter Travel choices.

Annual Monitoring

8.6.5 The Mobility Manager will carry out annual follow-up travel surveys with employees. These surveys should take place in the same month and be of the same format as the original baseline survey to ensure compatibility of results.

8.6.6 This monitoring is an opportunity to measure MMP achievements on an annual basis. This will then inform the ongoing development of the MMP, ensuring its targets and measures remain relevant to the needs of the residents, is site-specific and fit for purpose. Results will be analysed to enable the following:

- Measurement of the success of the MMP, enabling focused improvement on areas that have not achieved the desired modal shift via appropriate revisions to the MMP measures.
- Identification of early success stories of the MMP, which can help to encourage further participation and build momentum for sustainable travel.
- Ensures that changing travel patterns are considered, ensuring that the MMP measures can be updated to reflect the needs of development users.
- Allows targets which have been set too low or unrealistically high to be readjusted.

Reporting

8.6.7 Reporting of the results of the Post-Occupation Baseline Travel Survey, and findings from the ongoing monitoring activities and progress with implementation of the MMP will be agreed with SDCC.

8.6.8 All Actions will be agreed with the TWG and would be implemented over a five-year period. Actions will be reviewed and updated on a yearly basis to ensure they remain resource efficient and relevant to staff needs.

9. SUMMARY AND CONCLUSION

9.1 Summary

9.1.1 Systra Ltd has been commissioned by Starrus Eco Holdings Ltd (SEHL) to provide transport and highways advice in relation to the proposed redevelopment of the existing multi-processing facility at Panda Waste, which is located on Ballymount Road Upper, in the Ballymount area of Dublin.

9.1.2 The facility currently operates 24/7, and processes 150,000 tonnes of waste per year, as permitted by its current EPA Licence. Under the proposals, the existing buildings on the site would be demolished, and replaced with a new building with a processing capacity of 350,000 tonnes.

9.1.3 As soon as the new facility is operational, the activites at the nearby Ballymount Civic Amenity Baling Station will be transferred to the site, and the use of that site ceased in line with its future strategic objectives. The overall effect of the development will be to consolidate the operations of the existing Panda facility and Baling Station into one site

9.1.4 The site enjoys excellent access to the strategic road network, being located within 700m of Junction 10 of the M50.

9.1.5 The development will consist of:

- Demolition of all existing buildings on the site.
- Construction of a 4,710 sq m one-storey material recovery building, which will include an ancillary administration reception office, a canteen, WCs, and storage space.

9.1.6 There will be 20 staff employed on site, who will be split between production, cleaning and maintenance roles. It is expected that 10 people will be on site at any one time.

9.1.7 The transport impacts of the proposals will be to increase numbers of HGV trips travelling to and from the site on Ballymount Road Upper, which will primarily divert from Calmount Road to the north. HGV trips will with a similar daily profile to existing operations. Staff travel demand will be lower than current levels.

9.1.8 The number of HGVs travelling to and from the site will be twice the current level, with an estimated 390 inbound, and 390 outbound trips over the course of a typical weekday.

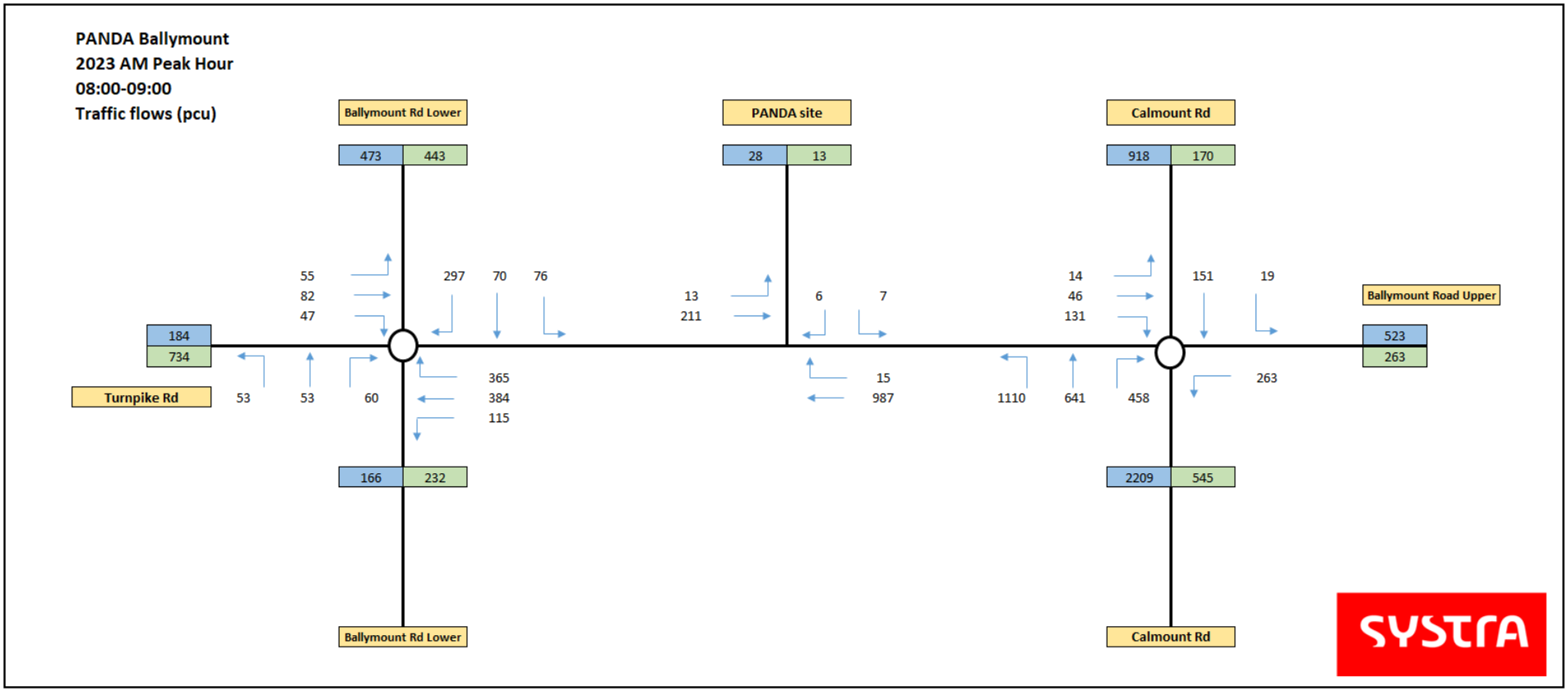
9.1.9 Analysis shows that the development will result in an increase in vehicle trips on Ballymount Road Upper of no more than 5% the in the AM, IP and PM peak hours. Traffic impacts on other roads are expected to result in increases in flow of less than 5%.

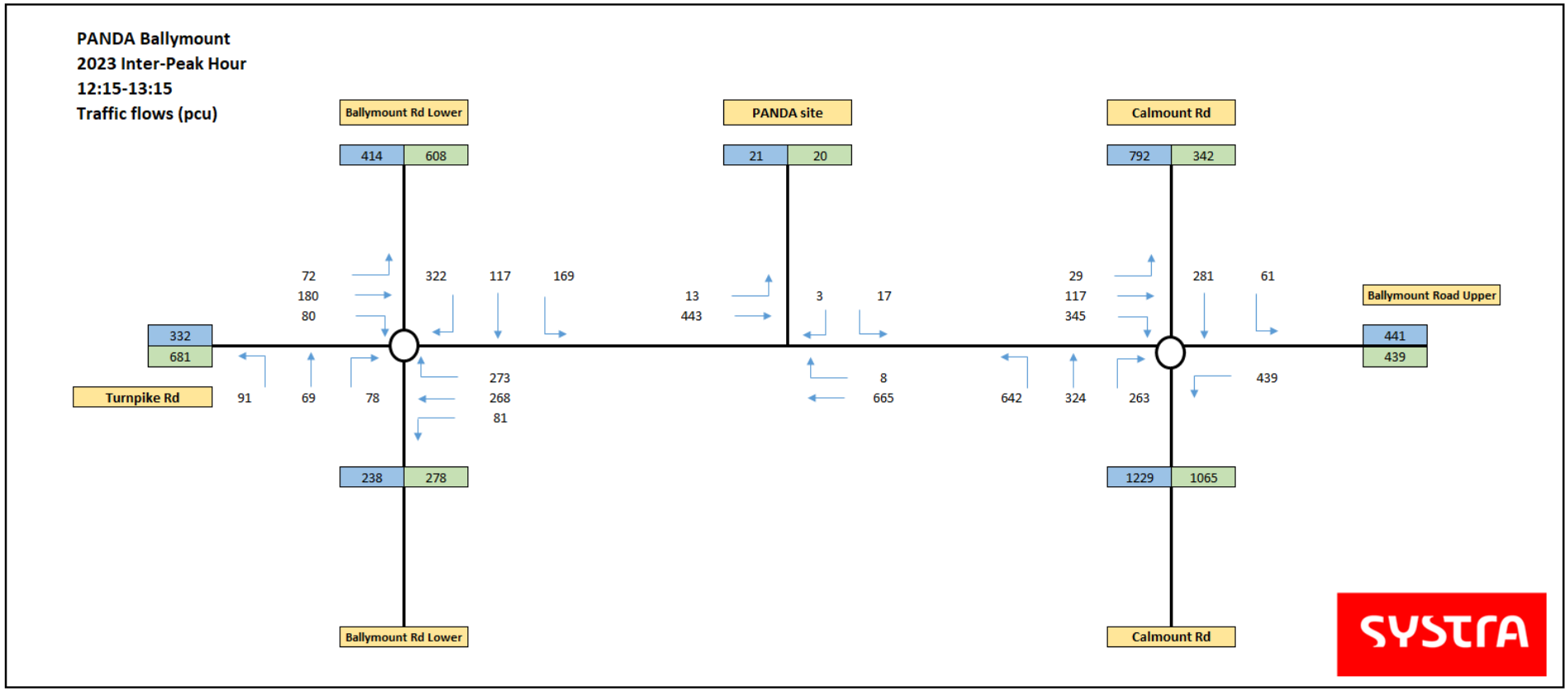
9.1.10 Junction capacity assessment demonstrates that the proposed development will have a very marginal impact on traffic flows and junction performance, and no mitigation measures are required.

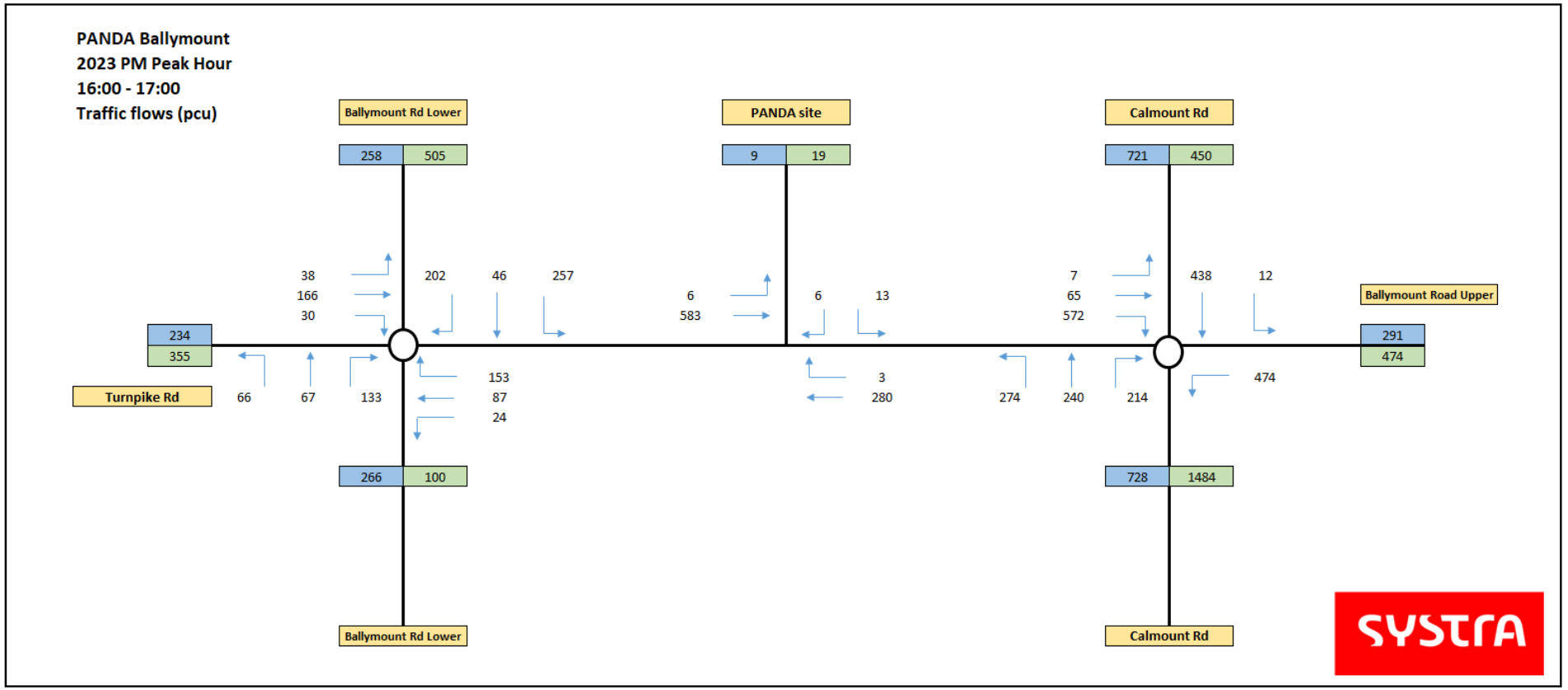
9.2 Conclusion

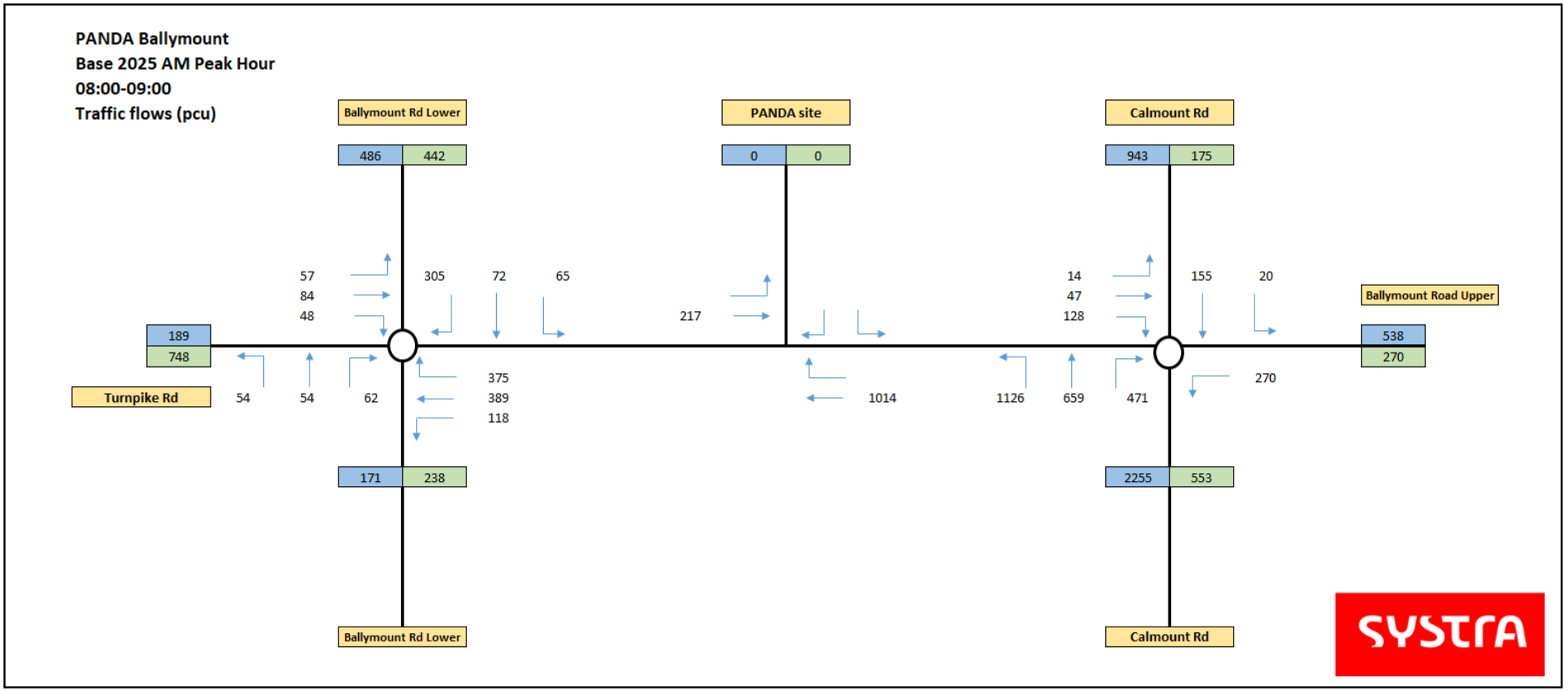
9.2.1 The Transport Assessment has found that the proposed development can be accommodated without any changes to the surrounding transport network.

