Tionscadal Éireann
Project Ireland
2040

Comhairle Cathrach
& Contae Phort Láirge
Waterford City
& County Council

NTA
Údarás Náisiúnta Iompair
National Transport Authority

Waterford Cordon Report 2024

Report on Inbound People Movements Across the Waterford City Cordon

List of Abbreviations and Definitions

JTC:

- Junction Turning Counts

LGV:

- Light Goods Vehicle. LGV includes the following vehicle types: Van, Pick-Up, Car Delivery Vans, Minibus, Commercial Vehicles < 3.5 tonnes (single rear tyres)

M/C:

- Motorcycle. M/C includes the following: Motorcycles, Motor Scooters, Mopeds, Three-wheel motorcycles

NTA:

- National Transport Authority

OGV1:

- Ordinary Goods Vehicle 1. OGV1 includes the following vehicle types: 2-Axles Rigid Truck, 3-Axles Rigid Truck and Commercial Vehicles > 3.5 Tonnes (single rear tyres)

OGV2:

- Ordinary Goods Vehicle 2. OGV2 includes the following vehicle types: 4 or more Axles Rigid Truck, 3 Axle or more Articulated Truck, Vehicles in Category OGV1 towing trailer

P/C:

- Pedal Cycle

PED:

- Pedestrian

PSV:

- Public Service Vehicle, excluding private / non-scheduled service vehicle

BUS:

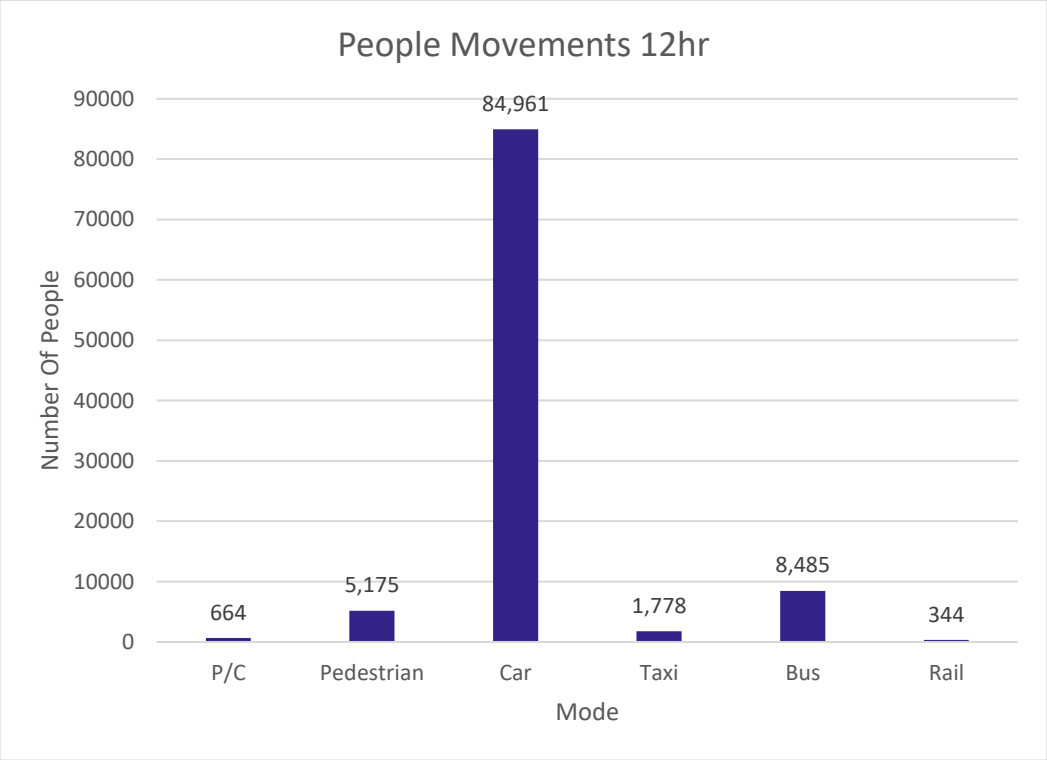
- Includes all public (PSV) / private, single / double deck, scheduled / non-scheduled service vehicles

Executive Summary

The Waterford City Cordon is a cordon of traffic survey locations that encloses Waterford City. Classified Junction Turning Counts and Pedestrian surveys were undertaken at 9 locations to determine the traffic flows crossing the Waterford City Cordon inbound during the key traffic periods for a typical weekday, i.e. AM (07:00 - 10:00), Lunch Time (10:00 - 13:00), School Run (13:00 - 16:00), PM (16:00 - 19:00), OP (19:00 - 07:00) and 24hr (00:00 - 24:00).

Vehicle occupancy surveys were undertaken at 9 sites and, in addition to this, Bus Occupancy surveys were undertaken at 9 bus stops to determine the number, occupancy and frequency of bus services crossing the Waterford City Cordon. Passenger numbers from the Annual Rail Census (Iarnród Éireann) were also used to determine the passengers travelling across the Waterford City Cordon inbound. Based on the analysis of the 2024 survey data, the key results are:

- In terms of overall people movements, 14,668 (14%) of a total of 101,407 people travelling inbound towards the City between 07:00 and 19:00 used sustainable modes of travel, i.e. pedal cycle, pedestrian, bus and rail.



- The total number of vehicles, pedestrians and cyclists that crossed the Waterford Cordon inbound was 86,850 on the day of the survey.
- The busiest time period for vehicles and cyclists was the AM peak with 17,157 crossing the Waterford City Cordon inbound towards the city. The busiest time period for Pedestrians was the PM peak with 1,488 crossing the Waterford City Cordon inbound.

- Between the hours of 07:00 and 19:00, cars were recorded to have the highest vehicular traffic split, with 79% of the total inbound flows. Light Goods Vehicles (LGVs) recorded 8%, Ordinary Goods Vehicles 1 (OGV1) recorded 1%, Ordinary Goods Vehicles 2 (OGV2) recorded <1% and taxis recorded 2%. The remaining vehicle classifications recorded 2% or less of the total flows.
- Between 07:00 and 19:00, 48% of buses were at 25-49% capacity. Approximately 9% of buses were at 0-24%. 30% were at 50-74% capacity, 11% were at 75-99% capacity and 2% were at 100% capacity.

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1 Introduction

The Waterford City Cordon is a closed cordon of traffic survey locations that encloses Waterford City. This report presents the findings of traffic surveys along the cordon, which were undertaken in November 2024 and captured the traffic movements crossing the Waterford City Cordon inbound towards the city.

The structure of this report is set out as follows:

- **Chapter 2** provides a definition of the Waterford City Cordon and sets out the methodology for the data collection;
- **Chapter 3** outlines
    - The traffic flows crossing the Waterford City Cordon inbound by vehicle classification;
    - The occupancy of the vehicles crossing the Waterford City Cordon in terms of the number of occupants per vehicle. Each vehicle type has been analysed per peak time periods and for the duration of the survey.
- **Chapter 4** outlines the total number of people movements crossing the Waterford City Cordon inbound towards the city; and
- **Chapter 5** provides a summary of the survey results.

2 Definition and Methodology

2.1 Data Sources

To establish the movement of people across the Waterford City Cordon, a bespoke data collection exercise was carried out, comprising of the following surveys:

Junction Turning Counts (JTC):

- The JTC surveys were recorded in 15-minute intervals over three consecutive 24-hour periods at 9 sites on 12/11/2024. They were undertaken using telescopically mounted video cameras and were recorded for car, LGV, OGV1, OGV2, motorcycle, pedal cycle, taxi and bus.

Vehicle Occupancy Surveys

- Vehicle Occupancy counts were also undertaken at survey points along the Waterford City Cordon. Vehicle Occupancy counts were carried out by a manual enumerator between 07:00 and 19:00. All information was recorded in hourly intervals.

Bus Occupancy Surveys

- Bus Occupancy surveys were undertaken at 9 bus stops inside the Waterford City Cordon on the day of the survey in order to record the number of people travelling inbound into the city via bus. Manual enumerators recorded both occupancy of the bus at the bus stop, and the number of passengers boarding and alighting. These surveys also recorded the number of public and private buses passing the bus stop and the type of bus.

Heavy Rail Data:

- Since 2012, Iarnród Éireann has undertaken a census of passengers boarding and alighting on all services passing through all stations on the national rail network in November 2024. While this rail survey was not commissioned as part of the multi-modal cordon surveys, results from the rail census were used to supplement the surveys.

Additional Two Weekly Vehicle Counts/Speed Surveys:

- Automatic Traffic Counts (ATCs) were carried out over a continuous two-week period (starting on 02/11/2024) in order to gather longer term data on daily movements at key points on the radial routes leading into the cordon.

2.2 Definition of the Waterford City Cordon

A map of the Waterford City Cordon is presented in Figure 2-1, and highlights the locations along the Cordon where JTC data has been collected on the movement of traffic into the city. It also shows the bus stops where bus occupancy surveys were conducted.

The Waterford City Cordon has been chosen to ensure, as far as possible, that any traffic flow (including cyclists and pedestrians) entering the city must pass through one of the locations where the surveys have been undertaken.

The data, as presented in this report, refers to movements in one direction only (i.e. inbound towards the city) across the various cordon points. Figure 2-2 is a map of the locations where ATC links have been surveyed, and the location of the rail station.