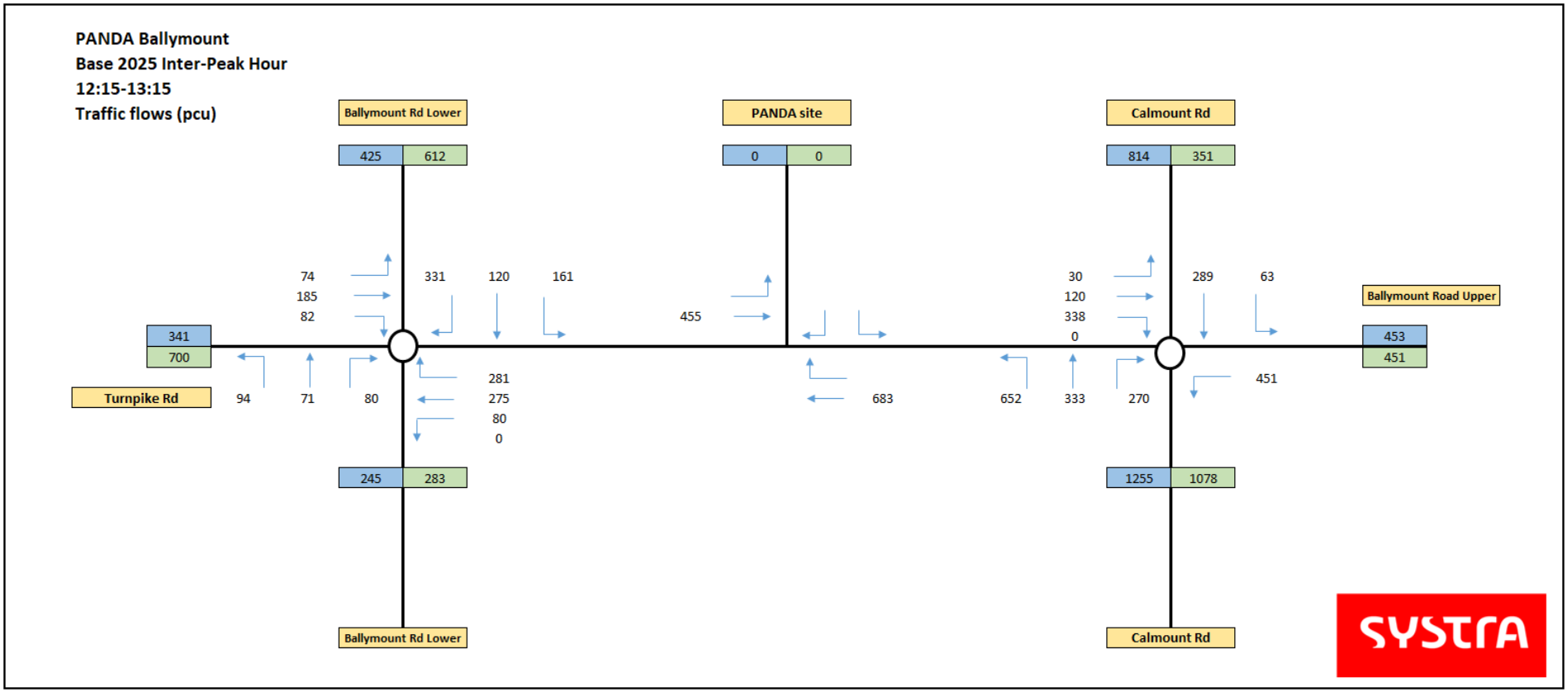
APPENDIX A – TRAFFIC FLOW DIAGRAMS

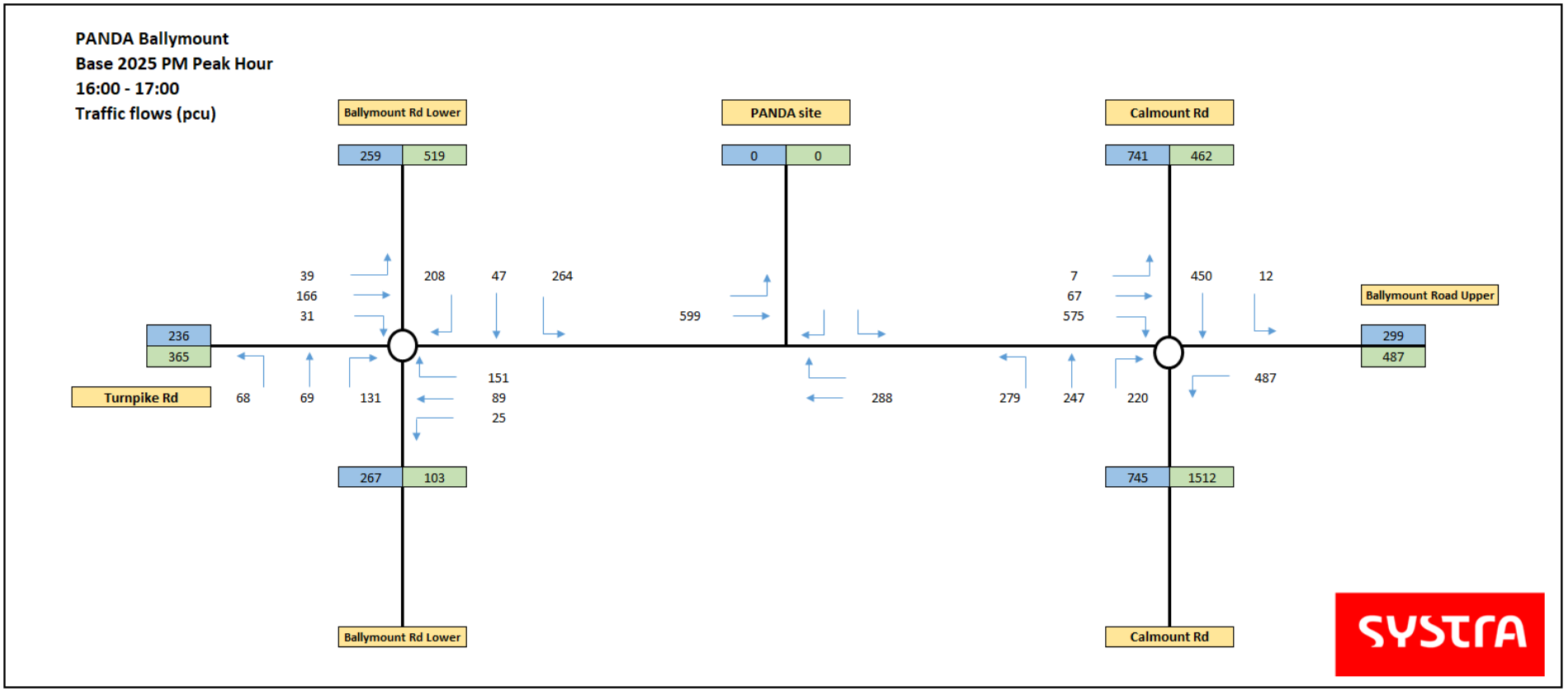

PANDA Ballymount
2023 AM Peak Hour
08:00-09:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
473
443
28
13
918
170
55
82
47
297
70
76
13
211
6
7
14
46
131
151
19
Ballymount Road Upper
184
734
523
263
Turnpike Rd
53
53
60
365
384
115
15
987
1110
641
458
263
166
232
2209
545
Ballymount Rd Lower
Calmount Rd

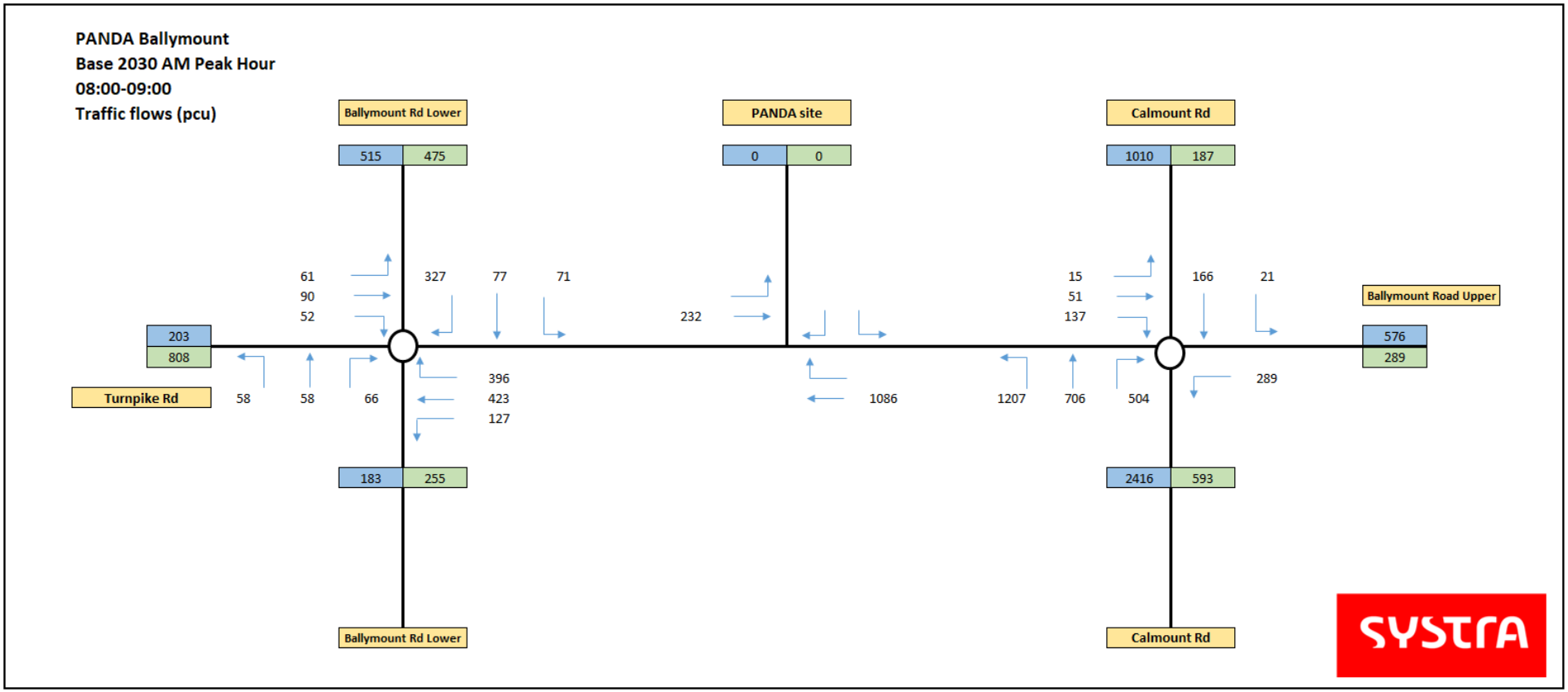

PANDA Ballymount
2023 Inter-Peak Hour
12:15-13:15
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
414
608
21
20
792
342
72
180
80
322
117
169
13
443
3
17
29
117
345
281
61
Ballymount Road Upper
332
681
441
439
Turnpike Rd
91
69
78
273
268
81
8
665
642
324
263
439
238
278
1229
1065
Ballymount Rd Lower
Calmount Rd

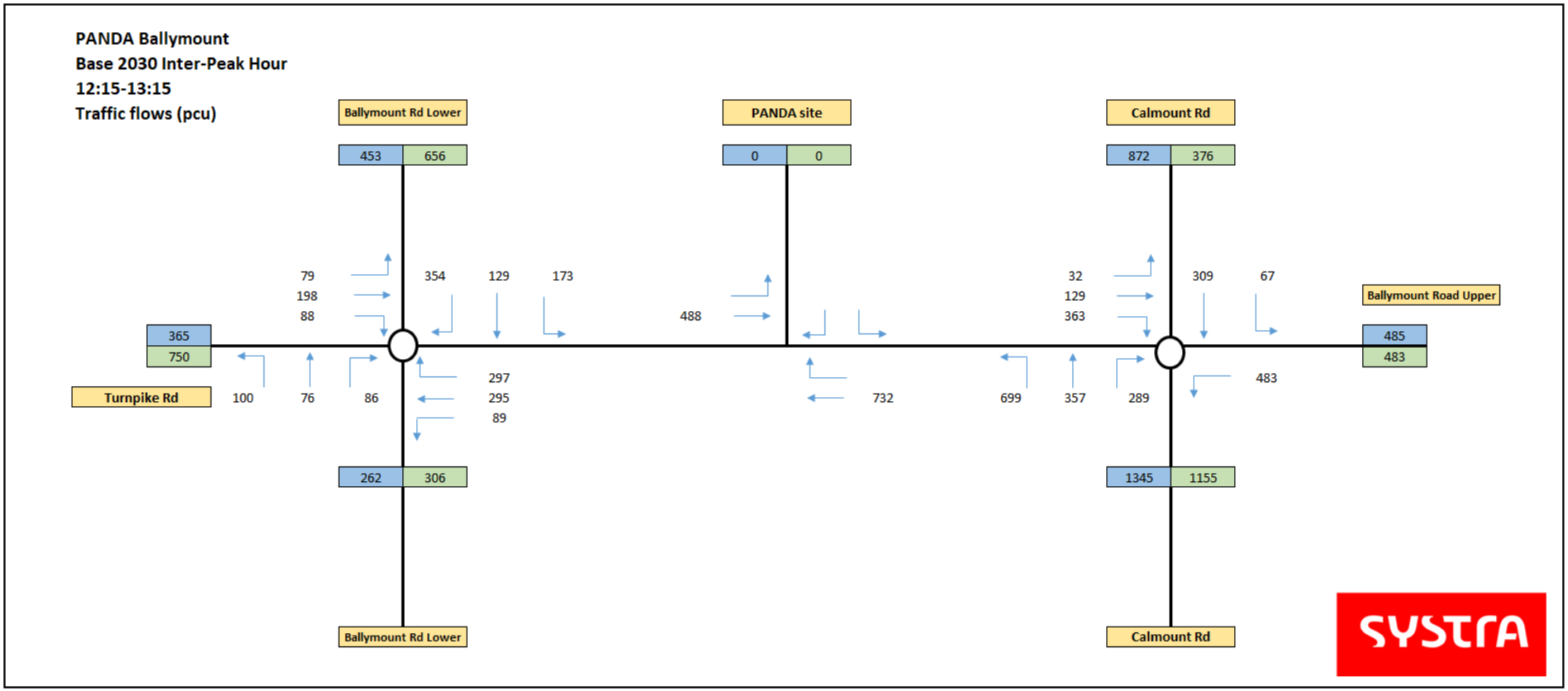

PANDA Ballymount
2023 PM Peak Hour
16:00 - 17:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
258
505
9
19
721
450
38
166
30
202
46
257
6
583
6
13
7
65
572
438
12
Ballymount Road Upper
234
355
291
474
Turnpike Rd
66
67
133
153
87
24
3
280
274
240
214
474
266
100
728
1484
Ballymount Rd Lower
Calmount Rd

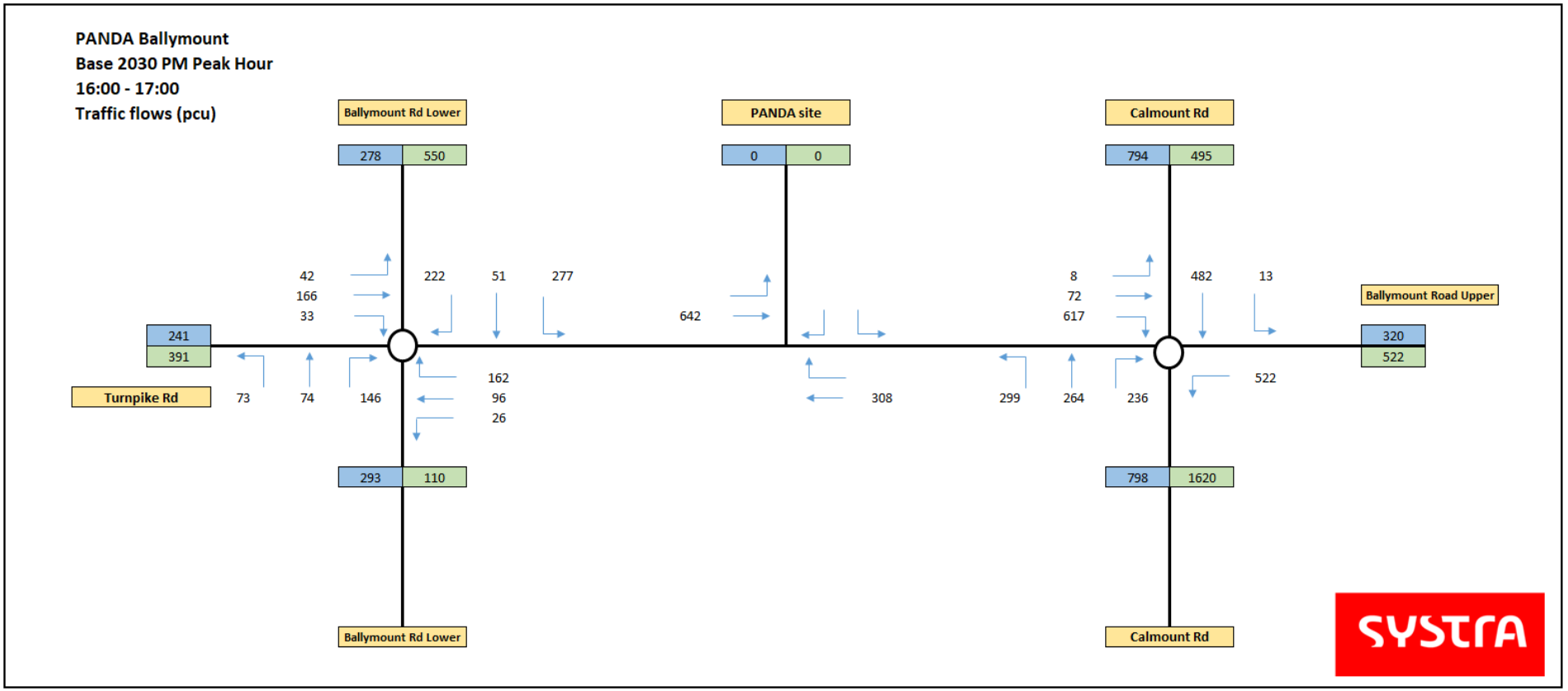

PANDA Ballymount
Base 2025 AM Peak Hour
08:00-09:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
486
442
0
0
943
175
57
84
48
305
72
65
217
14
47
128
155
20
Ballymount Road Upper
189
748
538
270
Turnpike Rd
54
54
62
375
389
118
1014
1126
659
471
270
171
238
2255
553
Ballymount Rd Lower
Calmount Rd

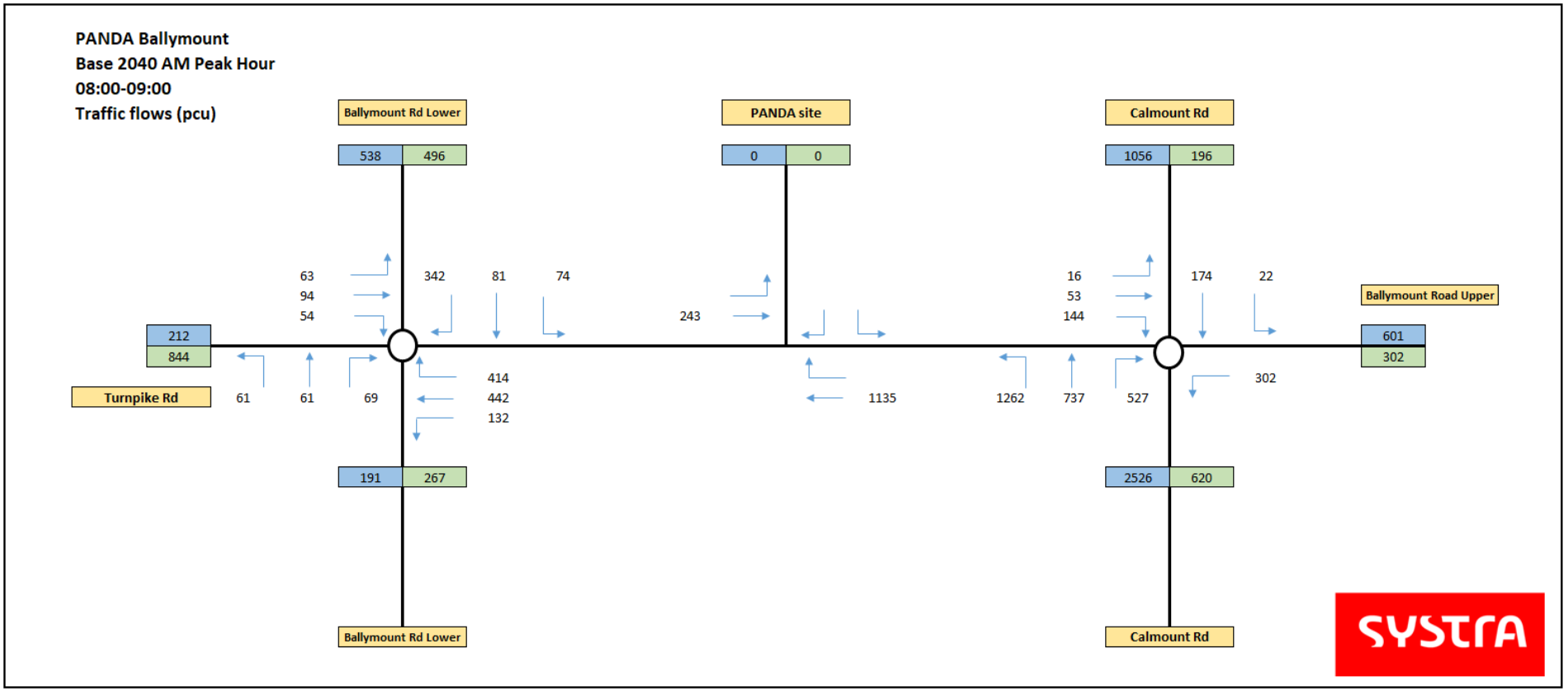

PANDA Ballymount
Base 2025 Inter-Peak Hour
12:15-13:15
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
425
612
0
0
814
351
74
185
82
331
120
161
455
30
120
338
0
289
63
Ballymount Road Upper
341
700
453
451
Turnpike Rd
94
71
80
281
275
80
0
683
652
333
270
451
245
283
1255
1078
Ballymount Rd Lower
Calmount Rd