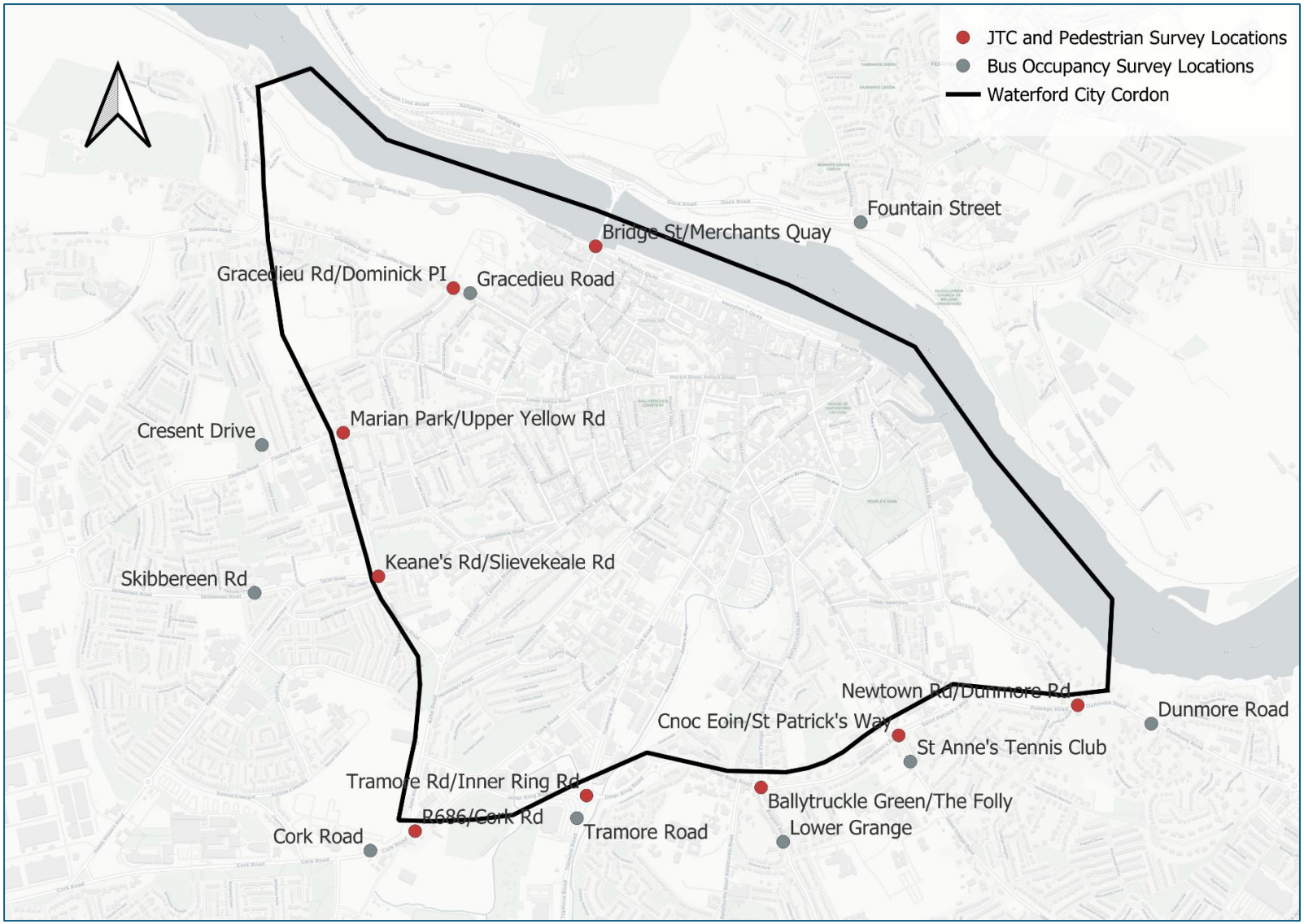


Figure 2-1:JTC, Pedestrian and Bus Occupancy Site Locations

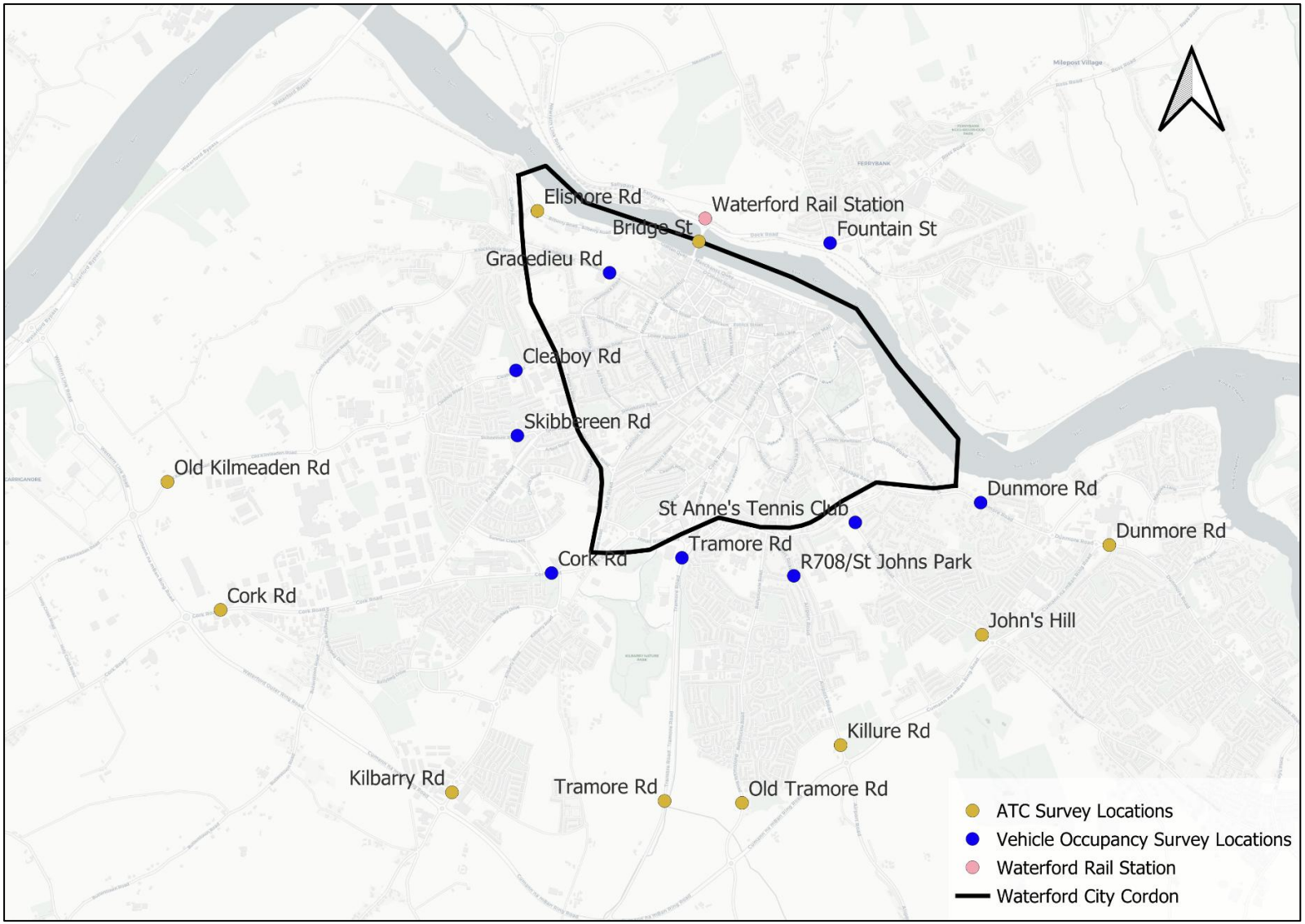


Figure 2-2:ATC Site Locations and Waterford Rail Station

2.3 Time Periods Analysed

Surveys were recorded at either 15-minute or one-hour intervals, or, in the case of public transport services, when the bus or train was at a specific stop or station. Therefore, it is possible to understand trends throughout the day from the data. As such, the data was analysed for the following time periods:

- **AM:** 07:00 - 10:00
- **Lunch Time (LT):** 10:00 - 13:00
- **School Run (SR):** 13:00 - 16:00
- **PM:** 16:00 - 19:00
- **Off-Peak (OP):** 19:00 - 07:00
- **24hr:** 00:00 - 00:00

3 Waterford City Cordon

3.1 Traffic Flow Surveys

3.1.1 Overview

This section outlines the classified vehicle, pedestrian and cycle flows crossing the Waterford City Cordon inbound, towards the city centre. This information was collected from the JTC traffic survey sites for car, LGV, OGV1, OGV2, motorcycle, pedal cycle, taxi and bus, as well as pedestrian survey sites. It should be noted that these surveys count the number of vehicles, cyclists and pedestrians crossing the cordon. However, the figures presented below do not include the number of people in each vehicle (vehicle occupancy). Therefore, these figures are not representative of the mode share. Total passenger flows and mode share are discussed in sections 4.4 and 4.5 of this report.

Table 3-1 presents the observed flows by vehicle classification crossing the Waterford City Cordon inbound during the time periods recorded in the 2024 survey.

Table 3-1:Movements Across the Waterford City Cordon Inbound

	AM	LT	SR	PM	OP	24hr
Vehicle Classifications	**07:00-10:00**	**10:00-13:00**	**13:00-16:00**	**16:00-19:00**	**19:00-07:00**	**00:00-24:00**
Car	14,466	12,927	14,663	14,581	12,688	69,325
LGV	1,662	1,547	1,388	1,145	840	6,582
OGV1	255	321	219	108	165	1,068
OGV2	117	119	90	20	54	400
Motorcycle	43	50	74	48	32	247
Pedal Cycle	170	114	159	221	159	823
Taxi	300	335	335	217	374	1,561
Bus	144	144	140	120	188	736
Pedestrian	1,089	1,247	1,351	1,488	933	6,108
Total	**18,246**	**16,804**	**18,419**	**17,948**	**15,433**	**86,850**

Figure 3-1 illustrates the overall flows for all vehicle types across the Waterford City Cordon per key time period. It is evident that the SR time period has the highest volume of overall traffic movements, with a total of 18,419 travelling inbound.

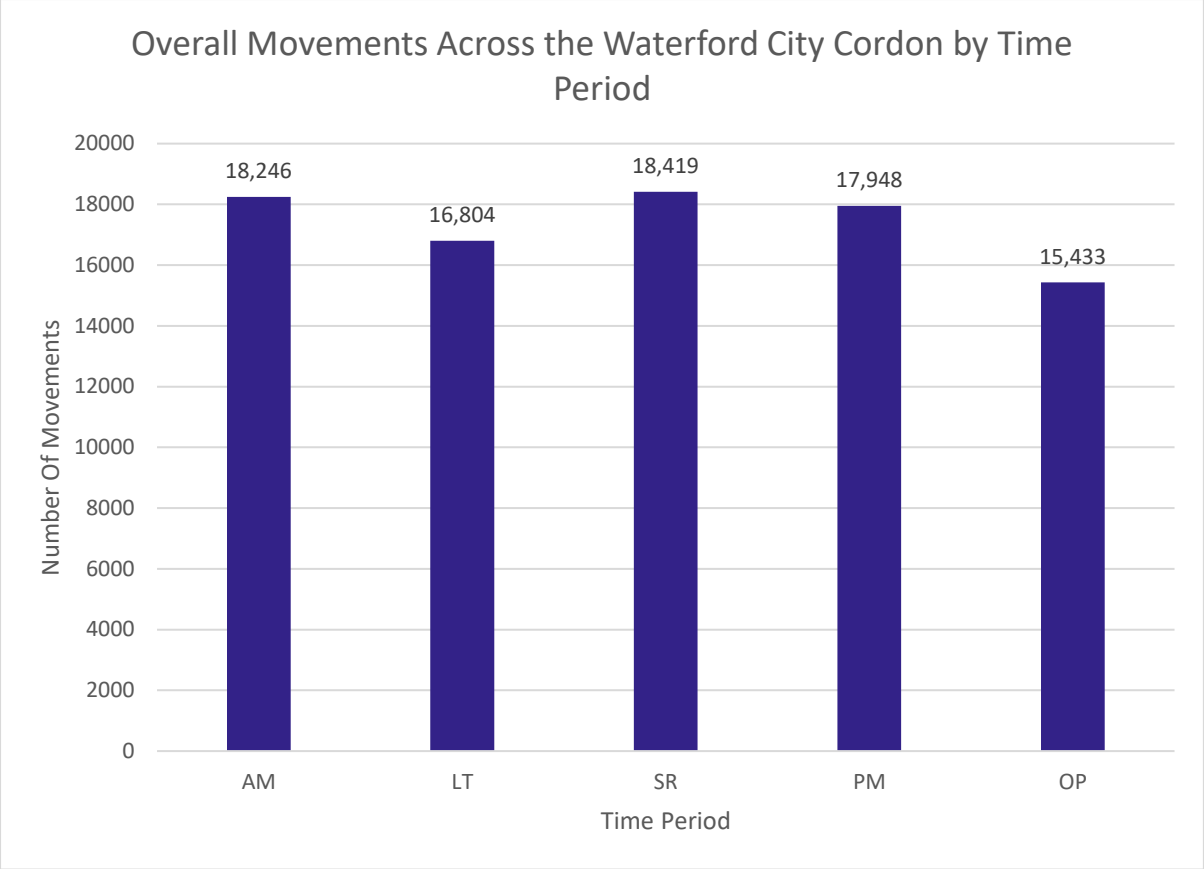


Figure 3-1:Total Movements across the Waterford City Cordon Inbound by Time Period

For further information, please refer to Appendix A, which presents additional graphs separated into the respective time periods surveyed and survey site locations.

Figure 3-2 sets out the number of vehicles in each classification as recorded in the JTC surveys, as well as the number of pedestrians, over a 24-hour period. This figure shows that car is the most common vehicle type, with 69,325 inbound movements in the 24-hour period, accounting for 80% of all crossings.