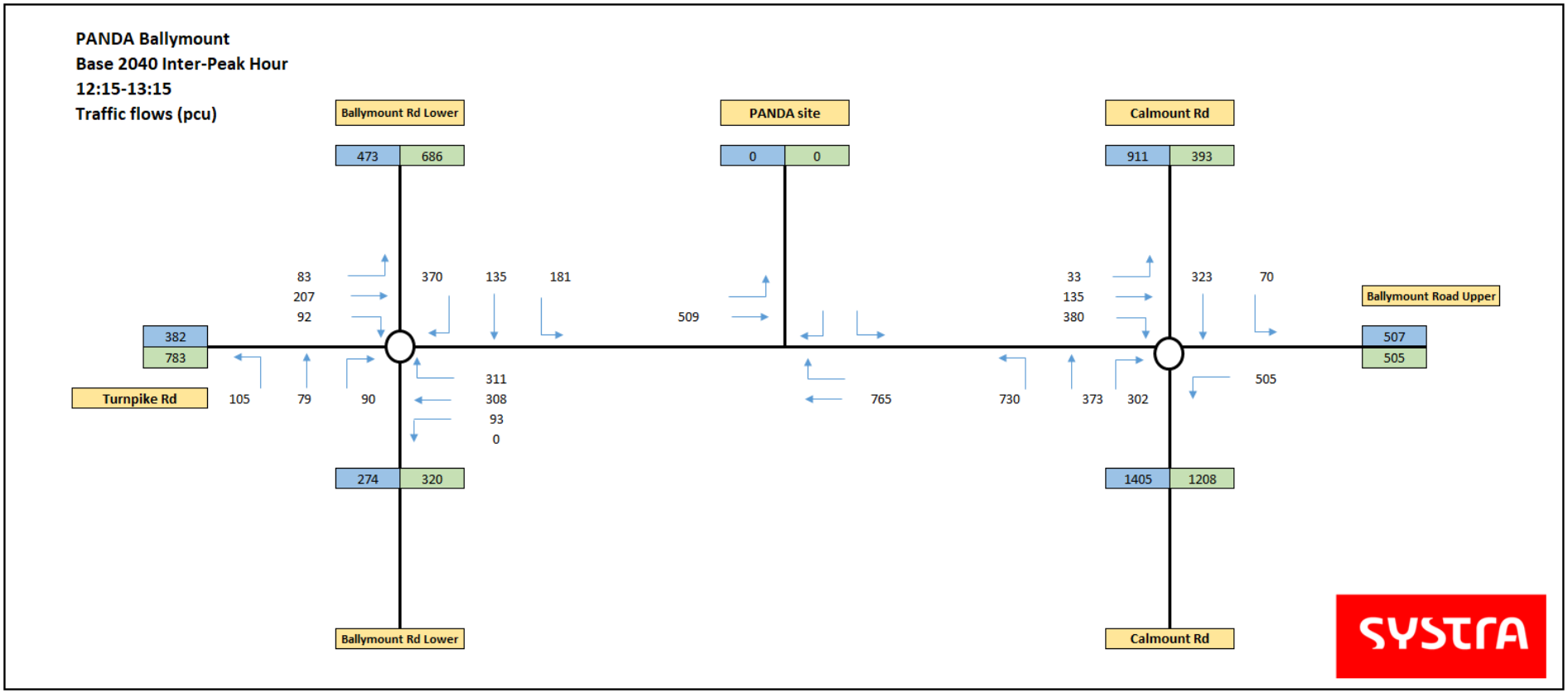

PANDA Ballymount
Base 2025 PM Peak Hour
16:00 - 17:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
259
519
0
0
741
462
39
166
31
208
47
264
599
7
67
575
450
12
Ballymount Road Upper
236
365
299
487
Turnpike Rd
68
69
131
151
89
25
288
279
247
220
487
267
103
745
1512
Ballymount Rd Lower
Calmount Rd

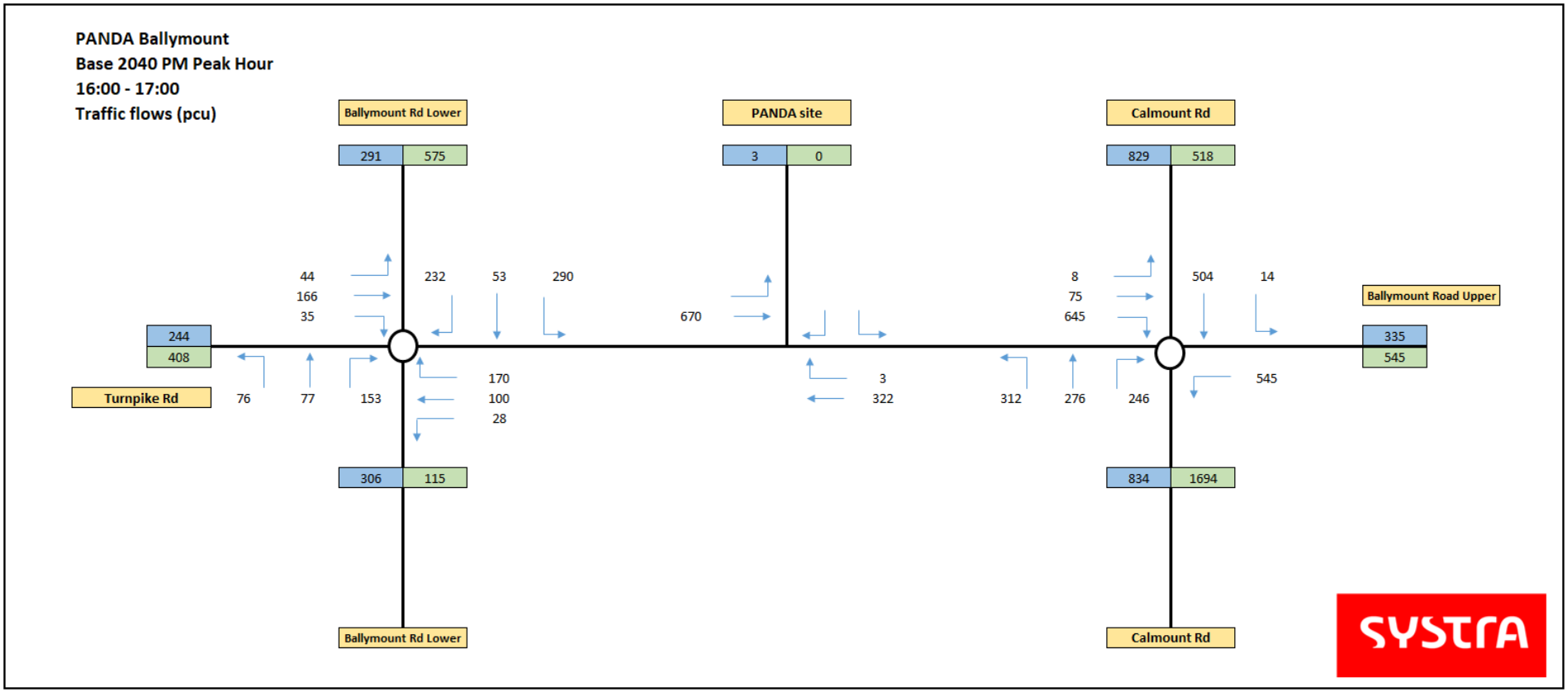

PANDA Ballymount
Base 2030 AM Peak Hour
08:00-09:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
515
475
0
0
1010
187
61
90
52
327
77
71
232
15
51
137
166
21
Ballymount Road Upper
203
808
576
289
Turnpike Rd
58
58
66
396
423
127
1086
1207
706
504
289
183
255
2416
593
Ballymount Rd Lower
Calmount Rd

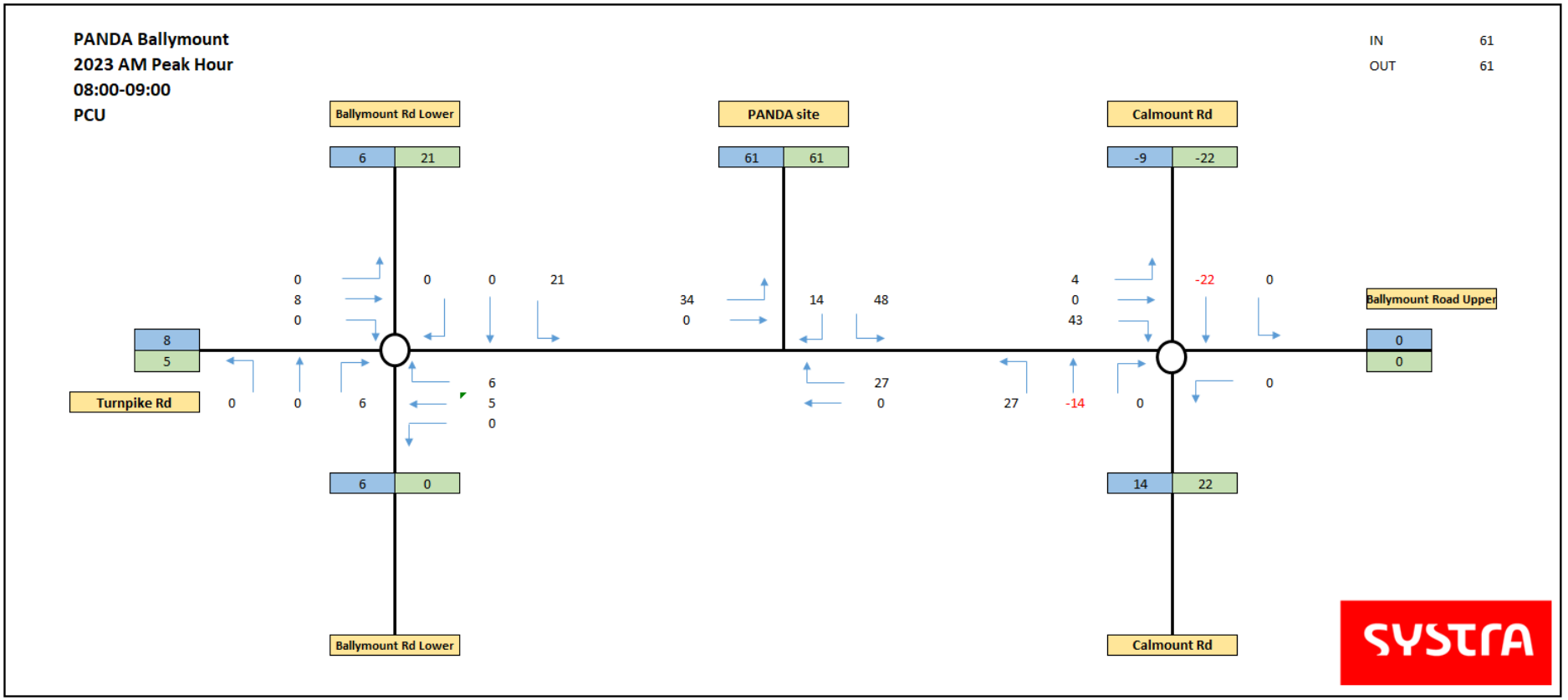

PANDA Ballymount
Base 2030 Inter-Peak Hour
12:15-13:15
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
453
656
0
0
872
376
79
198
88
354
129
173
488
32
129
363
309
67
Ballymount Road Upper
365
750
485
483
Turnpike Rd
100
76
86
297
295
89
732
699
357
289
483
262
306
1345
1155
Ballymount Rd Lower
Calmount Rd

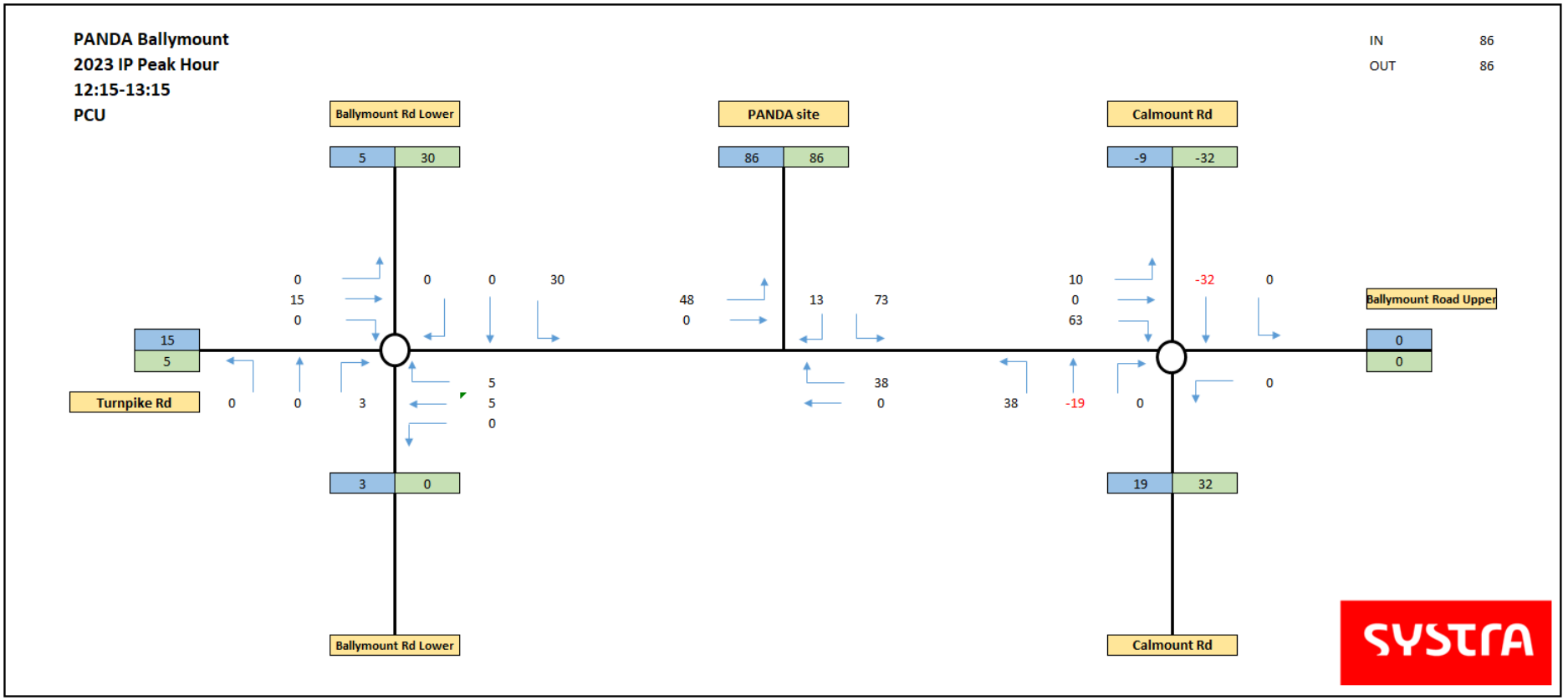

PANDA Ballymount
Base 2030 PM Peak Hour
16:00 - 17:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
278
550
0
0
794
495
42
166
33
222
51
277
642
8
72
617
482
13
Ballymount Road Upper
241
391
320
522
Turnpike Rd
73
74
146
162
96
26
308
299
264
236
522
293
110
798
1620
Ballymount Rd Lower
Calmount Rd

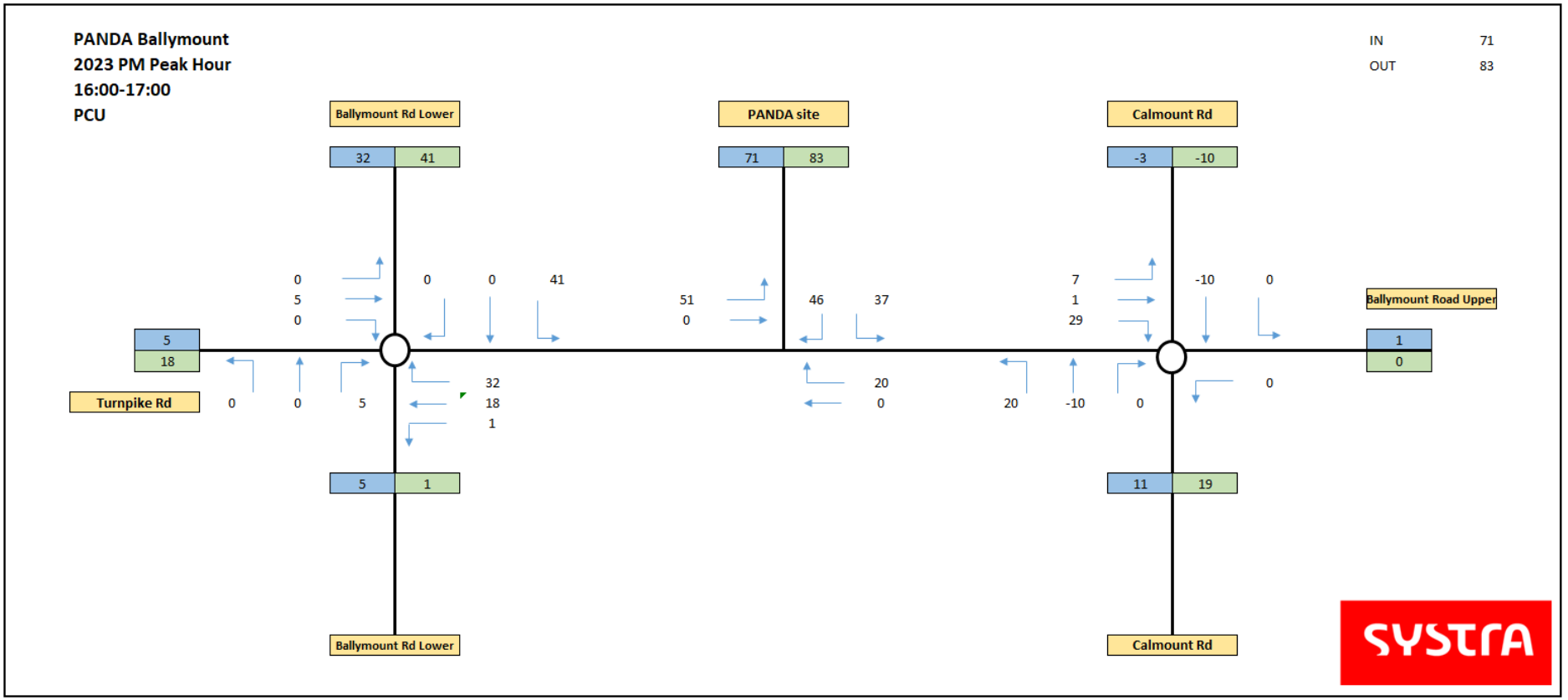

PANDA Ballymount
Base 2040 AM Peak Hour
08:00-09:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
538
496
0
0
1056
196
63
94
54
342
81
74
243
16
53
144
174
22
Ballymount Road Upper
212
844
601
302
Turnpike Rd
61
61
69
414
442
132
1135
1262
737
527
302
191
267
2526
620
Ballymount Rd Lower
Calmount Rd

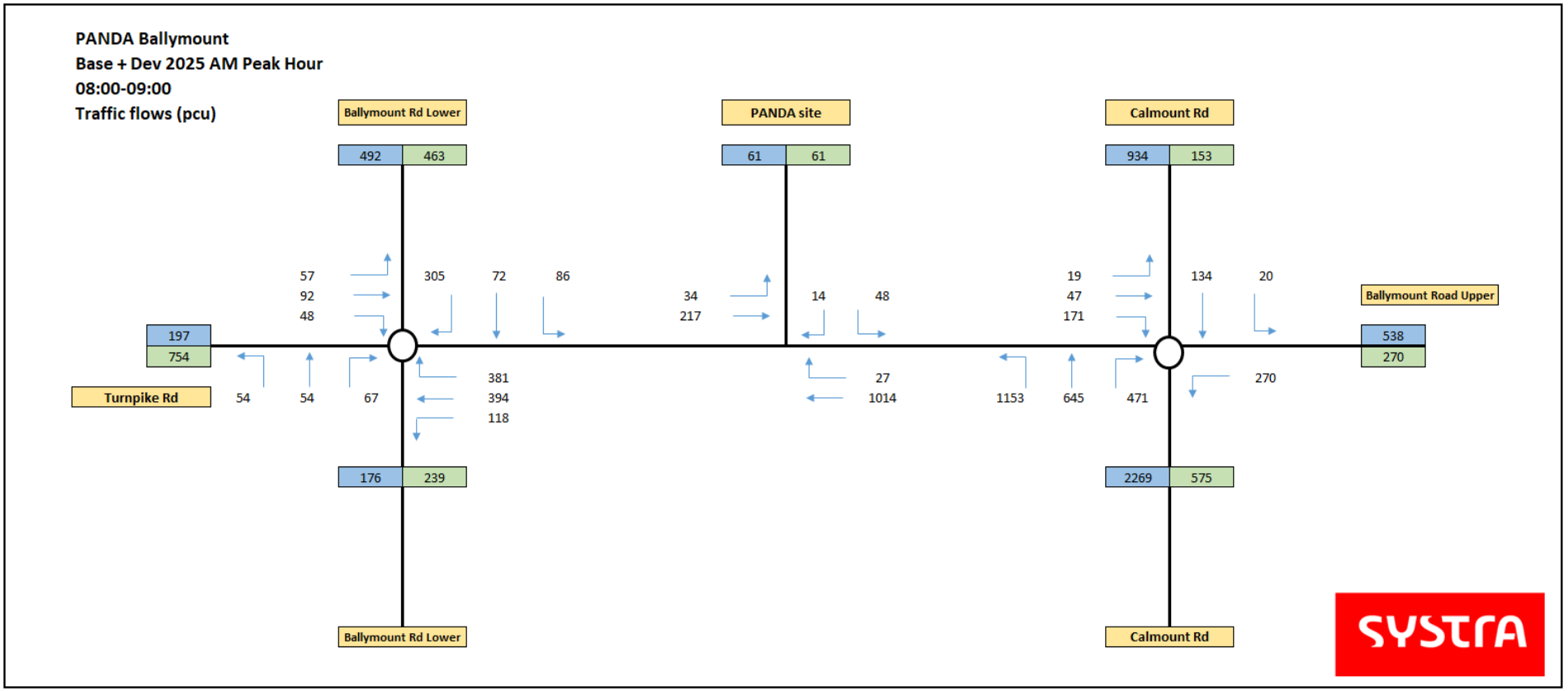

PANDA Ballymount
Base 2040 Inter-Peak Hour
12:15-13:15
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
473
686
0
0
911
393
83
207
92
370
135
181
509
33
135
380
323
70
Ballymount Road Upper
382
783
507
505
Turnpike Rd
105
79
90
311
308
93
0
765
730
373
302
505
274
320
1405
1208
Ballymount Rd Lower
Calmount Rd