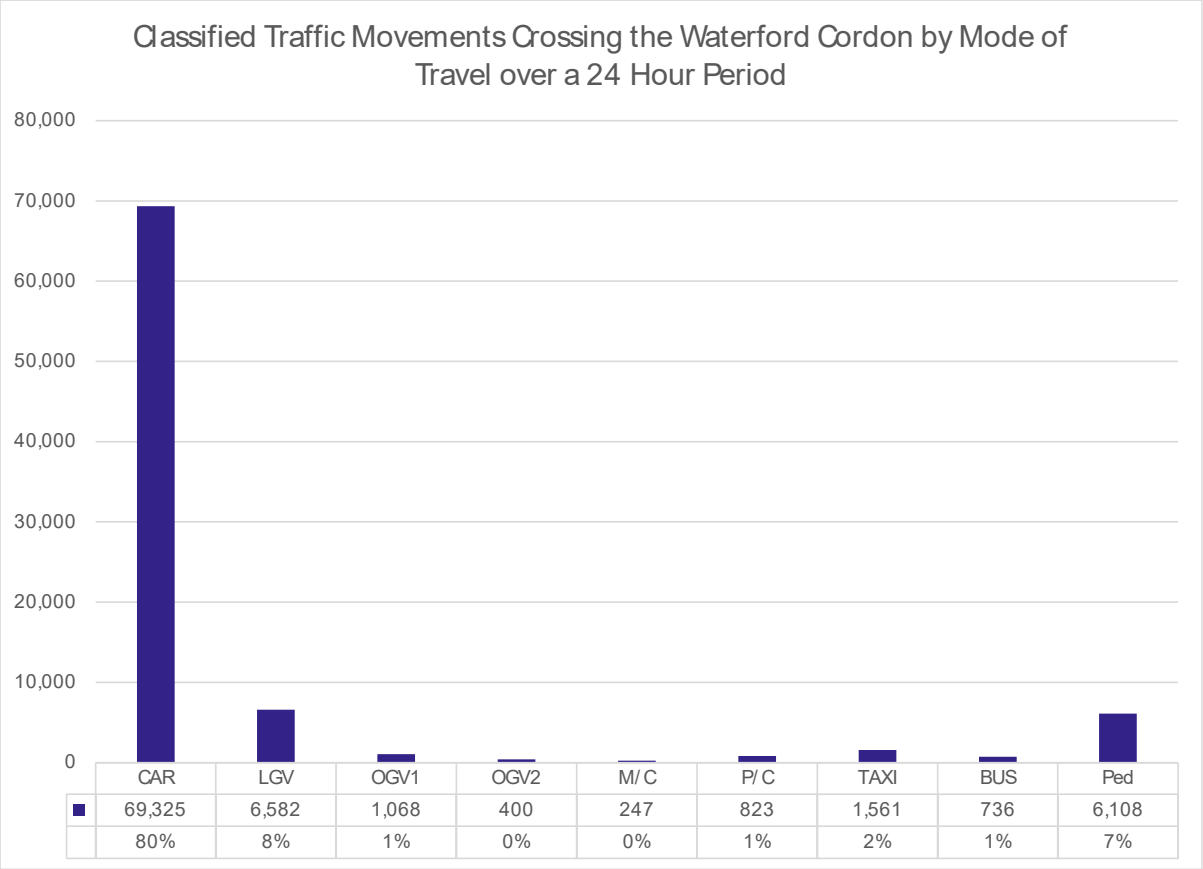


Figure 3-2:Total Number and Percentage of Vehicles crossing the Waterford City Cordon inbound by vehicle classification over a 24 hour period

Figure 3-3 sets out the number of vehicles in each classification as recorded in the JTC surveys, as well as the number of pedestrians, over a 12-hour period (i.e. 07:00 – 19:00). This figure shows that car is the most common vehicle type, with 56,637 inbound movements in the 12-hour period, accounting for 79% of all crossings.

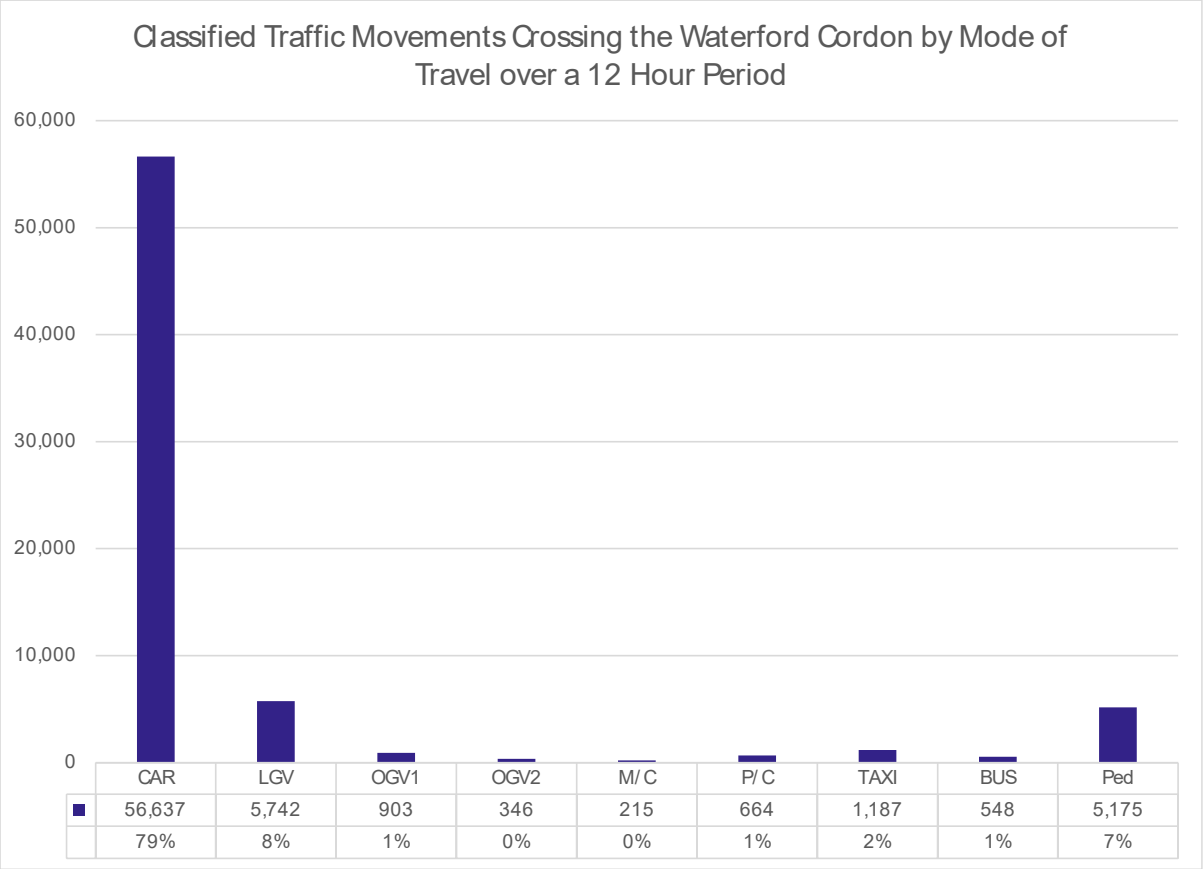


Figure 3-3:Total Number and Percentage of Vehicles crossing the Waterford City Cordon inbound by vehicle classification over a 12 hour period

3.1.2 Vehicle Classified Traffic Flows

The following sections provide a more detailed overview of the JTC survey results by vehicle classification and survey sites. Each vehicle class is analysed in turn providing information on the volume of vehicles per time period and per survey site.

Car

Figure 3-4 below presents the total number of cars crossing the Waterford City Cordon for each surveyed time period. Overall, it is evident that the SR time period has the highest volume of cars, with a total of 14,663 cars travelling inbound.

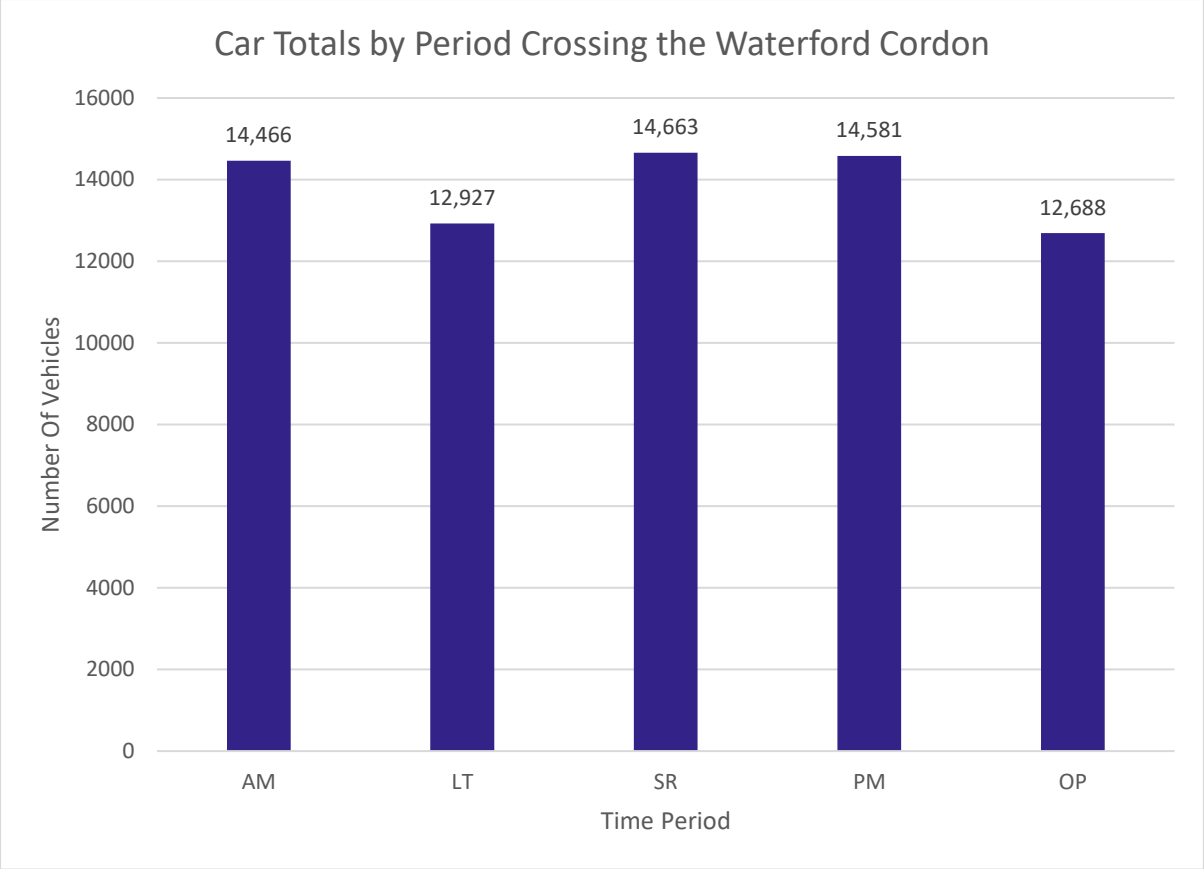


Figure 3-4:Total Number of Car journeys per Time Period

Figure 3-5 presents a further breakdown of the total number of cars, with reference to each site location. The busiest location for cars crossing the Waterford City Cordon was the Bridge St/Merchants Quay junction, with a total of 15,101 cars travelling inbound through this junction over a 24-hour period.

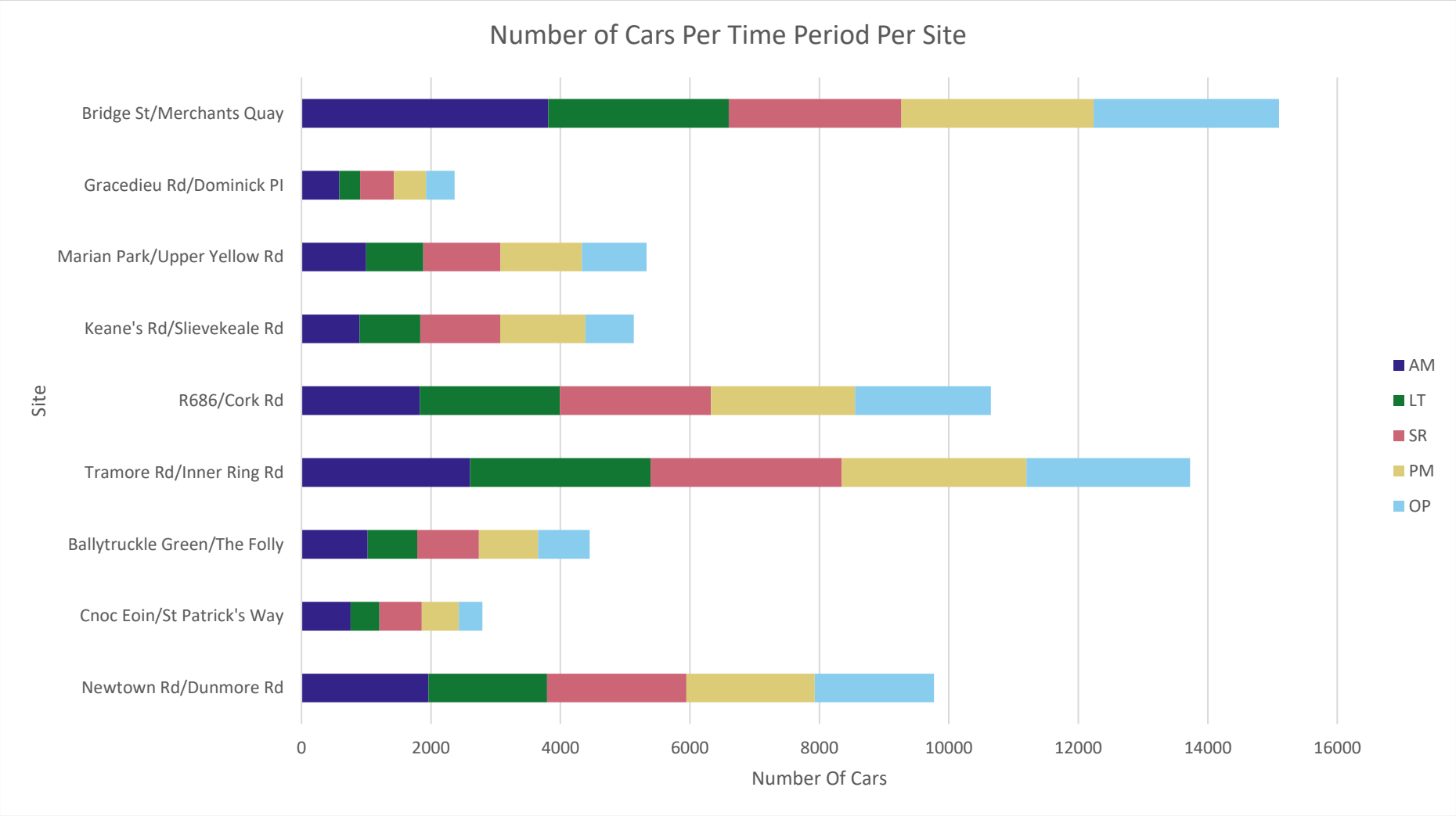


Figure 3-5:Number of Cars Crossing the Waterford City Cordon Inbound at all Sites Per Time Period

Light Goods Vehicle

Figure 3-6 below presents the total number of LGVs crossing the Waterford City Cordon for each surveyed time period. Overall, it is evident that the AM time period has the highest volume of LGVs, with a total of 1,662 LGVs travelling inbound.

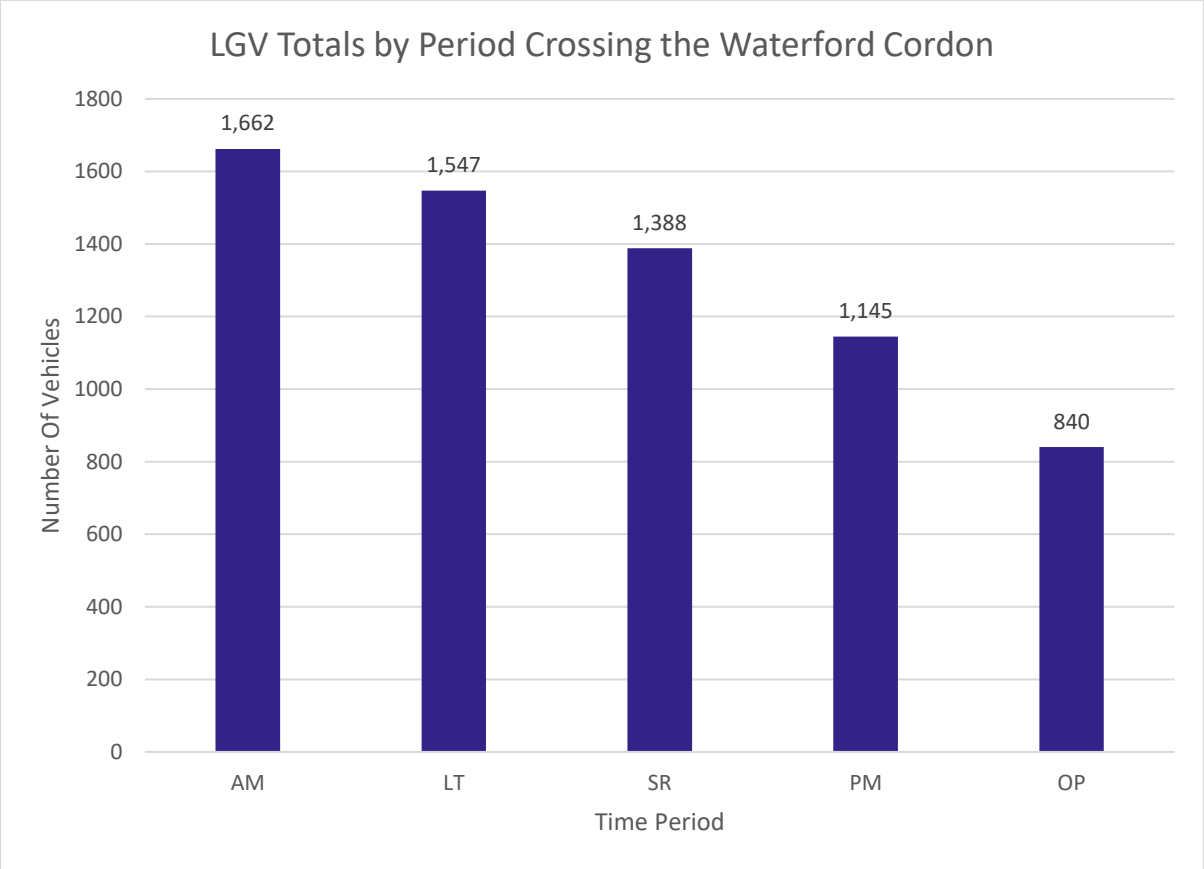


Figure 3-6:Total Number of LGV journeys per Time Period

Figure 3-7 presents a further breakdown of the total number of LGVs, with reference to each site location. The busiest location for LGVs crossing the Waterford City Cordon was the Bridge St/Merchants Quay junction, with a total of 1,856 LGVs travelling inbound through this junction over a 24-hour period.

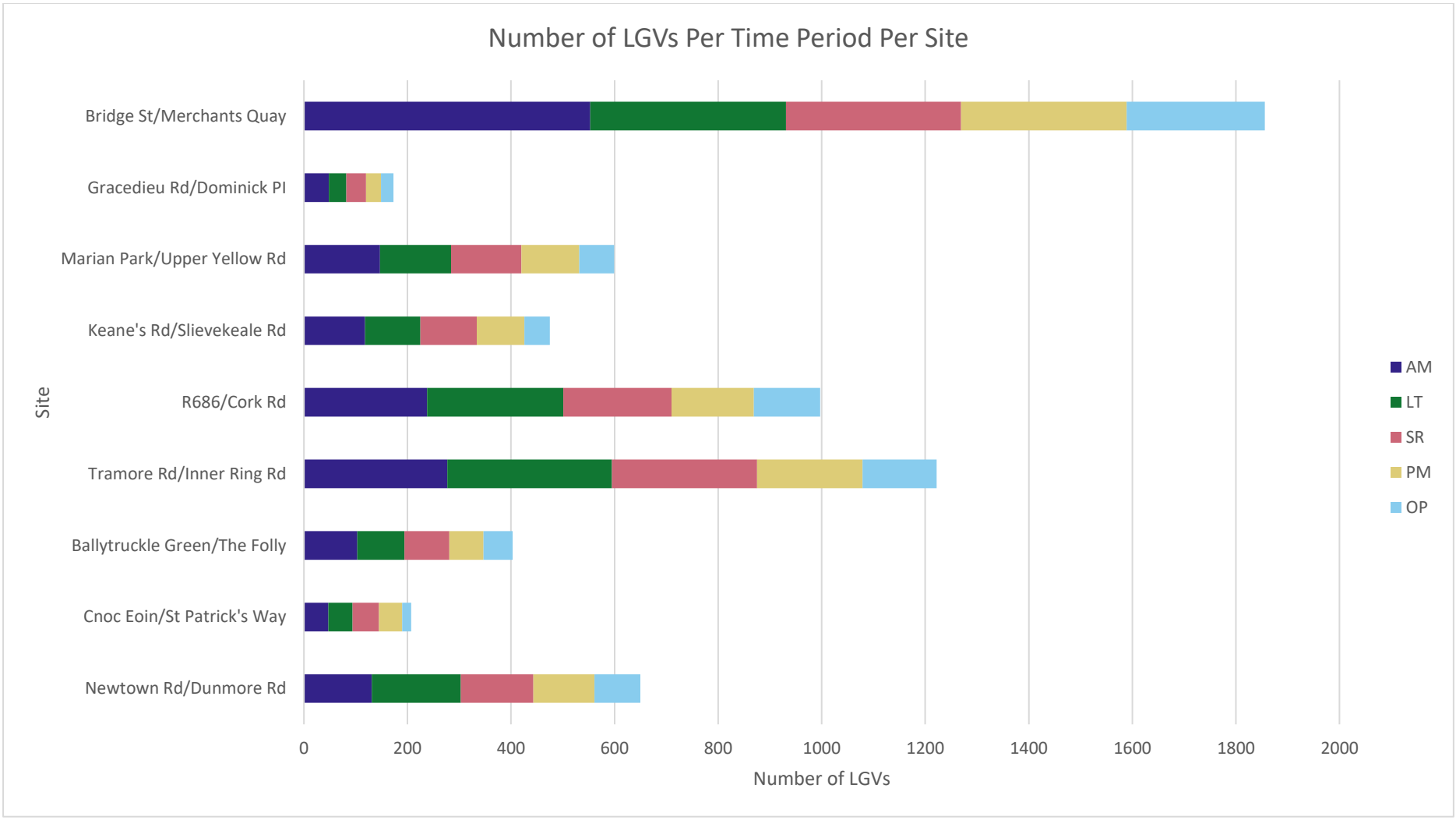


Figure 3-7:Number of LGVs Crossing the Waterford City Cordon Inbound at all Sites Per Time Period

Ordinary Goods Vehicle 1

Figure 3-8 below presents the total number of OGV1s crossing the Waterford City Cordon for each surveyed time period. Overall, it is evident that the LT time period has the highest volume of OGV1s, with a total of 321 OGV1s travelling inbound.