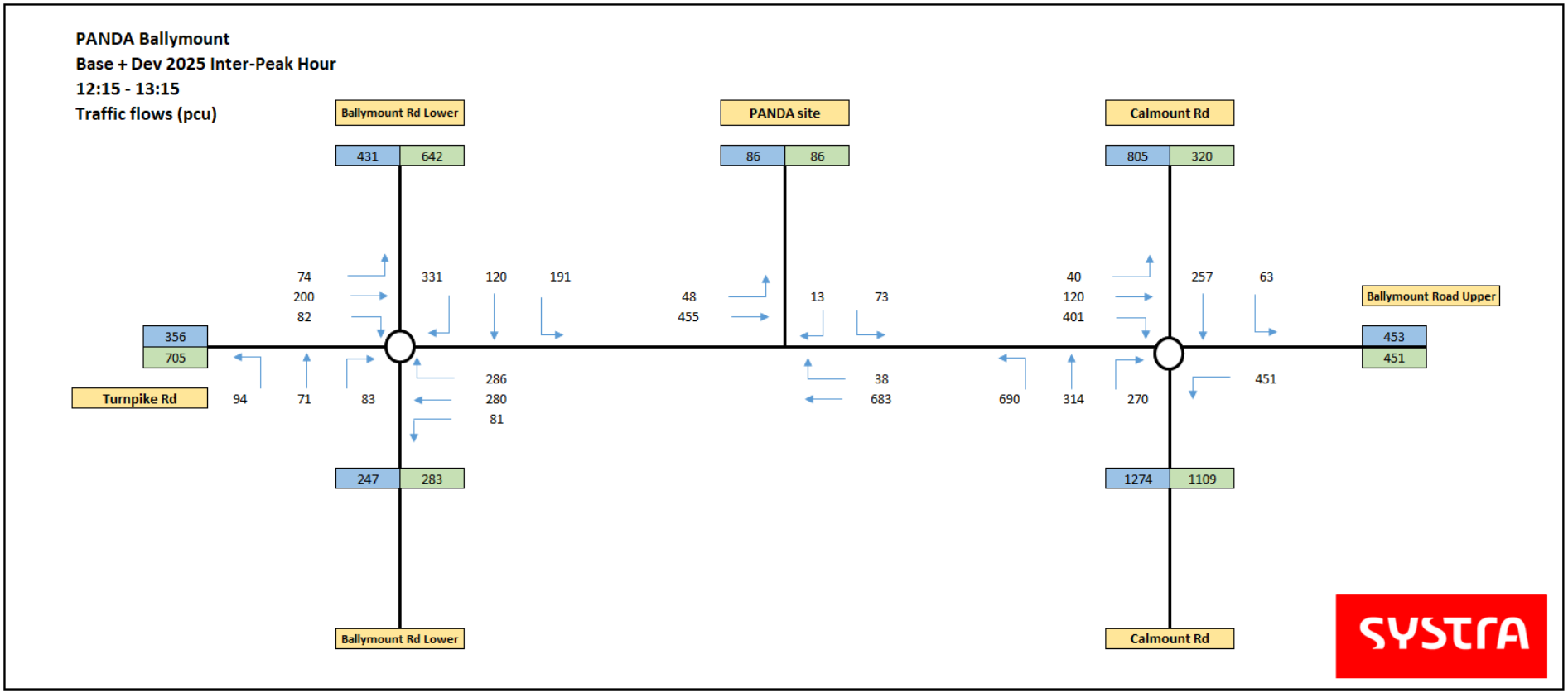

PANDA Ballymount
Base 2040 PM Peak Hour
16:00 - 17:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
291
575
3
0
829
518
44
166
35
232
53
290
670
8
75
645
504
14
Ballymount Road Upper
244
408
335
545
Turnpike Rd
76
77
153
170
100
28
3
322
312
276
246
545
306
115
834
1694
Ballymount Rd Lower
Calmount Rd

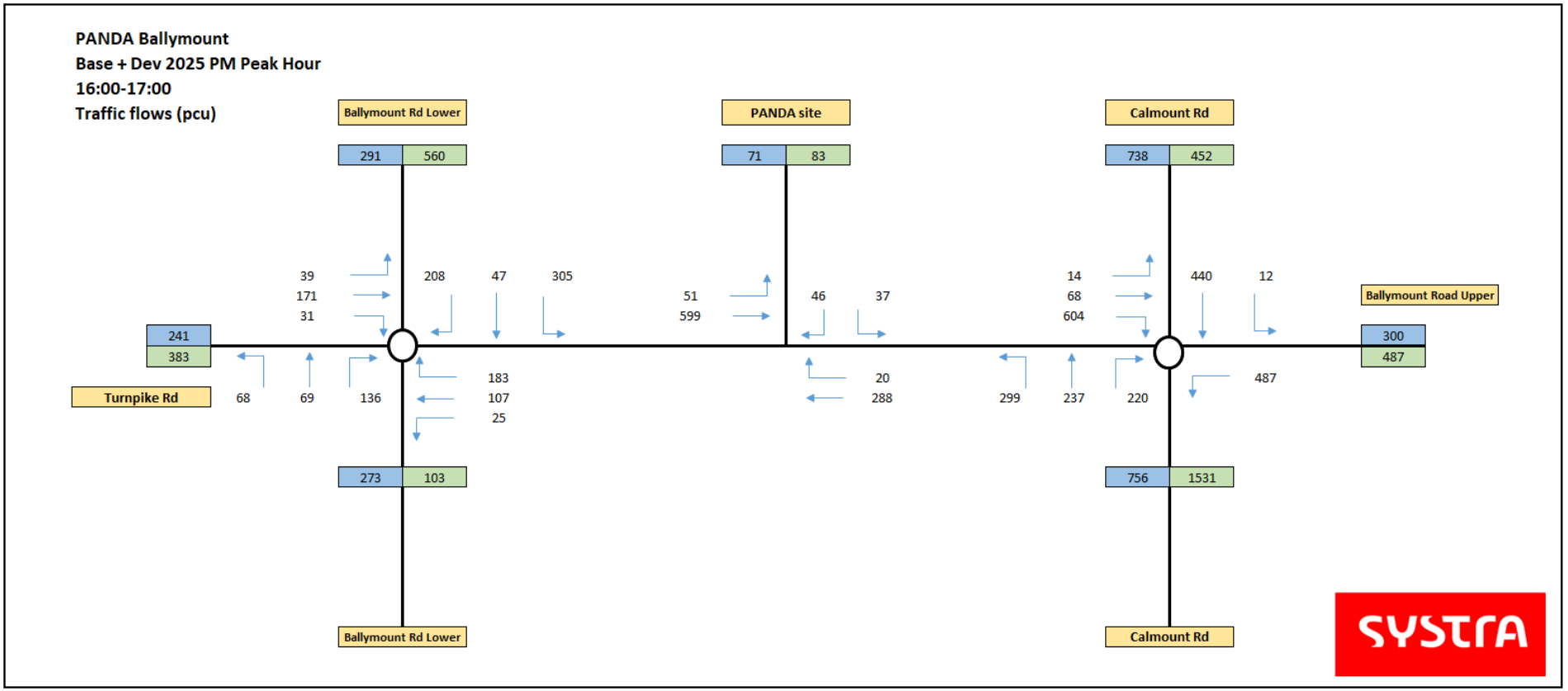

PANDA Ballymount
2023 AM Peak Hour
08:00-09:00
PCU
IN 61
OUT 61
Ballymount Rd Lower
PANDA site
Calmount Rd
Ballymount Road Upper
Turnpike Rd
Ballymount Rd Lower
Calmount Rd
6
21
61
61
-9
-22
8
5
0
0
6
0
14
22
0
0
0
8
0
0
0
21
34
0
14
48
4
0
43
-22
0
6
5
0
27
0
27
-14
0
0
0
6
0
0
SYSTRA

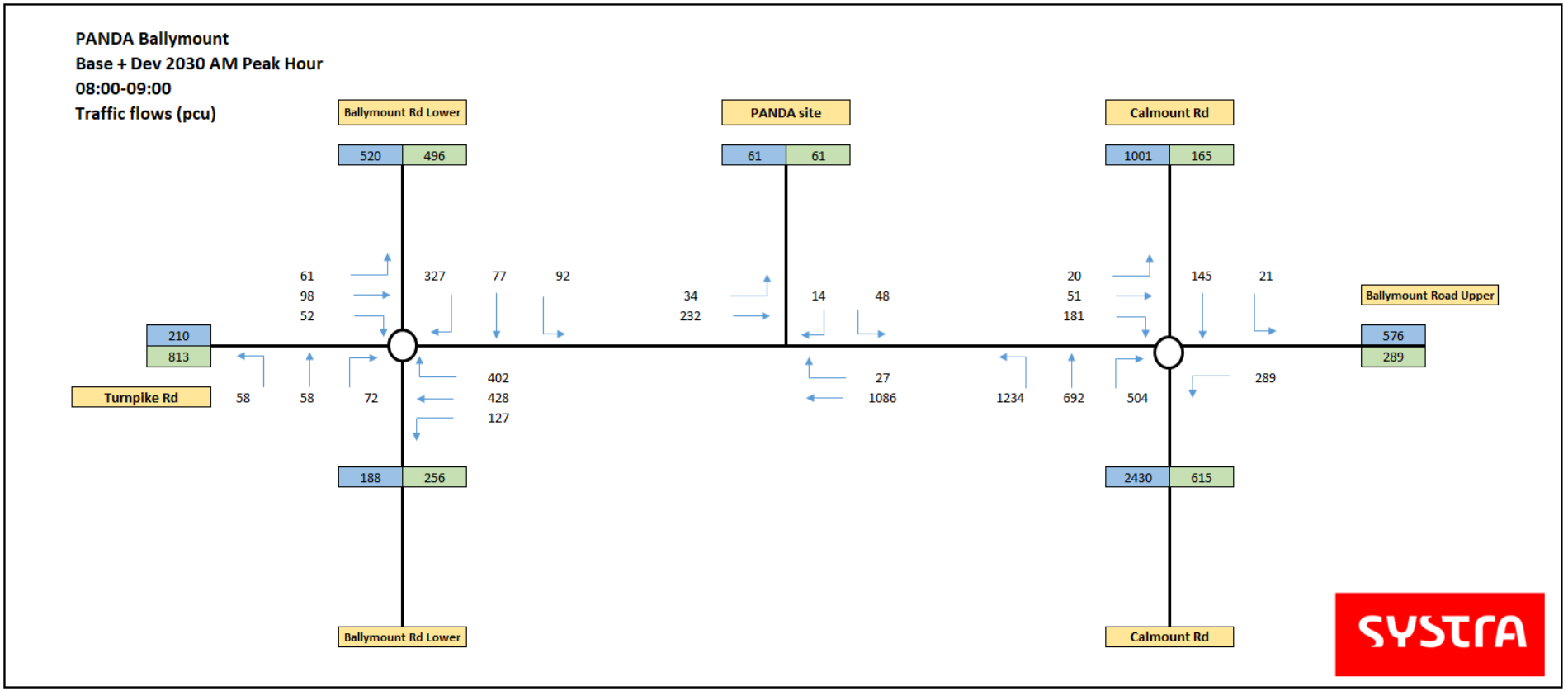

PANDA Ballymount
2023 IP Peak Hour
12:15-13:15
PCU
IN 86
OUT 86
Ballymount Rd Lower
PANDA site
Calmount Rd
Turnpike Rd
Ballymount Road Upper
Ballymount Rd Lower
Calmount Rd
5
30
86
86
-9
-32
15
5
0
0
0
3
0
0
0
30
15
0
48
0
13
73
10
0
63
-32
0
0
0
5
5
0
38
0
38
-19
0
0
3
0
19
32

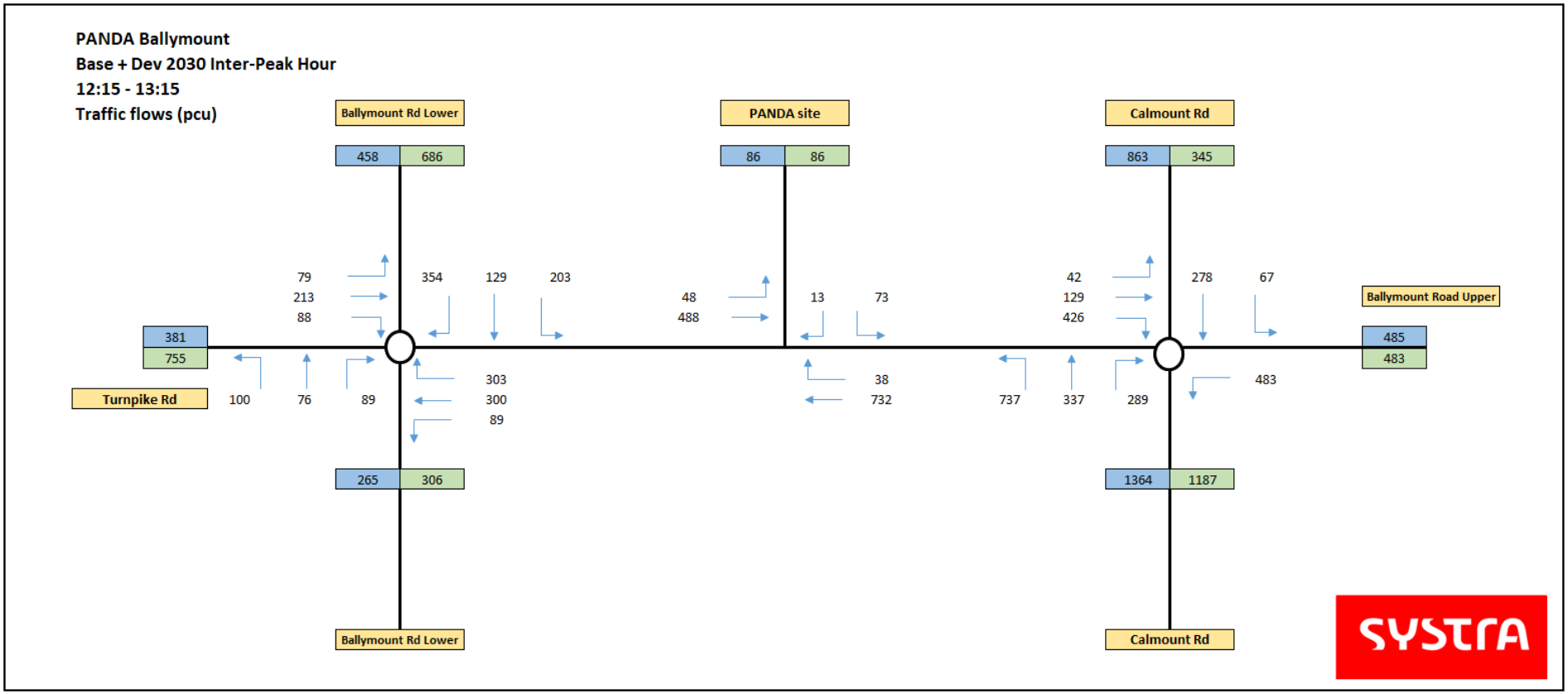

PANDA Ballymount
2023 PM Peak Hour
16:00-17:00
PCU
IN 71
OUT 83
Ballymount Rd Lower
PANDA site
Calmount Rd
32 41
71 83
-3 -10
0 5 0
0 0 41
51 0
46 37
7 1 29
-10 0
Ballymount Road Upper
5 18
1 0
Turnpike Rd
0 0 5
32 18 1
20 0
20 -10 0
0
5 1
11 19
Ballymount Rd Lower
Calmount Rd

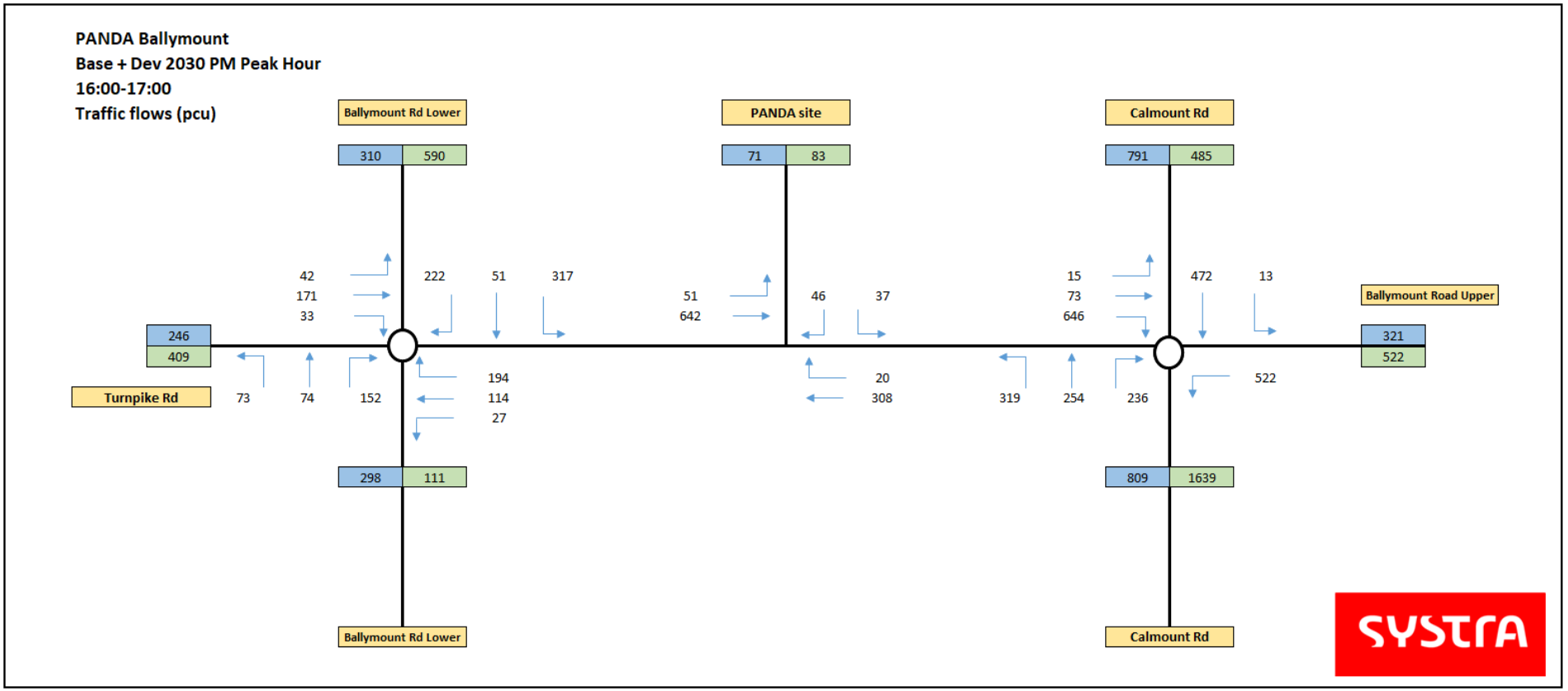

PANDA Ballymount
Base + Dev 2025 AM Peak Hour
08:00-09:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
492
463
61
61
934
153
57
92
48
305
72
86
34
217
14
48
19
47
171
134
20
Ballymount Road Upper
197
754
538
270
Turnpike Rd
54
54
67
381
394
118
27
1014
1153
645
471
270
176
239
2269
575
Ballymount Rd Lower
Calmount Rd