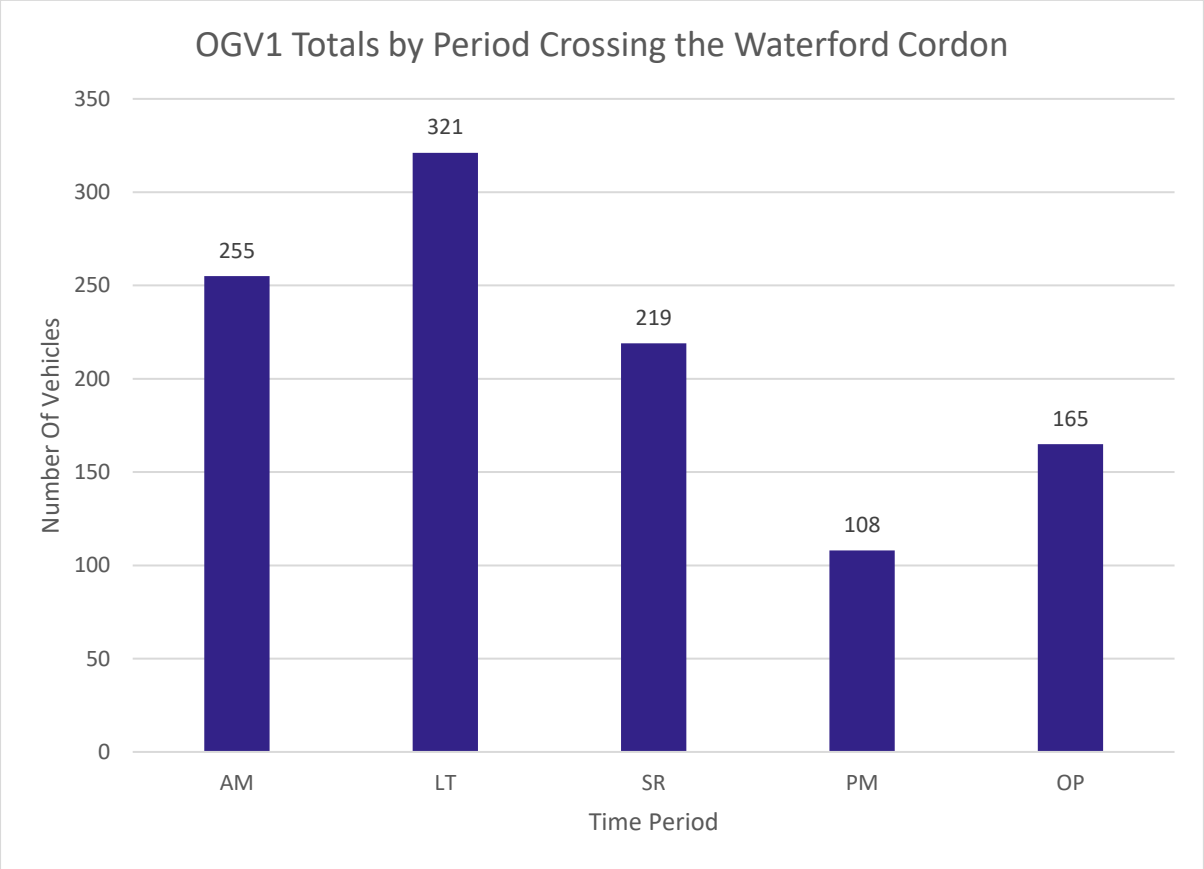


Figure 3-8:Total Number of OGV1 journeys per Time Period

Figure 3-9 presents a further breakdown of the total number of OGV1s, with reference to each site location. The busiest location for OGV1s crossing the Waterford City Cordon was the Bridge St/Merchants Quay junction, with a total of 295 OGV1s travelling inbound through this junction over a 24-hour period.

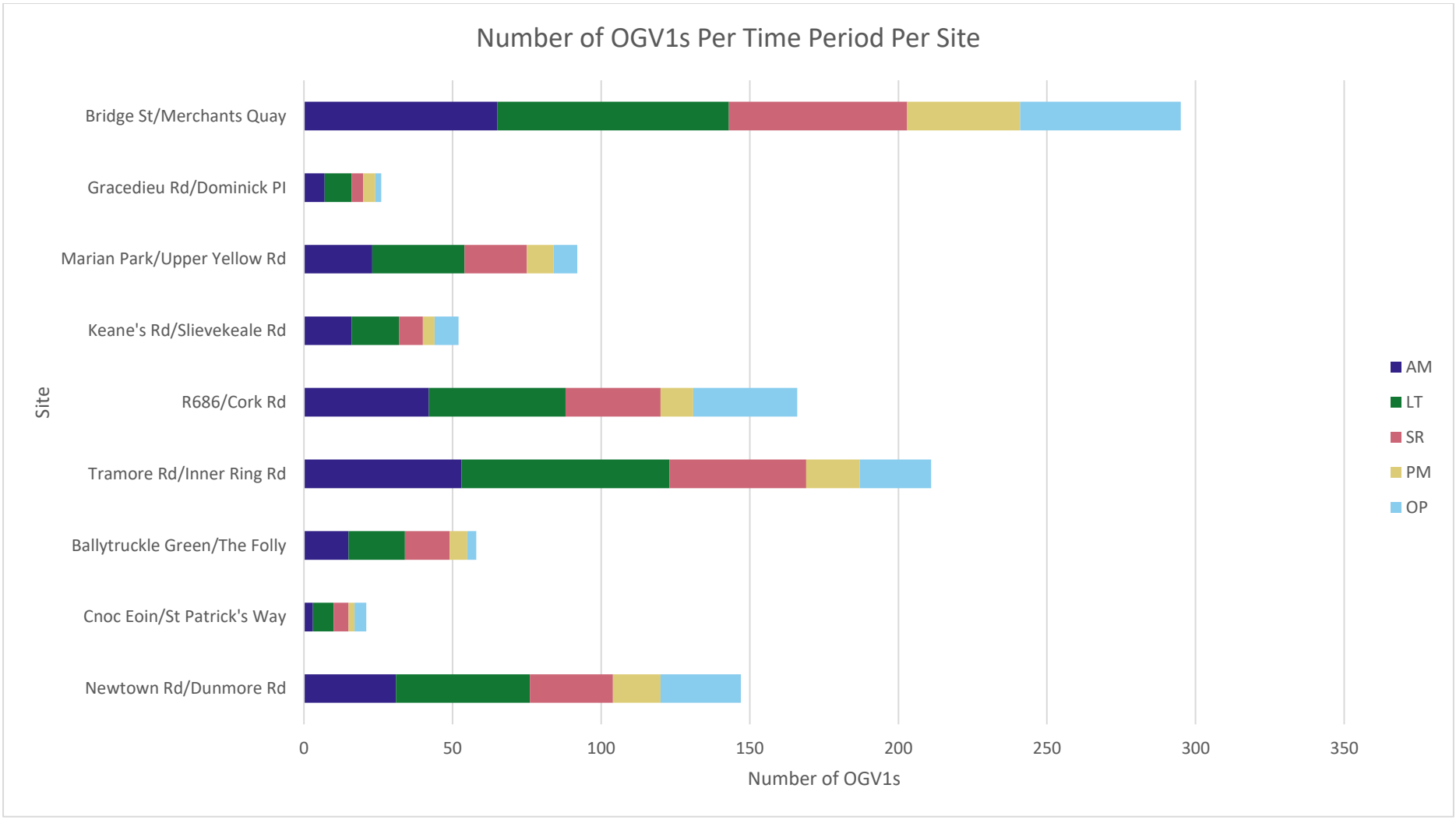


Figure 3-9:Number of OGV1s Crossing the Waterford City Cordon Inbound at all Sites Per Time Period

Ordinary Goods Vehicle 2

Figure 3-10 below presents the total number of OGV2s crossing the Waterford City Cordon for each surveyed time period. Overall, it is evident that the LT time period has the highest volume of OGV2s, with a total of 119 OGV2s travelling inbound.

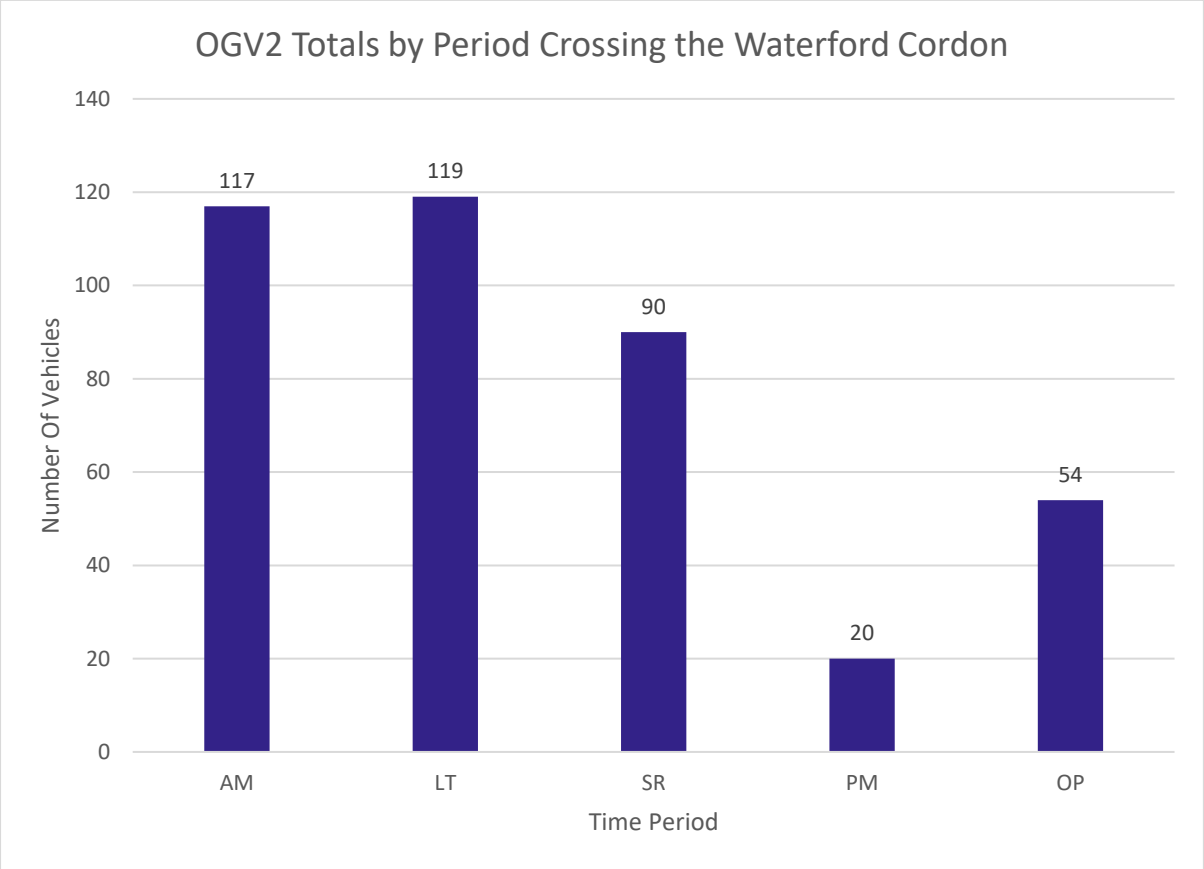


Figure 3-10:Total Number of OGV2 journeys per Time Period

Figure 3-11 presents a further breakdown of the total number of OGV2s, with reference to each site location. The busiest location for OGV2s crossing the Waterford City Cordon was the Bridge St/Merchants Quay junction, with a total of 185 OGV2s travelling inbound through this junction over a 24-hour period.

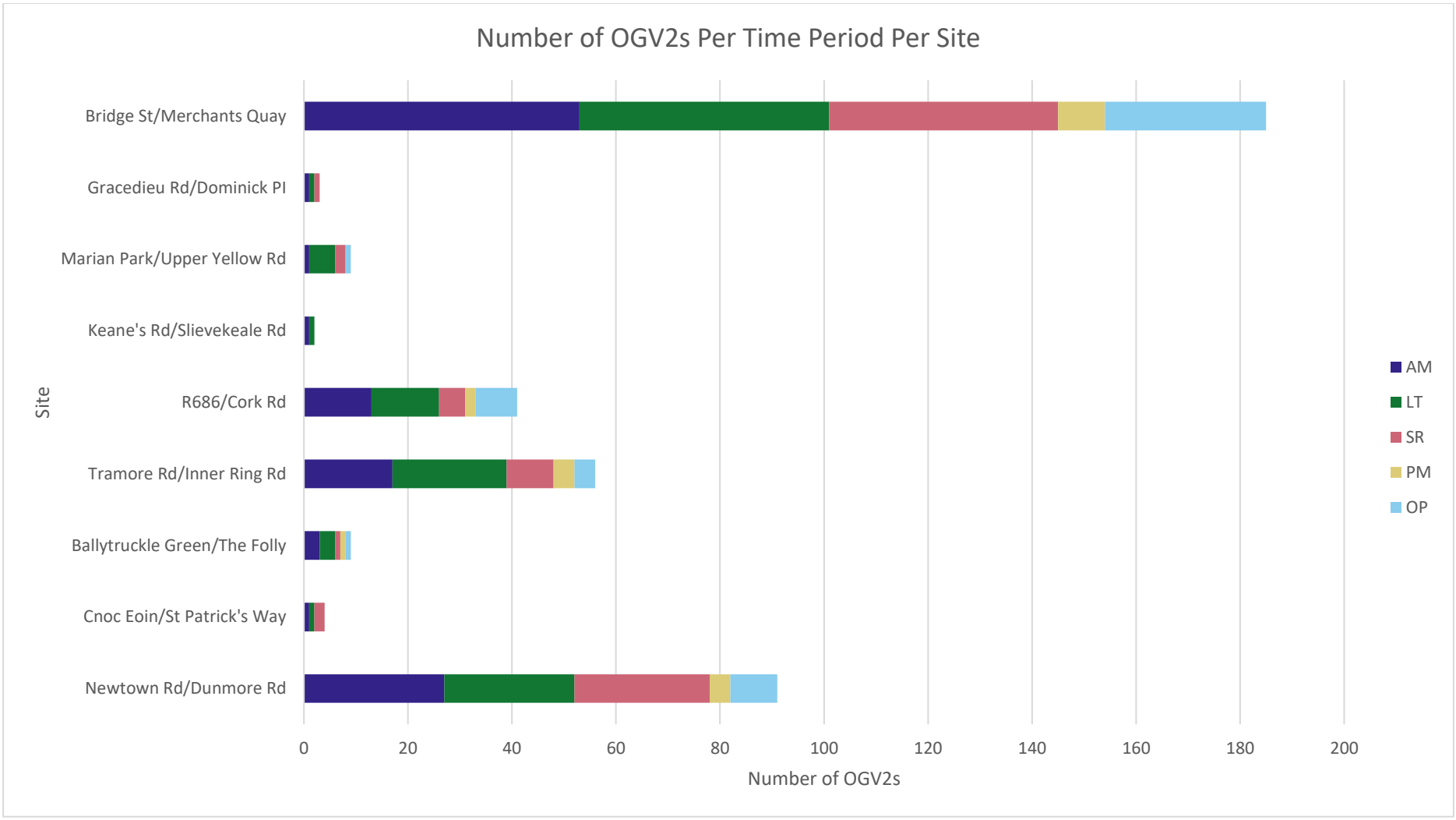


Figure 3-11:Number of OGV2s Crossing the Waterford City Cordon Inbound at all Sites Per Time Period

Motorcycle

Figure 3-12 below presents the total number of motorcycles crossing the Waterford City Cordon for each surveyed time period. Overall, it is evident that the SR time period has the highest volume of motorcycles, with a total of 74 motorcycles travelling inbound.

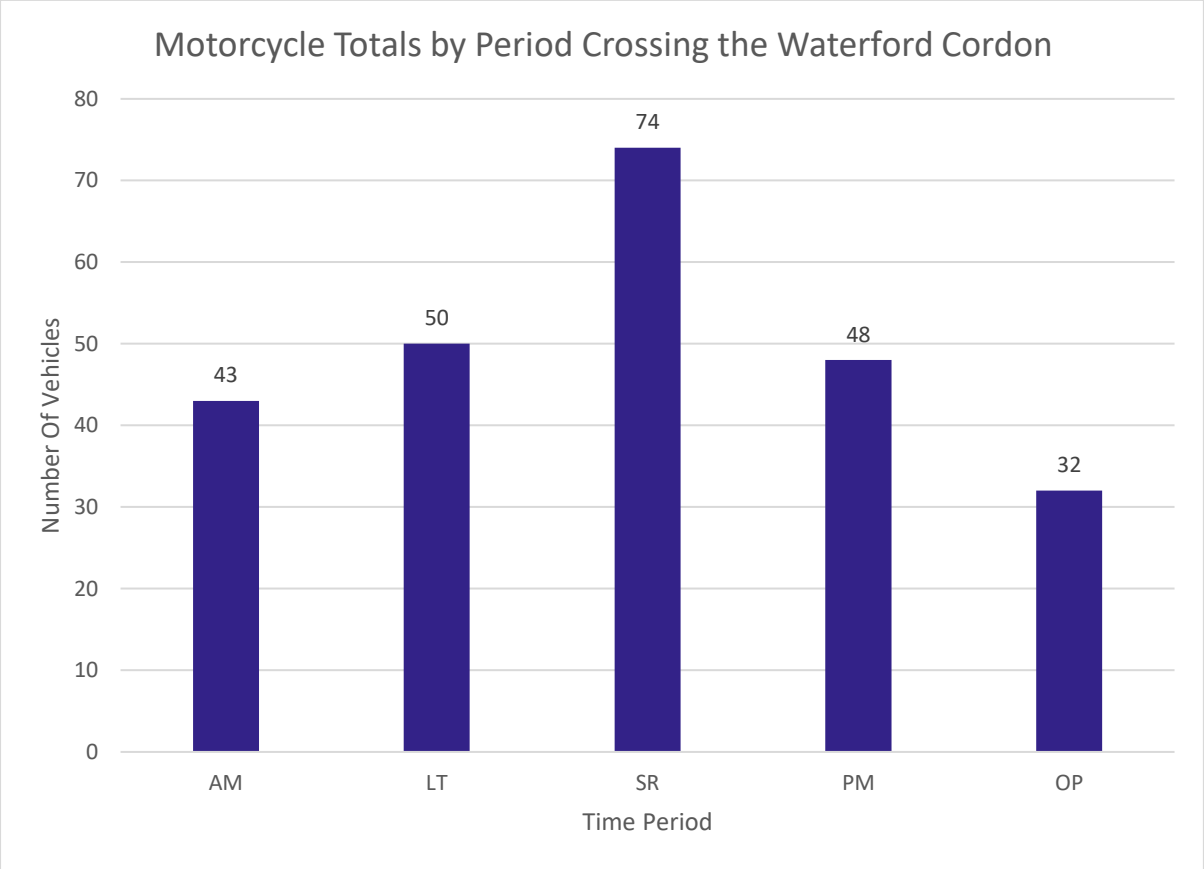


Figure 3-12:Total Number of Motorcycle journeys per Time Period

Figure 3-13 presents a further breakdown of the total number of motorcycles, with reference to each site location. The busiest location for motorcycles crossing the Waterford City Cordon was the Bridge St/Merchants Quay junction, with a total of 62 motorcycles travelling inbound through this junction over a 24-hour period.

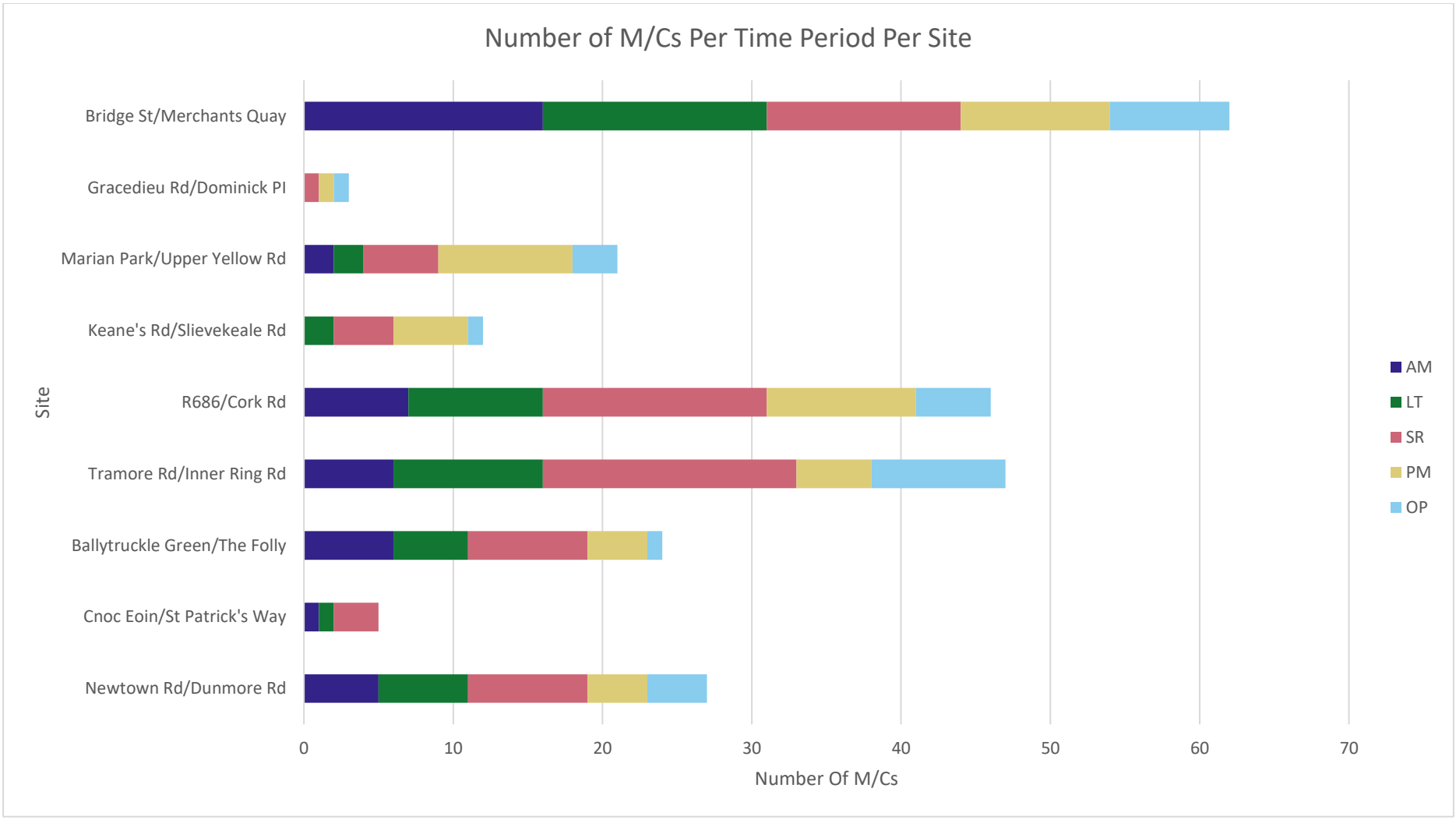


Figure 3-13:Number of Motorcycles Crossing the Waterford City Cordon Inbound at all Sites Per Time Period

Pedal Cycle

Figure 3-14 below presents the total number of pedal cycles crossing the Waterford City Cordon for each surveyed time period. Overall, it is evident that the PM time period has the highest volume of pedal cycles, with a total of 221 pedal cycles travelling inbound.