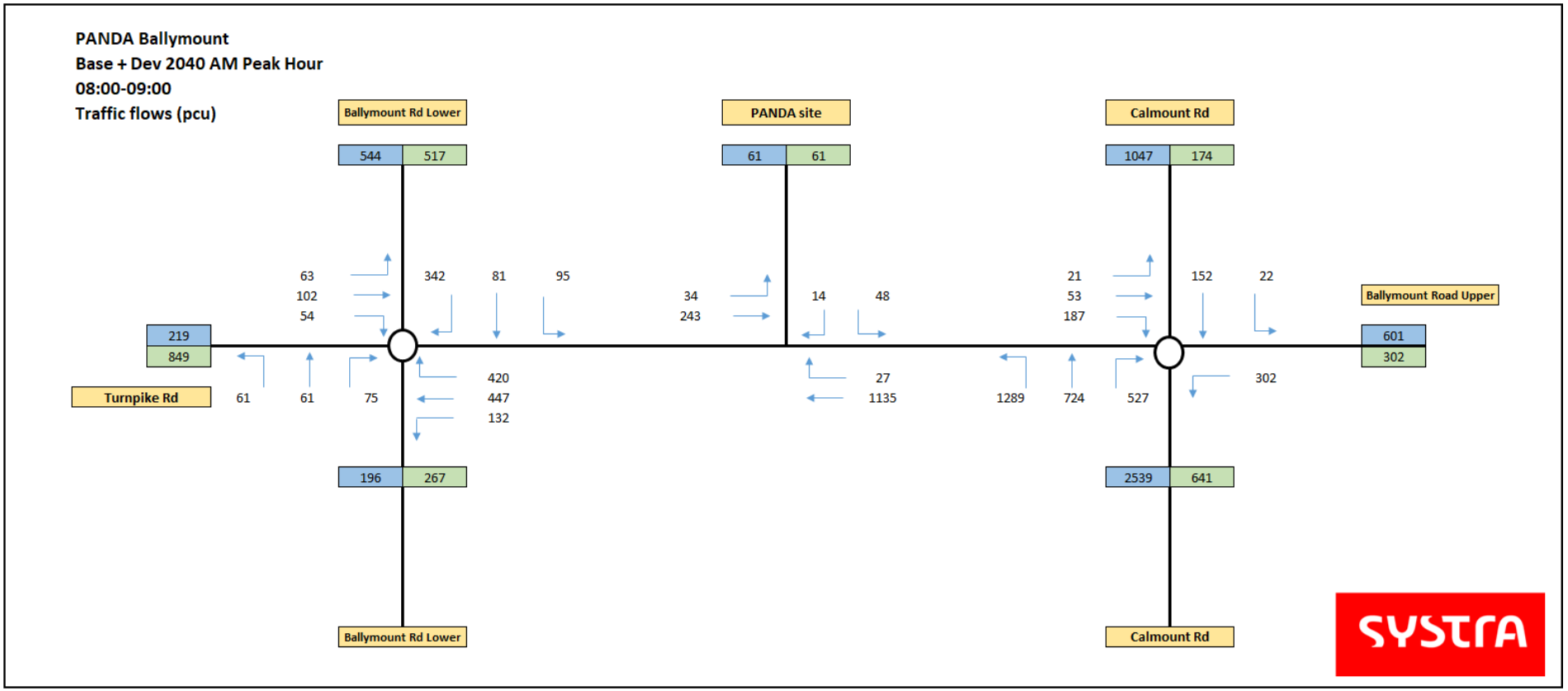

PANDA Ballymount
Base + Dev 2025 Inter-Peak Hour
12:15 - 13:15
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
431
642
86
86
805
320
74
200
82
331
120
191
48
455
13
73
40
120
401
257
63
Ballymount Road Upper
356
705
453
451
Turnpike Rd
94
71
83
286
280
81
38
683
690
314
270
451
247
283
1274
1109
Ballymount Rd Lower
Calmount Rd

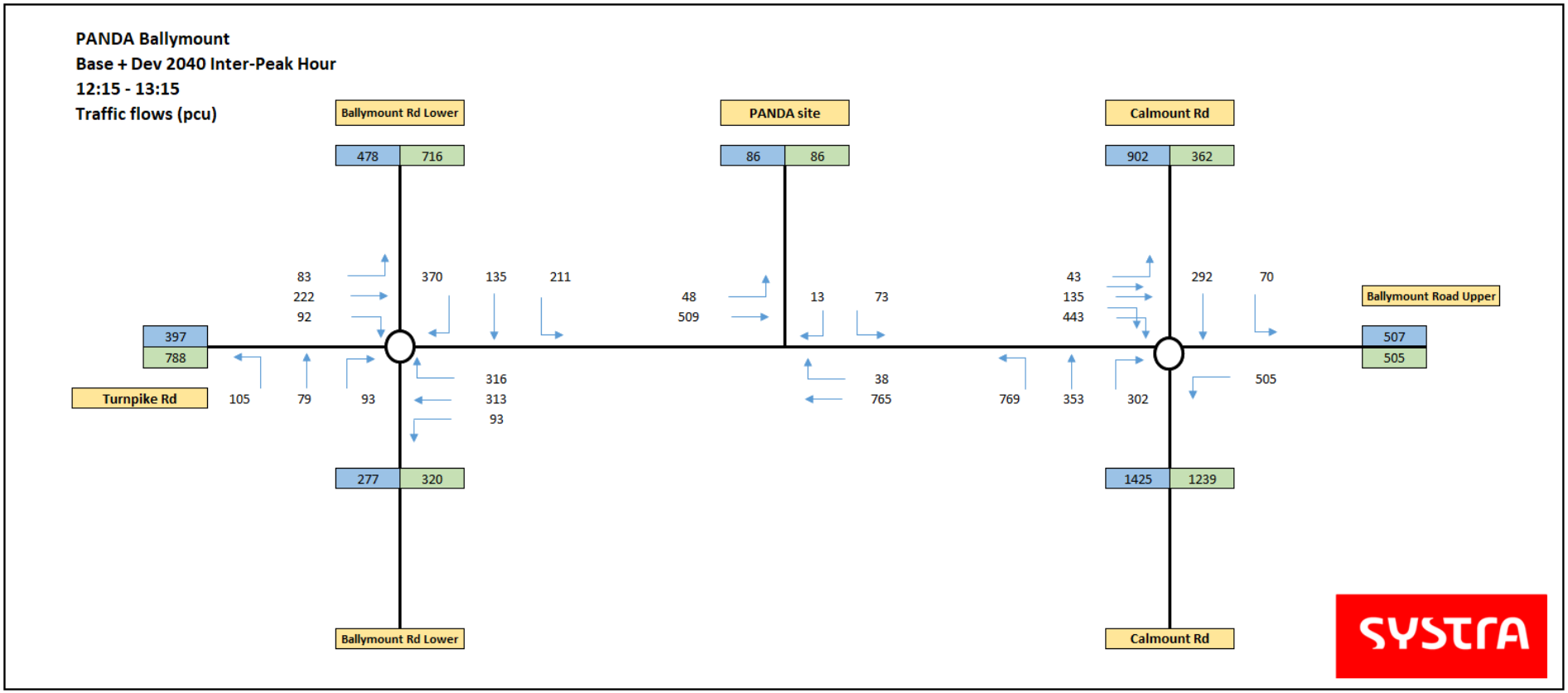

PANDA Ballymount
Base + Dev 2025 PM Peak Hour
16:00-17:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
291
560
71
83
738
452
39
171
31
208
47
305
51
599
46
37
14
68
604
440
12
Ballymount Road Upper
241
383
300
487
Turnpike Rd
68
69
136
183
107
25
20
288
299
237
220
487
273
103
756
1531
Ballymount Rd Lower
Calmount Rd

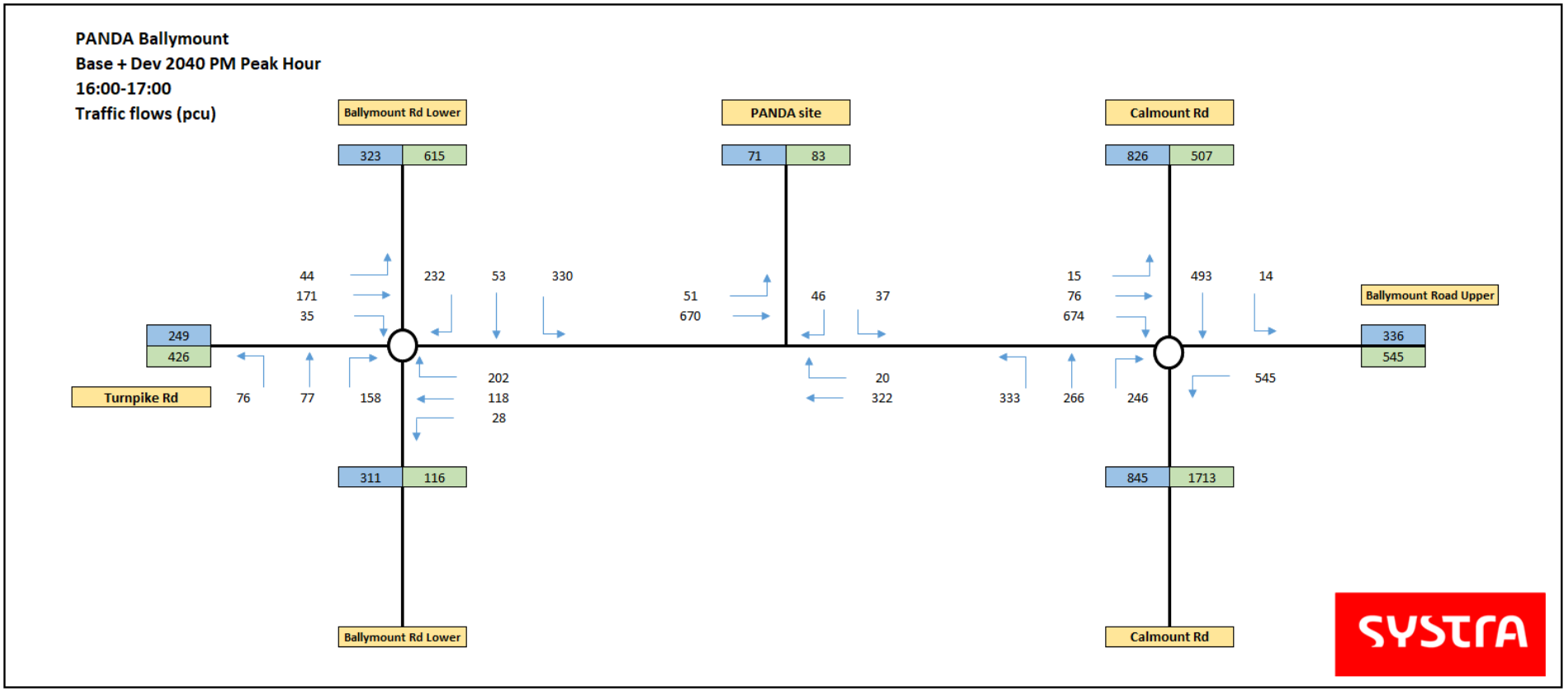

PANDA Ballymount
Base + Dev 2030 AM Peak Hour
08:00-09:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
520
496
61
61
1001
165
61
98
52
327
77
92
34
232
14
48
20
51
181
145
21
Ballymount Road Upper
210
813
576
289
Turnpike Rd
58
58
72
402
428
127
27
1086
1234
692
504
289
188
256
2430
615
Ballymount Rd Lower
Calmount Rd


PANDA Ballymount
Base + Dev 2030 Inter-Peak Hour
12:15 - 13:15
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
458
686
86
86
863
345
79
213
88
354
129
203
48
488
13
73
42
129
426
278
67
Ballymount Road Upper
381
755
485
483
Turnpike Rd
100
76
89
303
300
89
38
732
737
337
289
483
265
306
1364
1187
Ballymount Rd Lower
Calmount Rd


PANDA Ballymount
Base + Dev 2030 PM Peak Hour
16:00-17:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
310
590
71
83
791
485
42
171
33
222
51
317
51
642
46
37
15
73
646
472
13
Ballymount Road Upper
246
409
321
522
Turnpike Rd
73
74
152
194
114
27
20
308
319
254
236
522
298
111
809
1639
Ballymount Rd Lower
Calmount Rd

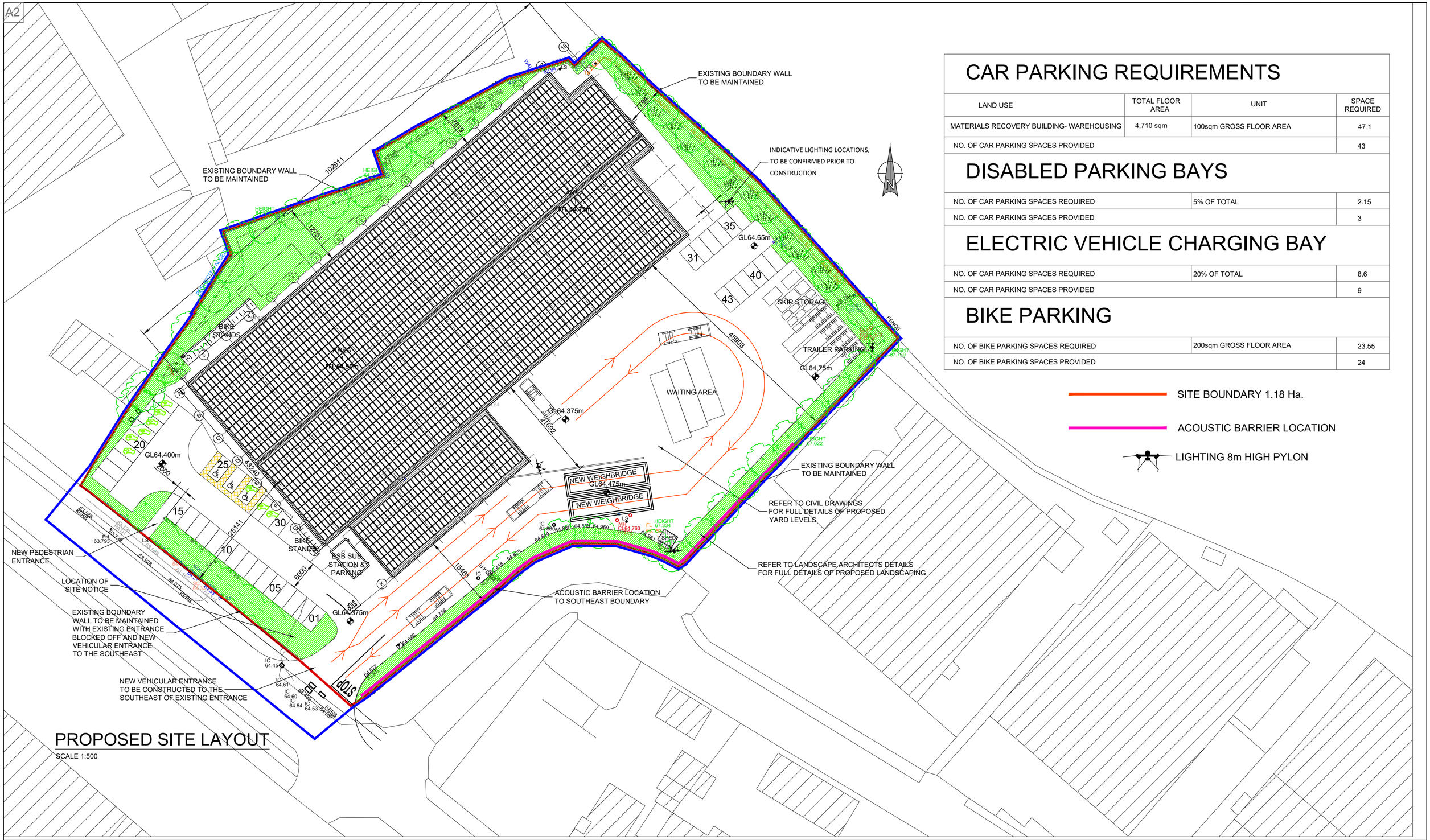

PANDA Ballymount
Base + Dev 2040 AM Peak Hour
08:00-09:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
544
517
61
61
1047
174
63
102
54
342
81
95
34
243
14
48
21
53
187
152
22
Ballymount Road Upper
219
849
601
302
Turnpike Rd
61
61
75
420
447
132
27
1135
1289
724
527
302
196
267
2539
641
Ballymount Rd Lower
Calmount Rd
SYSTRA


PANDA Ballymount
Base + Dev 2040 Inter-Peak Hour
12:15 - 13:15
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
478
716
86
86
902
362
83
222
92
370
135
211
48
509
13
73
43
135
443
292
70
Ballymount Road Upper
397
788
507
505
Turnpike Rd
105
79
93
316
313
93
38
765
769
353
302
505
277
320
1425
1239
Ballymount Rd Lower
Calmount Rd


PANDA Ballymount
Base + Dev 2040 PM Peak Hour
16:00-17:00
Traffic flows (pcu)
Ballymount Rd Lower
PANDA site
Calmount Rd
323
615
71
83
826
507
44
171
35
232
53
330
51
670
46
37
15
76
674
493
14
Ballymount Road Upper
249
426
336
545
Turnpike Rd
76
77
158
202
118
28
20
322
333
266
246
545
311
116
845
1713
Ballymount Rd Lower
Calmount Rd

APPENDIX B – SITE PLAN

A2



CAR PARKING REQUIREMENTS

LAND USE	TOTAL FLOOR AREA	UNIT	SPACE REQUIRED
MATERIALS RECOVERY BUILDING- WAREHOUSING	4,710 sqm	100sqm GROSS FLOOR AREA	47.1
NO. OF CAR PARKING SPACES PROVIDED			43

DISABLED PARKING BAYS

NO. OF CAR PARKING SPACES REQUIRED	5% OF TOTAL	2.15
NO. OF CAR PARKING SPACES PROVIDED		3

ELECTRIC VEHICLE CHARGING BAY

NO. OF CAR PARKING SPACES REQUIRED	20% OF TOTAL	8.6
NO. OF CAR PARKING SPACES PROVIDED		9

BIKE PARKING

NO. OF BIKE PARKING SPACES REQUIRED	200sqm GROSS FLOOR AREA	23.55
NO. OF BIKE PARKING SPACES PROVIDED		24

SITE BOUNDARY 1.18 Ha.

ACOUSTIC BARRIER LOCATION

LIGHTING 8m HIGH PYLON

PROPOSED SITE LAYOUT

SCALE 1:500

INFORMATION

REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
P01	10/05/2023	ISSUED FOR COMMENT	CB	CB
P02	12/06/2023	SITE LAYOUT UPDATED	CB	CB
P03	12/07/2023	BUILDING AND SITE LAYOUT UPDATED	CB	CB
P04	28/08/2023	BUILDING LAYOUT UPDATED	CB	CB
P05	02/10/2023	ISSUED FOR COMMENT	CB	CB
P06	01/12/2023	ISSUED FOR PLANNING	CB	CB

CLIENT:	STARRUS ECO HOLDINGS LIMITED (SEHL)			
PROJECT:	BALLYMOUNT ROAD UPPER, DUBLIN 24			
TITLE:	PROPOSED SITE LAYOUT			
DRAWN: CB	CHECKED: CB	APPROVED: OD	JOB NO: 221244	REV: P06
DATE: 01/12/2023	SCALE: 1:500		DRAWING NO: 221244-ORS-Z0-00-DR-AR-203	

ORS
Mullingar | Dublin | Galway | Donegal
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2015 QUALITY ASSURED COMPANY

APPENDIX C – JUNCTIONS 10 FILES

Junctions 10

ARCADY 10 - Roundabout Module

Filename: Ballymount Road Lower_ Turnpike Road Roundabout.j10
Path: \\GLASGOWFILE\Jobs\SCT\2023\T&T\Panda Waste Facility, Ballymount\5. Technical\5. Modelling\Junctions 10
Report generation date: 28/11/2023 17:24:28

Summary of junction performance

	AM					IP					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2025														
Arm 1	D1	0.7	4.95	0.38	A	D2	1.5	7.88	0.56	A	D3	0.9	5.95	0.47	A
Arm 2		3.0	11.42	0.74	B		1.5	7.80	0.57	A		0.3	3.55	0.21	A
Arm 3		0.3	4.95	0.20	A		0.4	4.82	0.25	A		0.3	3.46	0.21	A
Arm 4		0.2	3.64	0.16	A		0.4	3.94	0.28	A		0.2	3.22	0.18	A
	2025 + Dev														
Arm 1	D4	0.7	5.18	0.40	A	D5	1.7	8.63	0.60	A	D6	1.1	6.49	0.51	A
Arm 2		3.2	11.83	0.75	B		1.6	7.97	0.58	A		0.4	3.73	0.25	A
Arm 3		0.3	5.03	0.20	A		0.4	4.87	0.25	A		0.3	3.59	0.22	A
Arm 4		0.2	3.69	0.17	A		0.4	4.03	0.29	A		0.2	3.31	0.19	A
	2030														
Arm 1	D7	0.7	4.93	0.41	A	D8	1.8	9.04	0.61	A	D9	1.1	6.66	0.51	A
Arm 2		4.2	14.98	0.81	B		1.9	9.13	0.62	A		0.3	3.79	0.22	A
Arm 3		0.3	5.30	0.22	A		0.4	5.21	0.28	A		0.3	3.55	0.24	A
Arm 4		0.2	3.35	0.17	A		0.5	4.15	0.30	A		0.2	3.31	0.19	A
	2030 + Dev														
Arm 1	D10	0.8	5.53	0.43	A	D11	2.1	10.02	0.65	B	D12	1.3	7.29	0.55	A
Arm 2		4.6	16.35	0.82	C		2.0	9.37	0.63	A		0.4	3.99	0.26	A
Arm 3		0.3	5.52	0.23	A		0.4	5.28	0.28	A		0.3	3.69	0.25	A
Arm 4		0.2	3.83	0.18	A		0.5	4.25	0.31	A		0.3	3.40	0.20	A
	2040														
Arm 1	D13	0.8	5.56	0.43	A	D14	2.1	10.16	0.65	B	D15	1.2	7.14	0.53	A
Arm 2		5.9	20.51	0.85	C		2.2	10.49	0.66	B		0.4	3.94	0.24	A
Arm 3		0.3	5.83	0.24	A		0.5	5.58	0.30	A		0.3	3.66	0.25	A
Arm 4		0.3	3.93	0.18	A		0.5	4.34	0.32	A		0.3	3.38	0.20	A
	2040 + Dev														
Arm 1	D16	0.9	5.85	0.45	A	D17	2.5	11.40	0.68	B	D18	1.5	7.85	0.57	A
Arm 2		6.3	21.80	0.86	C		2.3	10.77	0.67	B		0.4	4.16	0.28	A
Arm 3		0.4	5.95	0.25	A		0.5	5.65	0.30	A		0.4	3.81	0.26	A
Arm 4		0.3	3.99	0.19	A		0.5	4.45	0.33	A		0.3	3.47	0.20	A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	PANDA, Ballymount
Location	
Site number	
Date	05/10/2023
Version	
Status	(new file)
Identifier	
Client	Beauparc
Jobnumber	
Enumerator	ADSYSTRA\cgow
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D18	2040 + Dev	PM	ONE HOUR	15:45	17:15	15

2040 + Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	BRL / BRU / Turnpike Rd	Standard Roundabout		1, 2, 3, 4	5.47	A

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	5.47	A

Arms

Arms

Arm	Name	Description	No give-way line
1	BRL N		
2	BRU		
3	BRL south		
4	Turnpike Rd		

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Entry only	Exit only
1	3.68	6.10	9.0	23.0	38.0	50.0		
2	4.50	5.73	14.0	24.9	36.0	42.0		
3	4.50	6.32	44.0	17.6	38.0	55.0		
4	3.70	6.31	24.4	30.4	38.0	44.0		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.569	1413
2	0.620	1601
3	0.613	1677
4	0.628	1656

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	615	100.000
2		✓	348	100.000
3		✓	311	100.000
4		✓	250	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	330	53	232
	2	202	0	28	118
	3	77	158	0	76
	4	44	171	35	0

Vehicle Mix

Heavy Vehicle %

		To			
		1	2	3	4
From	1	0	12	5	11
	2	19	0	15	10
	3	4	0	0	4
	4	10	3	4	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.57	7.85	1.5	A
2	0.28	4.16	0.4	A
3	0.26	3.81	0.4	A
4	0.20	3.47	0.3	A

Main Results for each time segment

15:45 - 16:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	463	273	1258	0.368	460	0.6	4.991	A
2	262	240	1453	0.180	261	0.3	3.484	A
3	234	414	1424	0.164	233	0.2	3.076	A
4	188	328	1450	0.130	188	0.2	2.966	A

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	553	327	1227	0.450	552	0.9	5.904	A
2	313	287	1423	0.220	313	0.3	3.742	A
3	280	496	1373	0.204	279	0.3	3.348	A
4	225	393	1409	0.159	225	0.2	3.161	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	677	400	1186	0.571	675	1.4	7.786	A
2	383	351	1383	0.277	383	0.4	4.151	A
3	342	607	1305	0.262	342	0.4	3.800	A
4	275	481	1354	0.203	275	0.3	3.471	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	677	401	1185	0.571	677	1.5	7.854	A
2	383	352	1383	0.277	383	0.4	4.157	A
3	342	608	1305	0.262	342	0.4	3.806	A
4	275	481	1354	0.203	275	0.3	3.472	A

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	553	328	1227	0.451	555	0.9	5.961	A
2	313	289	1422	0.220	313	0.3	3.751	A
3	280	497	1372	0.204	280	0.3	3.357	A
4	225	393	1409	0.160	225	0.2	3.167	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	463	274	1257	0.368	464	0.7	5.042	A
2	262	241	1452	0.180	262	0.3	3.497	A
3	234	416	1422	0.165	234	0.2	3.086	A
4	188	329	1449	0.130	188	0.2	2.971	A

Junctions 10

PICADY 10 - Priority Intersection Module

Filename: Ballymount Road Upper_Panda access.j10
Path: \\GLASGOWFILE\Jobs\SCT\2023\T&T\Panda Waste Facility, Ballymount\5. Technical\5. Modelling\Junctions 10
Report generation date: 28/11/2023 17:25:23

Summary of junction performance

	AM						IP						PM					
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2025+Dev																	
Stream B-C	D1	0.1	6.18	0.08	A	45 % [Stream C-AB]	D2	0.2	7.28	0.14	A	76 % [Stream B-A]	D3	0.1	7.56	0.08	A	80 % [Stream B-A]
Stream B-A		0.1	12.33	0.05	B			0.1	12.90	0.05	B			0.2	11.73	0.14	B	
Stream C-AB		0.3	3.41	0.13	A			0.3	4.18	0.13	A			0.1	5.28	0.05	A	
	2030+Dev																	
Stream B-C	D4	0.1	6.23	0.08	A	36 % [Stream C-AB]	D5	0.2	7.42	0.14	A	66 % [Stream B-A]	D6	0.1	7.75	0.08	A	71 % [Stream B-A]
Stream B-A		0.1	12.93	0.05	B			0.1	13.58	0.05	B			0.2	12.27	0.15	B	
Stream C-AB		0.4	3.32	0.15	A			0.4	4.10	0.14	A			0.1	5.26	0.06	A	
	2040+Dev																	
Stream B-C	D7	0.1	6.26	0.08	A	31 % [Stream C-AB]	D8	0.2	7.50	0.14	A	60 % [Stream B-A]	D9	0.1	7.88	0.08	A	65 % [Stream B-A]
Stream B-A		0.1	13.38	0.05	B			0.1	14.07	0.05	B			0.2	12.66	0.15	B	
Stream C-AB		0.5	3.27	0.17	A			0.4	4.04	0.15	A			0.1	5.24	0.06	A	

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	
Site number	
Date	01/11/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	ADSYSTRA\gmoon
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
	✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025+Dev	AM	ONE HOUR	00:00	01:30	15
D2	2025+Dev	IP	ONE HOUR	12:00	13:30	15
D3	2025+Dev	PM	ONE HOUR	16:45	18:15	15
D4	2030+Dev	AM	ONE HOUR	00:00	01:30	15
D5	2030+Dev	IP	ONE HOUR	12:00	13:30	15
D6	2030+Dev	PM	ONE HOUR	16:45	18:15	15
D7	2040+Dev	AM	ONE HOUR	00:00	01:30	15
D8	2040+Dev	IP	ONE HOUR	12:00	13:30	15
D9	2040+Dev	PM	ONE HOUR	16:45	18:15	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2025+Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	BRU / Panda Access	T-Junction	Two-way	Two-way	Two-way		0.66	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	45	Stream C-AB	0.66	A

Arms

Arms

Arm	Name	Description	Arm type
A	BRU west		Major
B	Panda Access		Minor
C	BRU east		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right-turn storage	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	9.20			150.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate flare length	Flare length (PCU)	Visibility to left (m)	Visibility to right (m)
B	One lane plus flare	10.00	6.30	3.60	3.30	3.30	✓	1.00	30	23

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	509	0.080	0.202	0.127	0.288
B-C	703	0.093	0.234	-	-
C-B	661	0.220	0.220	-	-

The slopes and intercepts shown above include custom intercept adjustments only.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2025+Dev	AM	ONE HOUR	00:00	01:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	251	100.000
B		✓	62	100.000
C		✓	1041	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	34	217
	B	14	0	48
	C	1014	27	0

Vehicle Mix

Heavy Vehicle %

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.08	6.18	0.1	A
B-A	0.05	12.33	0.1	B
C-AB	0.13	3.41	0.3	A
C-A				
A-B				
A-C				

Main Results for each time segment

00:00 - 00:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	36	658	0.055	36	0.1	5.790	A
B-A	11	371	0.028	10	0.0	9.976	A
C-AB	64	1120	0.057	63	0.1	3.407	A
C-A	720			720			
A-B	26			26			
A-C	163			163			

00:15 - 00:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	43	648	0.067	43	0.1	5.948	A
B-A	13	344	0.037	13	0.0	10.847	B
C-AB	98	1213	0.081	98	0.2	3.229	A
C-A	838			838			
A-B	31			31			
A-C	195			195			

00:30 - 00:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	53	635	0.083	53	0.1	6.181	A
B-A	15	307	0.050	15	0.1	12.325	B
C-AB	176	1345	0.131	176	0.3	3.080	A
C-A	970			970			
A-B	37			37			
A-C	239			239			

00:45 - 01:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	53	635	0.083	53	0.1	6.182	A
B-A	15	307	0.050	15	0.1	12.334	B
C-AB	177	1345	0.131	177	0.3	3.086	A
C-A	969			969			
A-B	37			37			
A-C	239			239			

01:00 - 01:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	43	648	0.067	43	0.1	5.951	A
B-A	13	344	0.037	13	0.0	10.856	B
C-AB	98	1214	0.081	99	0.2	3.231	A
C-A	837			837			
A-B	31			31			
A-C	195			195			

01:15 - 01:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	36	657	0.055	36	0.1	5.794	A
B-A	11	371	0.028	11	0.0	9.983	A
C-AB	64	1120	0.057	64	0.1	3.410	A
C-A	720			720			
A-B	26			26			
A-C	163			163			

2025+Dev, IP

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	BRU / Panda Access	T-Junction	Two-way	Two-way	Two-way		0.88	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	76	Stream B-A	0.88	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2025+Dev	IP	ONE HOUR	12:00	13:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	503	100.000
B		✓	86	100.000
C		✓	721	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	48	455
	B	13	0	73
	C	683	38	0

Vehicle Mix

Heavy Vehicle %

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.14	7.28	0.2	A
B-A	0.05	12.90	0.1	B
C-AB	0.13	4.18	0.3	A
C-A				
A-B				
A-C				

Main Results for each time segment

12:00 - 12:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	55	616	0.089	55	0.1	6.403	A
B-A	10	361	0.027	10	0.0	10.242	B
C-AB	64	927	0.069	64	0.1	4.172	A
C-A	479			479			
A-B	36			36			
A-C	343			343			

12:15 - 12:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	66	599	0.110	66	0.1	6.748	A
B-A	12	333	0.035	12	0.0	11.210	B
C-AB	91	984	0.093	91	0.2	4.034	A
C-A	557			557			
A-B	43			43			
A-C	409			409			

12:30 - 12:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	80	575	0.140	80	0.2	7.280	A
B-A	14	294	0.049	14	0.1	12.886	B
C-AB	143	1066	0.134	142	0.3	3.901	A
C-A	651			651			
A-B	53			53			
A-C	501			501			

12:45 - 13:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	80	575	0.140	80	0.2	7.283	A
B-A	14	293	0.049	14	0.1	12.895	B
C-AB	143	1066	0.134	143	0.3	3.905	A
C-A	651			651			
A-B	53			53			
A-C	501			501			

13:00 - 13:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	66	599	0.110	66	0.1	6.755	A
B-A	12	333	0.035	12	0.0	11.221	B
C-AB	92	984	0.093	92	0.2	4.040	A
C-A	557			557			
A-B	43			43			
A-C	409			409			

13:15 - 13:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	55	616	0.089	55	0.1	6.416	A
B-A	10	361	0.027	10	0.0	10.256	B
C-AB	65	927	0.070	65	0.1	4.180	A
C-A	478			478			
A-B	36			36			
A-C	343			343			

2025+Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	BRU / Panda Access	T-Junction	Two-way	Two-way	Two-way		0.95	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	80	Stream B-A	0.95	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2025+Dev	PM	ONE HOUR	16:45	18:15	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	650	100.000
B		✓	83	100.000
C		✓	308	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	51	599
	B	46	0	37
	C	288	20	0

Vehicle Mix

Heavy Vehicle %

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.08	7.56	0.1	A
B-A	0.14	11.73	0.2	B
C-AB	0.05	5.28	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	28	575	0.048	28	0.1	6.572	A
B-A	35	422	0.082	34	0.1	9.280	A
C-AB	22	703	0.031	22	0.0	5.282	A
C-A	210			210			
A-B	38			38			
A-C	451			451			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	33	551	0.060	33	0.1	6.952	A
B-A	41	395	0.105	41	0.1	10.176	B
C-AB	28	714	0.040	28	0.1	5.245	A
C-A	249			249			
A-B	46			46			
A-C	538			538			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	41	517	0.079	41	0.1	7.558	A
B-A	51	358	0.142	50	0.2	11.716	B
C-AB	39	732	0.053	39	0.1	5.196	A
C-A	300			300			
A-B	56			56			
A-C	660			660			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	41	517	0.079	41	0.1	7.560	A
B-A	51	358	0.142	51	0.2	11.730	B
C-AB	39	732	0.053	39	0.1	5.200	A
C-A	300			300			
A-B	56			56			
A-C	660			660			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	33	551	0.060	33	0.1	6.957	A
B-A	41	395	0.105	42	0.1	10.191	B
C-AB	28	715	0.040	28	0.1	5.250	A
C-A	249			249			
A-B	46			46			
A-C	538			538			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	28	575	0.048	28	0.1	6.580	A
B-A	35	422	0.082	35	0.1	9.302	A
C-AB	22	703	0.031	22	0.0	5.284	A
C-A	210			210			
A-B	38			38			
A-C	451			451			

2030+Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	BRU / Panda Access	T-Junction	Two-way	Two-way	Two-way		0.66	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	36	Stream C-AB	0.66	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2030+Dev	AM	ONE HOUR	00:00	01:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	266	100.000
B		✓	62	100.000
C		✓	1113	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	34	232
	B	14	0	48
	C	1086	27	0

Vehicle Mix

Heavy Vehicle %

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.08	6.23	0.1	A
B-A	0.05	12.93	0.1	B
C-AB	0.15	3.32	0.4	A
C-A				
A-B				
A-C				

Main Results for each time segment

00:00 - 00:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	36	655	0.055	36	0.1	5.815	A
B-A	11	362	0.029	10	0.0	10.236	B
C-AB	70	1154	0.060	69	0.1	3.318	A
C-A	768			768			
A-B	26			26			
A-C	175			175			

00:15 - 00:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	43	645	0.067	43	0.1	5.981	A
B-A	13	333	0.038	13	0.0	11.216	B
C-AB	110	1255	0.088	110	0.2	3.143	A
C-A	891			891			
A-B	31			31			
A-C	209			209			

00:30 - 00:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	53	631	0.084	53	0.1	6.226	A
B-A	15	294	0.052	15	0.1	12.919	B
C-AB	208	1396	0.149	207	0.4	3.029	A
C-A	1017			1017			
A-B	37			37			
A-C	255			255			

00:45 - 01:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	53	631	0.084	53	0.1	6.227	A
B-A	15	294	0.052	15	0.1	12.928	B
C-AB	209	1397	0.150	209	0.4	3.037	A
C-A	1016			1016			
A-B	37			37			
A-C	255			255			

01:00 - 01:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	43	645	0.067	43	0.1	5.986	A
B-A	13	333	0.038	13	0.0	11.228	B
C-AB	110	1256	0.088	111	0.2	3.149	A
C-A	890			890			
A-B	31			31			
A-C	209			209			

01:15 - 01:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	36	655	0.055	36	0.1	5.820	A
B-A	11	362	0.029	11	0.0	10.244	B
C-AB	70	1155	0.061	70	0.1	3.324	A
C-A	768			768			
A-B	26			26			
A-C	175			175			

2030+Dev, IP

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	BRU / Panda Access	T-Junction	Two-way	Two-way	Two-way		0.86	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	66	Stream B-A	0.86	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D5	2030+Dev	IP	ONE HOUR	12:00	13:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	536	100.000
B		✓	86	100.000
C		✓	770	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	48	488
	B	13	0	73
	C	732	38	0

Vehicle Mix

Heavy Vehicle %

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.14	7.42	0.2	A
B-A	0.05	13.58	0.1	B
C-AB	0.14	4.10	0.4	A
C-A				
A-B				
A-C				

Main Results for each time segment

12:00 - 12:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	55	611	0.090	55	0.1	6.471	A
B-A	10	351	0.028	10	0.0	10.530	B
C-AB	68	948	0.072	68	0.1	4.091	A
C-A	511			511			
A-B	36			36			
A-C	367			367			

12:15 - 12:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	66	592	0.111	66	0.1	6.837	A
B-A	12	321	0.036	12	0.0	11.627	B
C-AB	98	1010	0.097	98	0.2	3.949	A
C-A	594			594			
A-B	43			43			
A-C	439			439			

12:30 - 12:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	80	566	0.142	80	0.2	7.412	A
B-A	14	279	0.051	14	0.1	13.570	B
C-AB	158	1099	0.143	157	0.4	3.822	A
C-A	690			690			
A-B	53			53			
A-C	537			537			

12:45 - 13:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	80	566	0.142	80	0.2	7.415	A
B-A	14	279	0.051	14	0.1	13.582	B
C-AB	158	1100	0.144	158	0.4	3.831	A
C-A	690			690			
A-B	53			53			
A-C	537			537			

13:00 - 13:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	66	592	0.111	66	0.1	6.844	A
B-A	12	321	0.036	12	0.0	11.640	B
C-AB	99	1011	0.098	100	0.2	3.957	A
C-A	593			593			
A-B	43			43			
A-C	439			439			