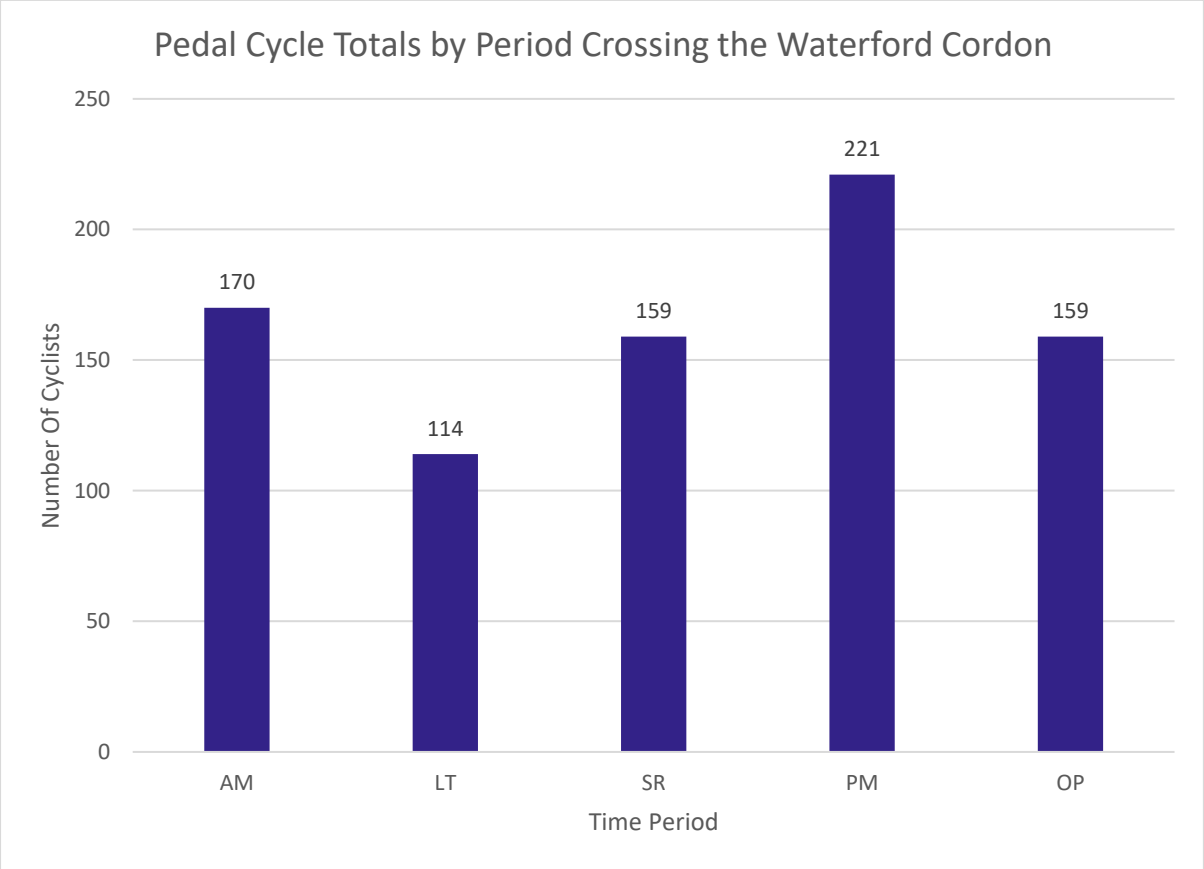


Figure 3-14:Total Number of Pedal Cycle journeys per Time Period

Figure 3-15 presents a further breakdown of the total number of pedal cycles, with reference to each site location. The busiest location for pedal cycles crossing the Waterford City Cordon was the R686/Cork Rd junction, with a total of 197 pedal cycles travelling inbound through this junction over a 24-hour period.

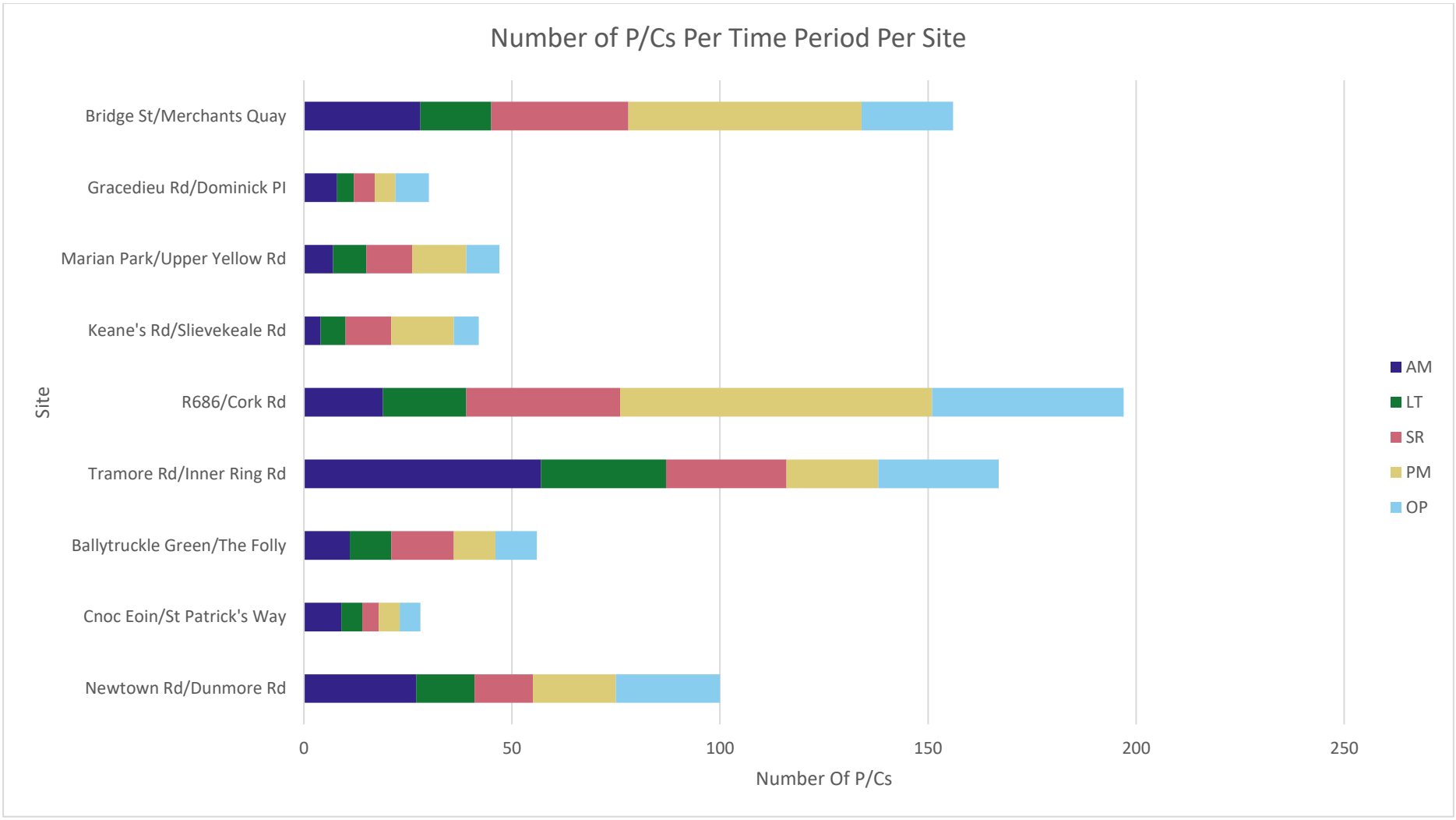


Figure 3-15:Number of Pedal Cycles Crossing the Waterford City Cordon Inbound at all Sites Per Time Period

Taxi

Figure 3-16 below presents the total number of taxis crossing the Waterford City Cordon for each surveyed time period. Overall, it is evident that the OP time period has the highest volume of taxis, with a total of 374 taxis travelling inbound.

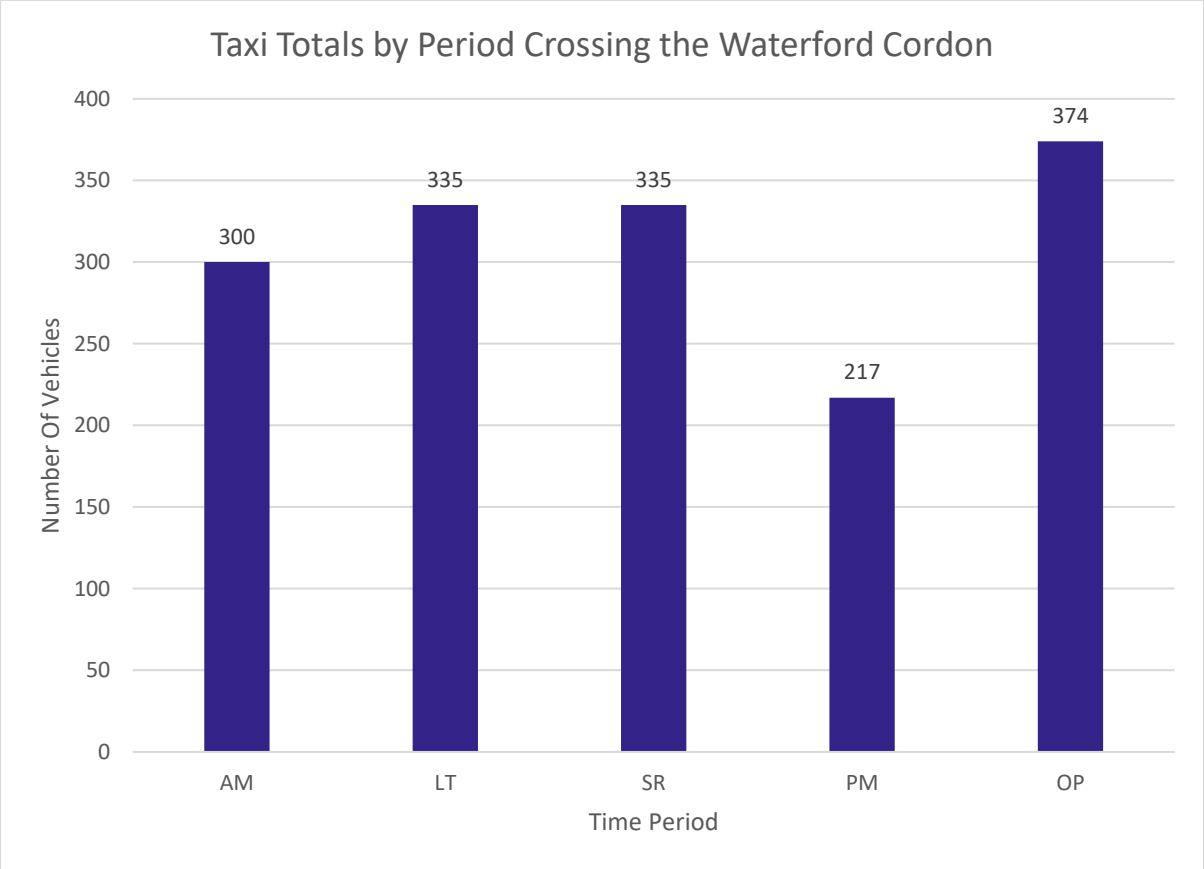


Figure 3-16:Total Number of Taxi journeys per Time Period

Figure 3-17 presents a further breakdown of the total number of taxis, with reference to each site location. The busiest location for taxis crossing the Waterford City Cordon was the R686/Cork Rd junction, with a total of 292 taxis travelling inbound through this junction over a 24-hour period.