13:15 - 13:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	55	610	0.090	55	0.1	6.482	A
B-A	10	351	0.028	10	0.0	10.544	B
C-AB	69	948	0.073	69	0.1	4.099	A
C-A	511			511			
A-B	36			36			
A-C	367			367			

2030+Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	BRU / Panda Access	T-Junction	Two-way	Two-way	Two-way		0.93	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	71	Stream B-A	0.93	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D6	2030+Dev	PM	ONE HOUR	16:45	18:15	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	693	100.000
B		✓	83	100.000
C		✓	328	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	51	642
	B	46	0	37
	C	308	20	0

Vehicle Mix

Heavy Vehicle %

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.08	7.75	0.1	A
B-A	0.15	12.27	0.2	B
C-AB	0.06	5.26	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	28	568	0.049	28	0.1	6.665	A
B-A	35	413	0.084	34	0.1	9.509	A
C-AB	22	707	0.032	22	0.0	5.254	A
C-A	225			225			
A-B	38			38			
A-C	483			483			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	33	542	0.061	33	0.1	7.077	A
B-A	41	384	0.108	41	0.1	10.506	B
C-AB	29	720	0.041	29	0.1	5.212	A
C-A	266			266			
A-B	46			46			
A-C	577			577			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	41	505	0.081	41	0.1	7.745	A
B-A	51	344	0.147	50	0.2	12.258	B
C-AB	41	739	0.055	41	0.1	5.155	A
C-A	320			320			
A-B	56			56			
A-C	707			707			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	41	505	0.081	41	0.1	7.748	A
B-A	51	344	0.147	51	0.2	12.274	B
C-AB	41	739	0.055	41	0.1	5.157	A
C-A	320			320			
A-B	56			56			
A-C	707			707			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	33	542	0.061	33	0.1	7.084	A
B-A	41	384	0.108	42	0.1	10.523	B
C-AB	29	720	0.041	29	0.1	5.216	A
C-A	266			266			
A-B	46			46			
A-C	577			577			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	28	567	0.049	28	0.1	6.673	A
B-A	35	413	0.084	35	0.1	9.532	A
C-AB	22	707	0.032	23	0.0	5.258	A
C-A	224			224			
A-B	38			38			
A-C	483			483			

2040+Dev, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	BRU / Panda Access	T-Junction	Two-way	Two-way	Two-way		0.66	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	31	Stream C-AB	0.66	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D7	2040+Dev	AM	ONE HOUR	00:00	01:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	277	100.000
B		✓	62	100.000
C		✓	1162	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	34	243
	B	14	0	48
	C	1135	27	0

Vehicle Mix

Heavy Vehicle %

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.08	6.26	0.1	A
B-A	0.05	13.38	0.1	B
C-AB	0.17	3.27	0.5	A
C-A				
A-B				
A-C				

Main Results for each time segment

00:00 - 00:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	36	653	0.055	36	0.1	5.834	A
B-A	11	356	0.030	10	0.0	10.424	B
C-AB	74	1177	0.063	74	0.1	3.261	A
C-A	801			801			
A-B	26			26			
A-C	183			183			

00:15 - 00:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	43	642	0.067	43	0.1	6.005	A
B-A	13	326	0.039	13	0.0	11.488	B
C-AB	119	1283	0.093	119	0.2	3.094	A
C-A	925			925			
A-B	31			31			
A-C	218			218			

00:30 - 00:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	53	628	0.084	53	0.1	6.260	A
B-A	15	285	0.054	15	0.1	13.365	B
C-AB	236	1432	0.165	234	0.5	3.009	A
C-A	1044			1044			
A-B	37			37			
A-C	268			268			

00:45 - 01:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	53	628	0.084	53	0.1	6.260	A
B-A	15	285	0.054	15	0.1	13.376	B
C-AB	237	1432	0.165	237	0.5	3.018	A
C-A	1043			1043			
A-B	37			37			
A-C	268			268			

01:00 - 01:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	43	642	0.067	43	0.1	6.011	A
B-A	13	326	0.039	13	0.0	11.501	B
C-AB	120	1284	0.093	121	0.2	3.102	A
C-A	925			925			
A-B	31			31			
A-C	218			218			

01:15 - 01:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	36	653	0.055	36	0.1	5.842	A
B-A	11	356	0.030	11	0.0	10.432	B
C-AB	75	1178	0.063	75	0.1	3.267	A
C-A	800			800			
A-B	26			26			
A-C	183			183			

2040+Dev, IP

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	BRU / Panda Access	T-Junction	Two-way	Two-way	Two-way		0.86	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	60	Stream B-A	0.86	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D8	2040+Dev	IP	ONE HOUR	12:00	13:30	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	557	100.000
B		✓	86	100.000
C		✓	803	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	48	509
	B	13	0	73
	C	765	38	0

Vehicle Mix

Heavy Vehicle %

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.14	7.50	0.2	A
B-A	0.05	14.07	0.1	B
C-AB	0.15	4.04	0.4	A
C-A				
A-B				
A-C				

Main Results for each time segment

12:00 - 12:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	55	607	0.091	55	0.1	6.515	A
B-A	10	345	0.028	10	0.0	10.728	B
C-AB	71	962	0.074	71	0.1	4.037	A
C-A	533			533			
A-B	36			36			
A-C	383			383			

12:15 - 12:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	66	587	0.112	66	0.1	6.896	A
B-A	12	314	0.037	12	0.0	11.917	B
C-AB	104	1028	0.101	103	0.2	3.894	A
C-A	618			618			
A-B	43			43			
A-C	458			458			

12:30 - 12:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	80	560	0.143	80	0.2	7.499	A
B-A	14	270	0.053	14	0.1	14.059	B
C-AB	169	1122	0.150	168	0.4	3.778	A
C-A	715			715			
A-B	53			53			
A-C	560			560			

12:45 - 13:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	80	560	0.144	80	0.2	7.503	A
B-A	14	270	0.053	14	0.1	14.072	B
C-AB	169	1123	0.151	169	0.4	3.781	A
C-A	715			715			
A-B	53			53			
A-C	560			560			

13:00 - 13:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	66	587	0.112	66	0.1	6.904	A
B-A	12	314	0.037	12	0.0	11.933	B
C-AB	104	1029	0.101	105	0.2	3.904	A
C-A	618			618			
A-B	43			43			
A-C	458			458			

13:15 - 13:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	55	607	0.091	55	0.1	6.529	A
B-A	10	345	0.028	10	0.0	10.742	B
C-AB	72	963	0.074	72	0.1	4.044	A
C-A	533			533			
A-B	36			36			
A-C	383			383			

2040+Dev, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Arm A Direction	Arm B Direction	Arm C Direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	BRU / Panda Access	T-Junction	Two-way	Two-way	Two-way		0.92	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	65	Stream B-A	0.92	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D9	2040+Dev	PM	ONE HOUR	16:45	18:15	15

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	721	100.000
B		✓	83	100.000
C		✓	342	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	51	670
	B	46	0	37
	C	322	20	0

Vehicle Mix

Heavy Vehicle %

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-C	0.08	7.88	0.1	A
B-A	0.15	12.66	0.2	B
C-AB	0.06	5.24	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	28	563	0.050	28	0.1	6.728	A
B-A	35	406	0.085	34	0.1	9.663	A
C-AB	23	711	0.032	23	0.0	5.232	A
C-A	235			235			
A-B	38			38			
A-C	504			504			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	33	536	0.062	33	0.1	7.162	A
B-A	41	376	0.110	41	0.1	10.737	B
C-AB	30	724	0.041	30	0.1	5.185	A
C-A	277			277			
A-B	46			46			
A-C	602			602			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	41	498	0.082	41	0.1	7.869	A
B-A	51	335	0.151	50	0.2	12.646	B
C-AB	42	745	0.057	42	0.1	5.123	A
C-A	334			334			
A-B	56			56			
A-C	738			738			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	41	498	0.082	41	0.1	7.876	A
B-A	51	335	0.151	51	0.2	12.663	B
C-AB	42	745	0.057	42	0.1	5.124	A
C-A	334			334			
A-B	56			56			
A-C	738			738			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	33	536	0.062	33	0.1	7.169	A
B-A	41	376	0.110	42	0.1	10.755	B
C-AB	30	724	0.042	30	0.1	5.188	A
C-A	277			277			
A-B	46			46			
A-C	602			602			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-C	28	562	0.050	28	0.1	6.739	A
B-A	35	406	0.085	35	0.1	9.690	A
C-AB	23	711	0.032	23	0.0	5.236	A
C-A	235			235			
A-B	38			38			
A-C	504			504			

Junctions 10

ARCADY 10 - Roundabout Module

Filename: Calmount Road_ Ballymount Road Upper Roundabout.j10
Path: \\GLASGOWFILE\Jobs\SCT\2023\T&T\Panda Waste Facility, Ballymount\5. Technical\5. Modelling\Junctions 10
Report generation date: 28/11/2023 17:26:10

Summary of junction performance

	AM					IP					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2025														
Arm 1	D1	0.3	4.97	0.19	A	D2	0.7	6.47	0.39	A	D3	1.3	9.65	0.57	A
Arm 2		0.3	3.63	0.21	A		0.8	5.97	0.43	A		1.6	10.65	0.61	B
Arm 3		0.0	0.04	0.02	A		0.0	0.04	0.01	A		0.0	0.04	0.01	A
Arm 4		0.6	10.04	0.33	B		1.4	9.51	0.56	A		2.2	11.11	0.68	B
	2025 + Dev														
Arm 1	D4	0.2	4.99	0.17	A	D5	0.6	6.51	0.37	A	D6	1.3	9.85	0.57	A
Arm 2		0.3	3.68	0.22	A		0.8	6.16	0.44	A		1.6	11.05	0.62	B
Arm 3		0.0	0.04	0.02	A		0.0	0.04	0.01	A		0.0	0.04	0.01	A
Arm 4		0.8	11.23	0.41	B		1.9	11.31	0.63	B		2.5	12.40	0.71	B
	2030														
Arm 1	D7	0.3	5.27	0.20	A	D8	0.8	7.21	0.44	A	D9	1.8	11.99	0.63	B
Arm 2		0.3	3.76	0.23	A		1.0	6.66	0.47	A		2.2	14.27	0.69	B
Arm 3		0.0	0.04	0.03	A		0.0	0.04	0.01	A		0.0	0.04	0.01	A
Arm 4		0.6	10.20	0.39	B		1.8	11.33	0.61	B		3.0	14.20	0.74	B
	2030 + Dev														
Arm 1	D10	0.3	5.29	0.19	A	D11	0.8	7.27	0.42	A	D12	1.8	12.29	0.64	B
Arm 2		0.3	3.82	0.23	A		1.0	6.91	0.48	A		2.3	14.99	0.70	B
Arm 3		0.0	0.04	0.03	A		0.0	0.04	0.02	A		0.0	0.04	0.01	A
Arm 4		0.9	11.69	0.47	B		2.5	13.92	0.69	B		3.6	16.33	0.78	C
	2040														
Arm 1	D13	0.3	5.58	0.22	A	D14	0.9	7.88	0.47	A	D15	2.2	14.37	0.68	B
Arm 2		0.4	3.90	0.24	A		1.1	7.30	0.50	A		3.0	18.44	0.75	C
Arm 3		0.0	0.04	0.03	A		0.0	0.04	0.02	A		0.0	0.04	0.01	A
Arm 4		0.9	14.10	0.43	B		2.2	13.15	0.66	B		3.7	17.38	0.79	C
	2040 + Dev														
Arm 1	D16	0.3	5.60	0.20	A	D17	0.9	7.96	0.45	A	D18	2.2	14.72	0.68	B
Arm 2		0.4	3.96	0.25	A		1.2	7.60	0.51	A		3.1	19.56	0.76	C
Arm 3		0.0	0.04	0.03	A		0.0	0.04	0.02	A		0.0	0.04	0.01	A
Arm 4		1.3	16.52	0.52	C		3.1	16.68	0.73	C		4.6	20.56	0.82	C

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	
Location	
Site number	
Date	05/10/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	ADSYSTRA\cgow
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D18	2040 + Dev	PM	ONE HOUR	15:45	17:15	15

2040 + Dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	BRU / Calmount Rd	Standard Roundabout		1, 2, 3, 4	12.73	B

Junction Network

Driving side	Lighting	Network delay (s)	Network LOS
Left	Normal/unknown	12.73	B

Arms

Arms

Arm	Name	Description	No give-way line
1	Calmount Rd N		
2	BRU east		
3	Calmount Rd S		✓
4	BRU west		

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Entry only	Exit only
1	4.30	5.77	12.8	9.8	29.5	49.0		
2	4.30	6.00	14.1	19.0	29.5	46.0		
3	3.00	3.00	0.0	3.0	13.0	0.0		
4	4.30	4.77	1.4	26.9	29.5	37.0		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.569	1438
2	0.615	1578
3	0.000	99999
4	0.584	1354

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1		✓	507	100.000
2		✓	545	100.000
3		✓	845	100.000
4		✓	765	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1	2	3	4
From	1	0	14	493	0
	2	0	0	545	0
	3	266	246	0	333
	4	15	76	674	0

Vehicle Mix

Heavy Vehicle %

		To			
		1	2	3	4
From	1	0	31	5	0
	2	0	0	3	0
	3	13	6	0	0
	4	100	6	5	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.68	14.72	2.2	B
2	0.76	19.56	3.1	C
3	0.01	0.04	0.0	A
4	0.82	20.56	4.6	C

Main Results for each time segment

15:45 - 16:00

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	382	746	1014	0.376	379	0.6	5.956	A
2	410	872	1041	0.394	408	0.7	5.848	A
3	636	0	99999	0.006	636	0.0	0.038	A
4	576	385	1129	0.510	572	1.1	6.802	A

16:00 - 16:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	456	893	931	0.490	454	1.0	7.953	A
2	490	1045	934	0.524	488	1.1	8.298	A
3	760	0	99999	0.008	760	0.0	0.038	A
4	688	460	1085	0.634	685	1.8	9.475	A

16:15 - 16:30

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	558	1086	821	0.680	554	2.1	14.002	B
2	600	1271	795	0.754	593	2.9	17.749	C
3	930	0	99999	0.009	930	0.0	0.038	A
4	842	564	1025	0.822	832	4.4	18.842	C

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	558	1096	815	0.685	558	2.2	14.724	B
2	600	1284	788	0.762	599	3.1	19.562	C
3	930	0	99999	0.009	930	0.0	0.038	A
4	842	564	1025	0.822	841	4.6	20.556	C

16:45 - 17:00

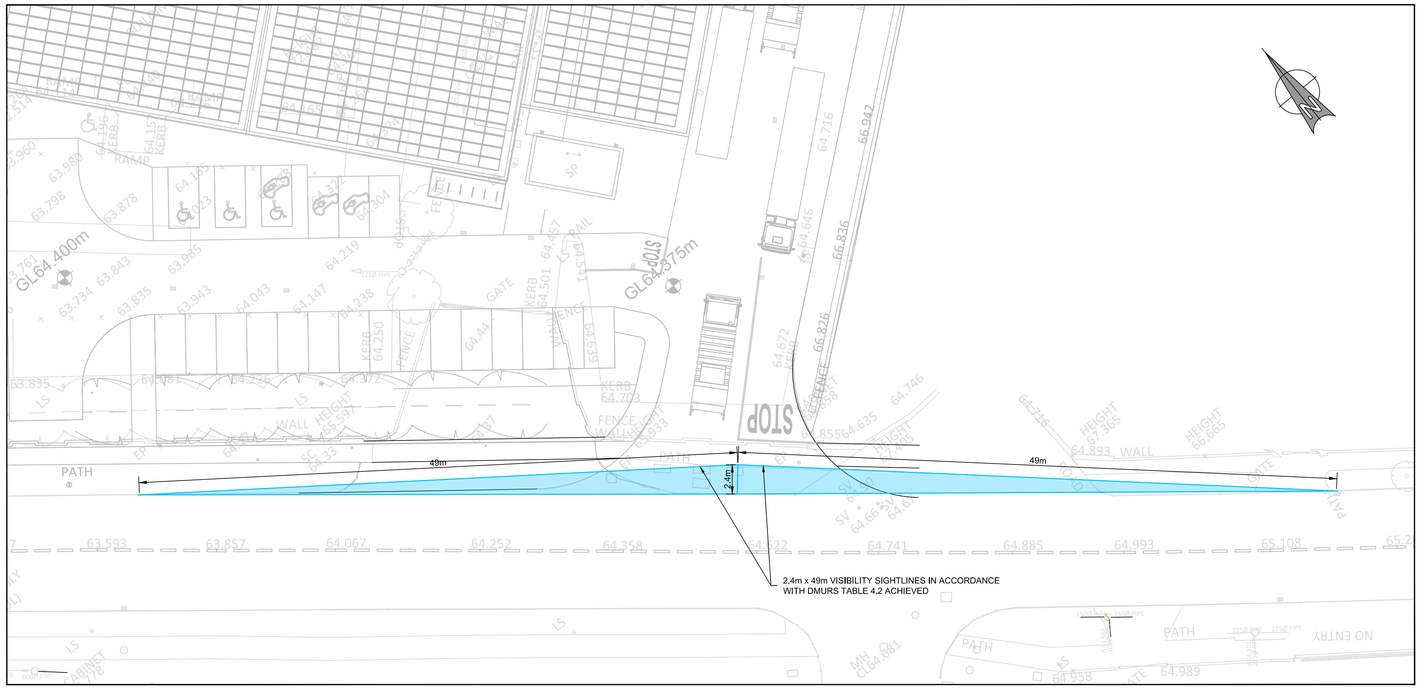
Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	456	906	923	0.494	460	1.0	8.297	A
2	490	1063	923	0.531	498	1.2	8.889	A
3	760	0	99999	0.008	760	0.0	0.038	A
4	688	460	1085	0.634	699	1.9	10.142	B

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	382	753	1010	0.378	383	0.6	6.076	A
2	410	883	1034	0.397	412	0.7	5.996	A
3	636	0	99999	0.006	636	0.0	0.038	A
4	576	385	1129	0.510	579	1.1	6.986	A

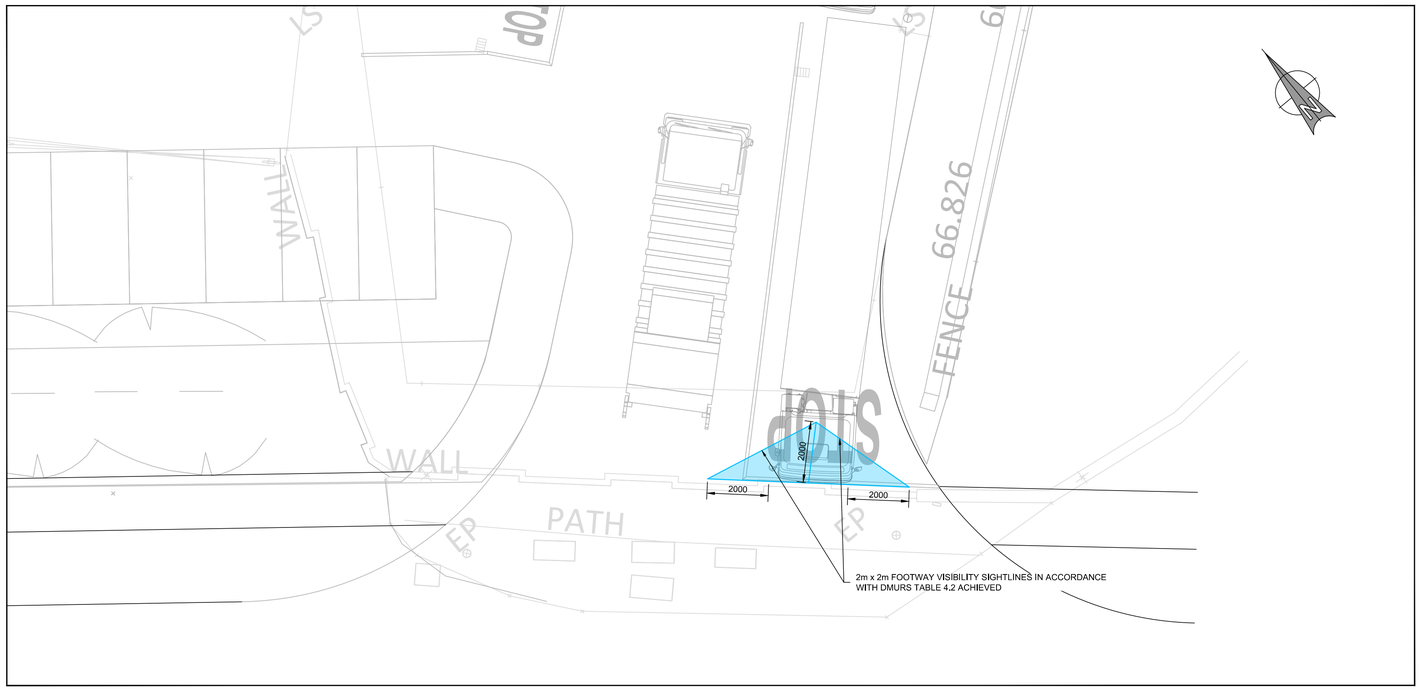
APPENDIX D – DRAWINGS

A1



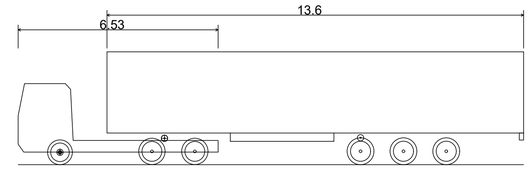
VISIBILITY SIGHTLINES AT ENTRANCE

SCALE 1:250



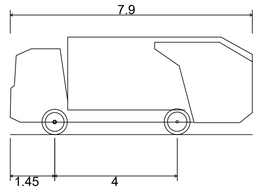
EXISTING FOOTWAY VISIBILITY SIGHTLINES AT ENTRANCE

SCALE 1:100



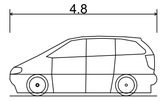
Max Legal Length (UK) Articulated Vehicle (16.5m)

Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	6.530m



DB32 Refuse Vehicle

Overall Length	7.900m
Overall Width	2.400m
Overall Body Height	3.183m
Min Body Ground Clearance	0.388m
Max Track Width	2.400m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	9.625m



Standard Design Vehicle (SDV)

Overall Length	4.800m
Overall Width	2.000m
Overall Body Height	1.950m
Min Body Ground Clearance	0.100m
Track Width	2.000m
Lock-to-lock time	4.00s
Wall to Wall Turning Radius	6.000m

INFORMATION

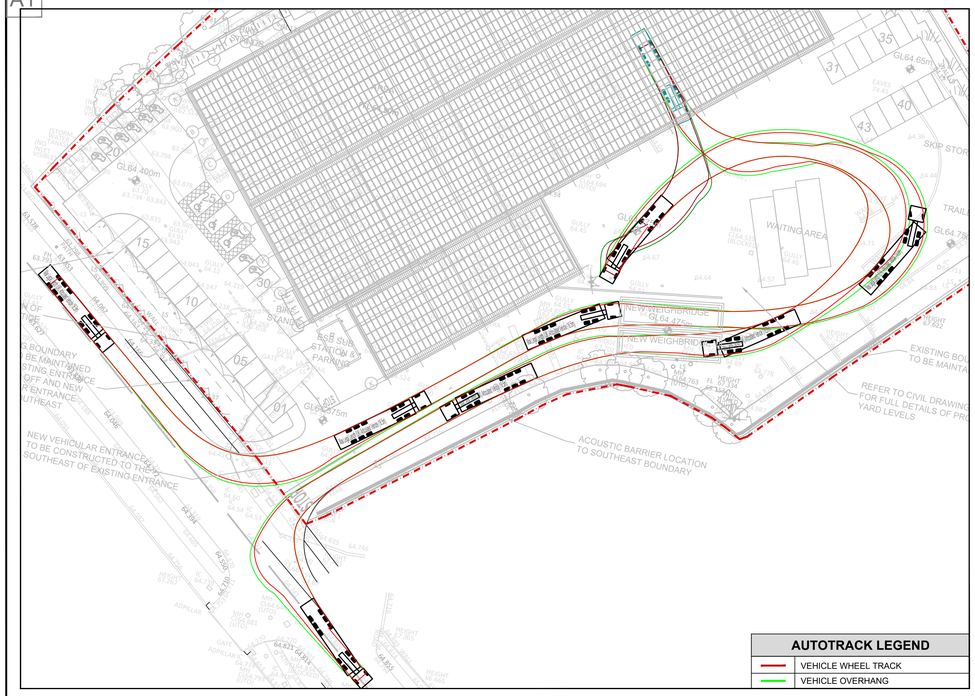
REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
P01	04/12/2023	ISSUED FOR PLANNING	LH	AK

CLIENT:	BEAUPARK UTILITIES LIMITED
PROJECT:	PROPOSED WASTE PROCESSING FACILITY AT BALLYMOUNT, DUBLIN 24.
TITLE:	VISIBILITY SIGHTLINES AT PROPOSED ENTRANCE JUNCTION

DRAWN:	CHECKED:	APPROVED:	JOB NO:	REV:
LH	AK	MH	221244	P01
DATE: 28/11/2023	SCALE: AS SHOWN		DRAWING NO: 221244-ORS-ZZ-00-DR-TR-731	

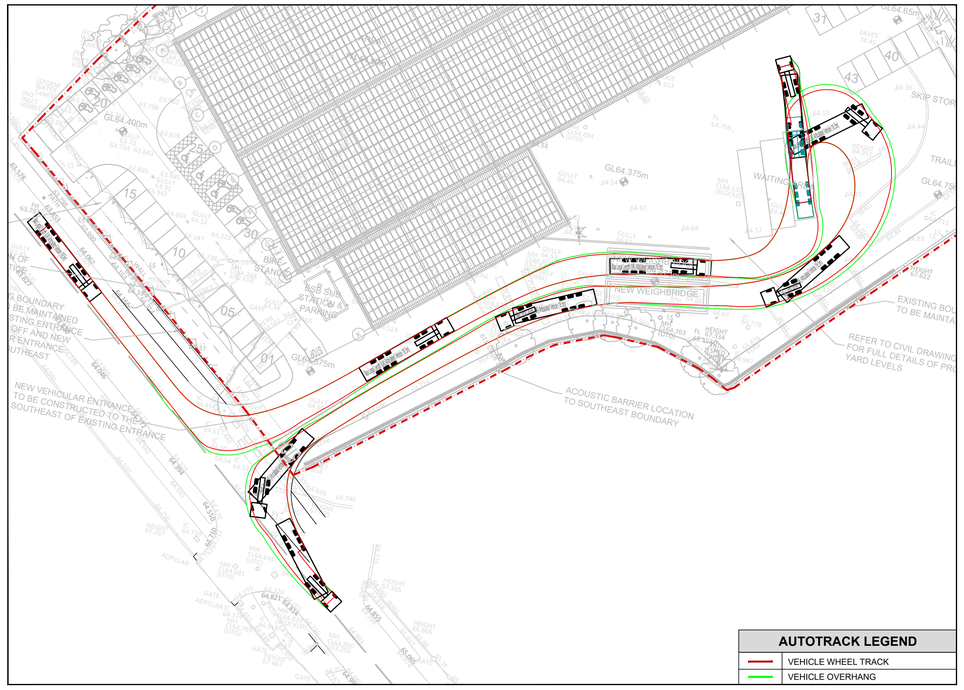
ORS
Mullingar | Dublin | Galway | Donegal | Cork
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2015 QUALITY ASSURED COMPANY

A1



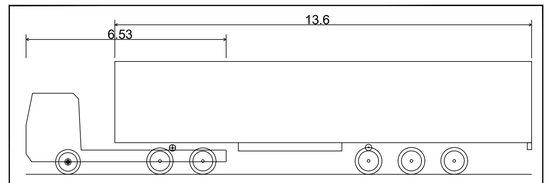
AUTOTRACK 01 - (UK) Articulated Vehicle (16.5m)

ENTERING PREMISES FROM NORTHWEST, TRANSIT OVER WEIGH-BRIDGE, REVERSING INTO WAREHOUSE AND EXITING PREMISES ONTO PUBLIC ROAD IN A SOUTH-EASTERLY DIRECTION



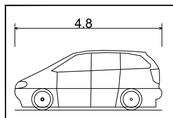
AUTOTRACK 02 - (UK) Articulated Vehicle (16.5m)

ENTERING PREMISES FROM SOUTH EAST, TRANSIT OVER WEIGH-BRIDGE, REVERSING INTO WAREHOUSE AND EXITING PREMISES ONTO PUBLIC ROAD IN A SOUTH-EASTERLY DIRECTION



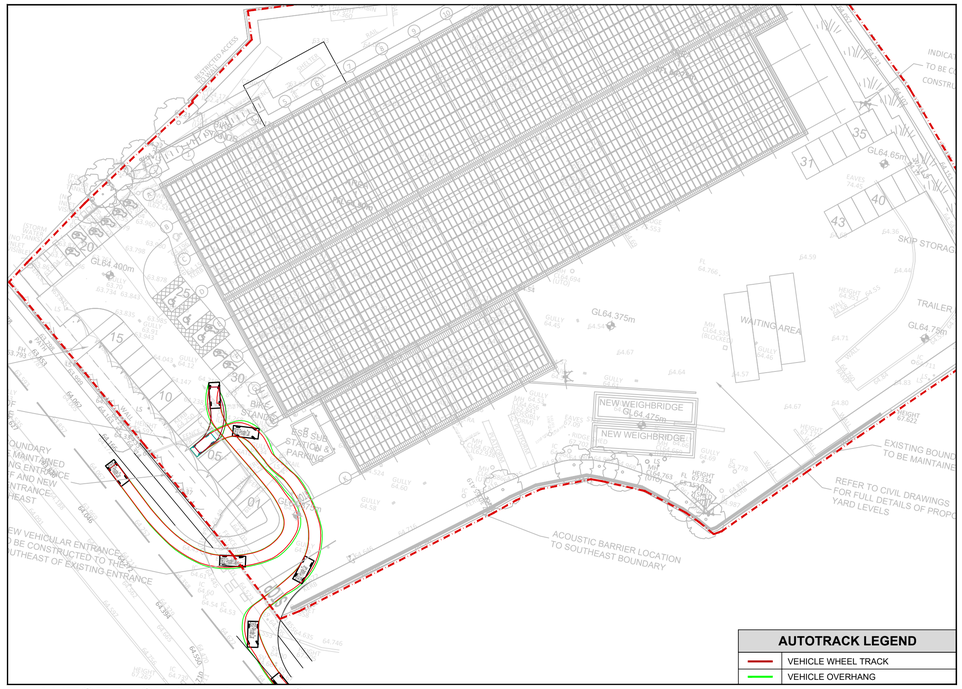
Max Legal Length (UK) Articulated Vehicle (16.5m)

Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	6.530m



Standard Design Vehicle (SDV)

Overall Length	4.800m
Overall Width	2.000m
Overall Body Height	1.950m
Min Body Ground Clearance	0.100m
Track Width	2.000m
Lock-to-lock time	4.00s
Wall to Wall Turning Radius	6.000m



AUTOTRACK 03 - Private Car

ENTERING PREMISES FROM NORTHWEST, PARKING IN SPACES PROVIDED, EXITING PREMISES ONTO PUBLIC ROAD IN A SOUTH-EASTERLY DIRECTION

INFORMATION

REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
P01	01/11/2023	ISSUED FOR PLANNING	LH	AK
P02	04/12/2023	RE-ISSUED FOR PLANNING	LH	AK

CLIENT:	BEAUPARK UTILITIES LIMITED
PROJECT:	PROPOSED WASTE PROCESSING FACILITY AT BALLYMOUNT, DUBLIN 24.
TITLE:	AUTOTRACK ANALYSIS

DRAWN:	CHECKED:	APPROVED:	JOB NO:	REV:
LH	AK	MH	221244	P02
DATE: 17/10/2023	SCALE: 1:500		DRAWING NO: 221244-ORS-ZZ-00-DR-TR-730	

ORS
Mullingar | Dublin | Galway | Donegal | Cork
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2015 QUALITY ASSURED COMPANY

A1

NOTE:
ALL PROPOSED ROAD MARKINGS / HATCHING TO BE IN ACCORDANCE WITH CHAPTER 7 OF THE TRAFFIC SIGNS MANUAL.

NOTE:
FOR VISIBILITY SIGHTLINES, REFER TO DRAWING 221244-ORS-ZZ-00-DR-TR-730.

PROPOSED TRAFFIC LAYOUT

SCALE 1:250

GENERAL NOTES

1. THE CONTRACTOR SHOULD READ THIS ROAD SPECIFICATION IN CONJUNCTION WITH THE RELEVANT TYPICAL DETAILS.
2. JOINTS BETWEEN NEW ROAD CONSTRUCTION AND EXISTING ROADS SHALL BE AS PER THE DETAILS IN TII-CC-SCD-00703. THE EDGES OF THE EXISTING CARRIAGEWAY TO BE CUT BACK BY 0.5m WITH A ROTARY SAW TO FORM A VERTICAL FACE AND FRAMED IN ACCORDANCE WITH TII-CC-SCD-00703 INCLUDE FOR ALL ADDITIONAL EXCAVATION AND FILLING TO ACHIEVE REQUIRED DEPTH OF SUB BASE WHERE NEW AND EXISTING WORKS MEET.
3. ALL MANHOLES RAISED TO MEET THE NEW ROAD LEVEL WHERE REQUIRED. DISHING CONCRETE TO MANHOLE COVERS AND FRAMES AND INCLUDE FOR SETTING FRAME IN CONCRETE TO NEW OR ADJUSTED LEVELS WHERE REQUIRED PROTECT COVER AND FRAME DURING COURSE OF WORKS. ALL GULLIES TO MEET PROPOSED NEW SURFACE LEVEL WHERE REQUIRED
4. FOOTPATH EXPANSION JOINTS SHALL BE NEATLY FORMED IN STRAIGHT LINES AT NOT GRATER THAN 3m CENTERS AND SO ARRANGED AS TO COINCIDE WITH THE JOINTS IN THE KERB JOINTS SHALL BE FORMED BY INSERTING A DOUBLE LAYER OF ROOFING FELT OR OTHER APPROVED METHODS. WHICH SHALL EXTEND THE FULL DEPTH OF THE SLAB AND BE FINISHED OFF NEATLY AT THE SURFACE. THE CONTRACTOR SHALL ENSURE THE DOUBLE LAYER OF ROOFING FELT IS SUPPORTED IN THE JOINT AND HELD IN A STRAIGHT LINE DURING THE CONSTRUCTION PROCESS.
5. IN-SITU CONCRETE SHALL BE POURED ON A SUB-BASE OF 150mm NOMINAL THICK OF GRANULAR MATERIAL COMPLYING WITH CLAUSE 808. CONCRETE SHALL BE LAID AND COMPACTED IN COMPLIANCE WITH THE 800 SERIES OF THE SPECIFICATION FOR ROAD WORKS. ALL MATERIALS SPECIFIED SHALL COMPLY WITH REQUIREMENTS OF SR 21 (ANNEX E AMENDED TO I.S. EN 13242:2013 AND BASED ON THE REPORT OF PYRITE PANEL 2012) AGGREGATED FOR USE IN UNBOUND & HYDRAULICALLY BOUND GRANULAR MATERIALS
6. THE VERTICAL ALIGNMENT OF THE FINISHED SURFACE SHALL NOT DEPART FROM THE DESIGN LEVEL BY MORE THAN +-10m AT ANY POINT . THE MAXIMUM DEVIATION OF THE SURFACE UNDER A STRAIGHT EDGE SHALL NOT BE GREATER THAN 5mm IN 3m. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION OF ALL EXISTING SERVICE CHAMBERS. MANHOLES AND DUCTING THROUGHOUT THE WORKS ALL CONCRETE JOINTS AND EDGES SHALL BE BULL NOSED.
7. CBR TESTS SHALL BE CARRIED OUT ON THE SUBGRADE AT FORMATION LEVEL. THE RATE OF THE TESTS SHALL BE 1 TEST PER 50 LINEAR METERS OF ROAD. WHERE TEST VALUES VARY SIGNIFICANTLY ADDITIONAL TESTS MAY BE REQUIRED AT THE DISCRETION OF THE ENGINEER
8. CAPPING LAYER SPECIFIED BASED ON ESTIMATED SUBGRADE CBR VALUE OF 8%. CAPPING LAYER MAY BE REDUCED/INCREASED SUBJECT TO ACTUAL SUBGRADE CBR TEST VALUES OBTAINED ON SITE.

LEGEND

	PROPOSED FOOTPATH
	PROPOSED ROAD PAVEMENT
	PROPOSED GREEN/LANDSCAPE AREA
	PROPOSED PERMEABLE BLOCK PAVING
	PROPOSED TACTILE PAVING (UNCONTROLLED)
0.00m	PROPOSED LEVELS
STOP	RUS 027: STOP SIGN

INFORMATION

REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
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P02	04/12/2023	RE-ISSUED FOR PLANNING	LH	AK

CLIENT:	BEAUPARK UTILITIES LIMITED
PROJECT:	PROPOSED WASTE PROCESSING FACILITY AT BALLYMOUNT, DUBLIN 24.
TITLE:	PROPOSED TRAFFIC LAYOUT

DRAWN:	CHECKED:	APPROVED:	JOB NO:	REV:
LH	AK	MH	221244	P02
DATE: 09/10/2023	SCALE: 1:250		DRAWING NO: 221244-ORS-ZZ-00-DR-TR-700	

ORS
Mullingar | Dublin | Galway | Donegal | Cork
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2015 QUALITY ASSURED COMPANY

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BIRMINGHAM, ALPHA TOWER
8TH FLOOR
CROWNE PLAZA,
SUFFOLK STREET

BIRMINGHAM
UNITED KINGDOM
B1 1TT
TEL: +441213934841

BIRMINGHAM, NEWALL ST
5TH FLOOR
LANCASTER HOUSE
67 NEWHALL STREET

BIRMINGHAM
UNITED KINGDOM
B3 1NQ
TEL: +44 (0)121 233 7680

DUBLIN
2ND FLOOR
RIVERVIEW HOUSE
21-23 CITY QUAY
REPUBLIC OF IRELAND
DUBLIN 2
TEL: +353 (0)1 905 3961

EDINBURGH, THISTLE ST
PROSPECT HOUSE
5 THISTLE STREET
EDINBURGH
UNITED KINGDOM
EH2 1DF
TEL: +44 (0)131 344 4950
Tel: +44 (0)131 220 6966

GLASGOW, ST VINCENT ST
124 ST VINCENT STREET
GLASGOW
UNITED KINGDOM
G2 5HF
TEL: +44 (0)141 225 4400

GLASGOW, WEST GEORGE ST
250 WEST GEORGE STREET
GLASGOW
UNITED KINGDOM
G2 4QY
TEL: +44 (0)141 221 4030

LEEDS
100 WELLINGTON STREET
LEEDS
UNITED KINGDOM
LS1 1BA
TEL: +44 (0)113 397 9740

LONDON, 15 OLD BAILEY
SEVENTH FLOOR
15 OLD BAILEY
LONDON
UNITED KINGDOM
EC4M 7EF
TEL: +44 (0)20 7529 6500

LONDON, 5 OLD BAILEY
PROSPECT BUSINESS CENTRE
5 OLD BAILEY
LONDON
UNITED KINGDOM
EC4M 7BA
TEL: +44 (0)203 714 4400

MANCHESTER
25TH FLOOR
CITY TOWER
PICCADILLY PLAZA
MANCHESTER
UNITED KINGDOM
M1 4BT
TEL: +44 (0)161 236 0282
TEL: +44 (0)161 831 5600

NEWCASTLE
FLOOR B
SOUTH CORRIDOR, MILBURN HOUSE
DEAN STREET

NEWCASTLE
UNITED KINGDOM
NE1 1LE
TEL: + 44 (0)191 260 0135

WOKING
DUKES COURT
DUKE STREET
WOKING
SURREY
UNITED KINGDOM
GU21 5BH
Tel: +44 (0)483 728051

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