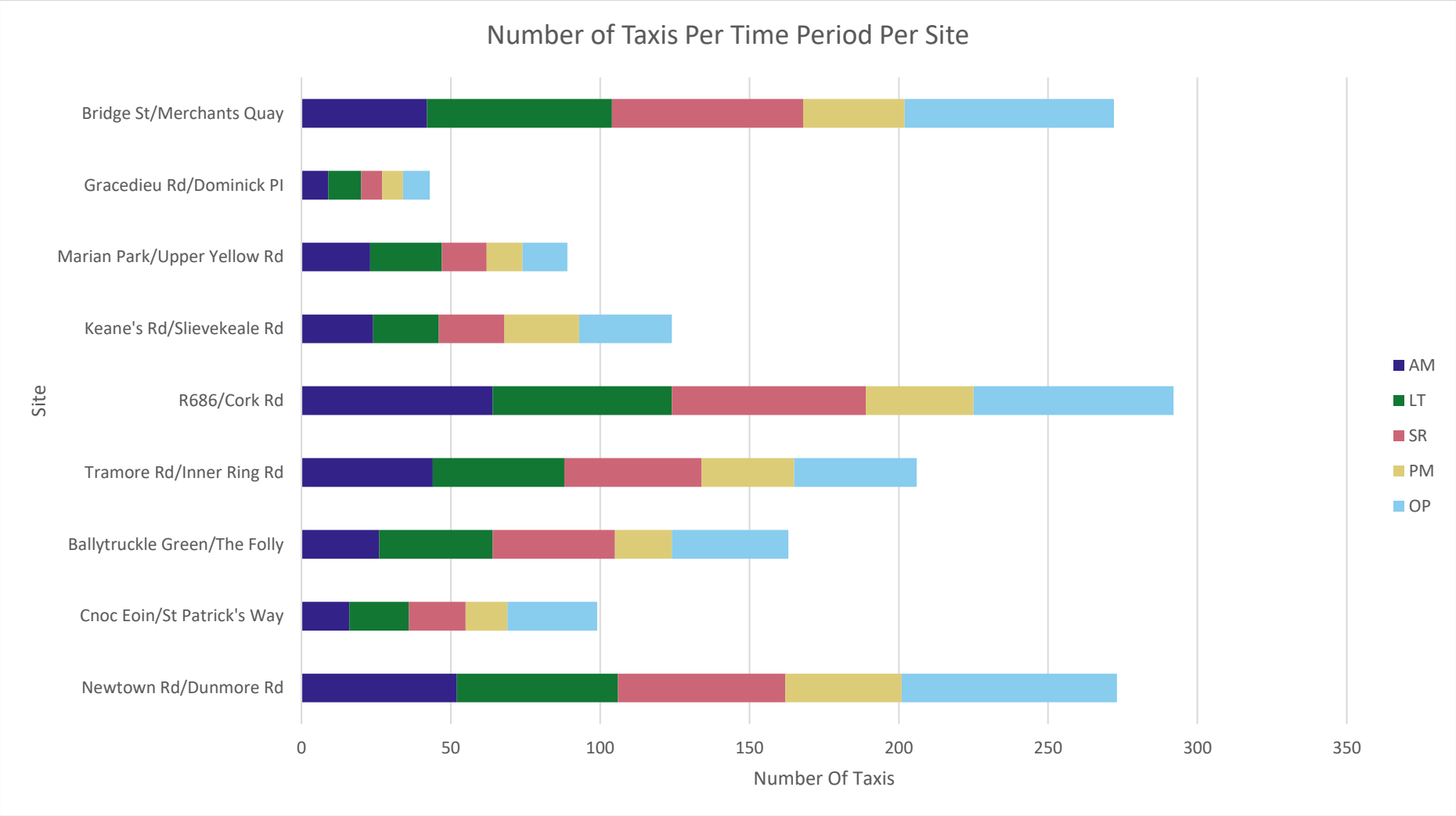


Figure 3-17:Number of Taxis Crossing the Waterford City Cordon Inbound at all Sites Per Time Period

Bus

Figure 3-18 below presents the total number of buses crossing the Waterford City Cordon for each surveyed time period. Overall, it is evident that the OP time period has the highest volume of buses, with a total of 188 buses travelling inbound.

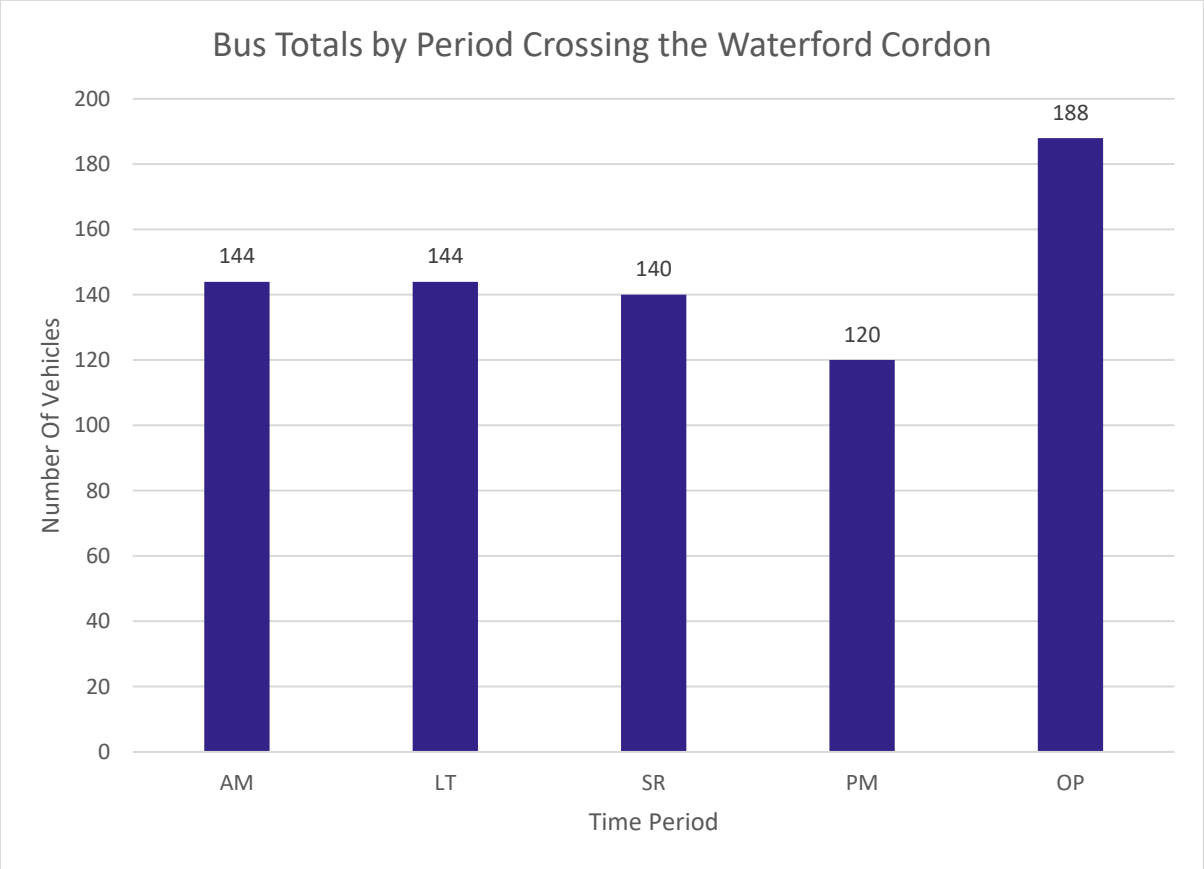


Figure 3-18:Total Number of Bus journeys per Time Period

Figure 3-19 presents a further breakdown of the total number of buses, with reference to each site location. The busiest location for buses crossing the Waterford City Cordon was the R686/Cork Rd junction, with a total of 192 buses travelling inbound through this junction over a 24-hour period.

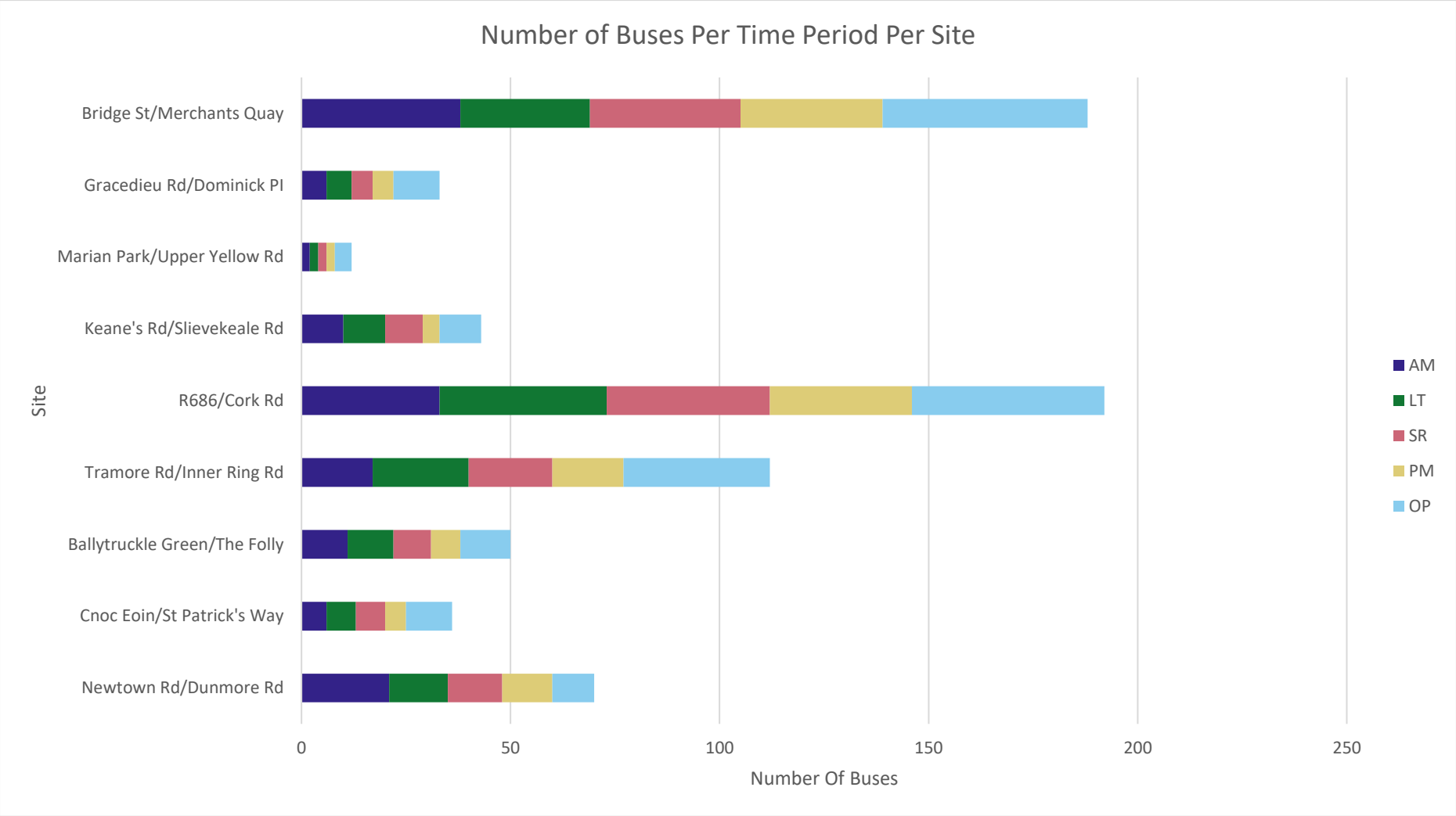


Figure 3-19:Number of Buses Crossing the Waterford City Cordon Inbound at all Sites Per Time Period

Pedestrians

Figure 3-20 presents the total number of pedestrian movements crossing the Waterford City Cordon per surveyed time period. Overall, it is evident that the PM period has the highest volume of pedestrians, with a total of 1,488 pedestrians travelling inbound.

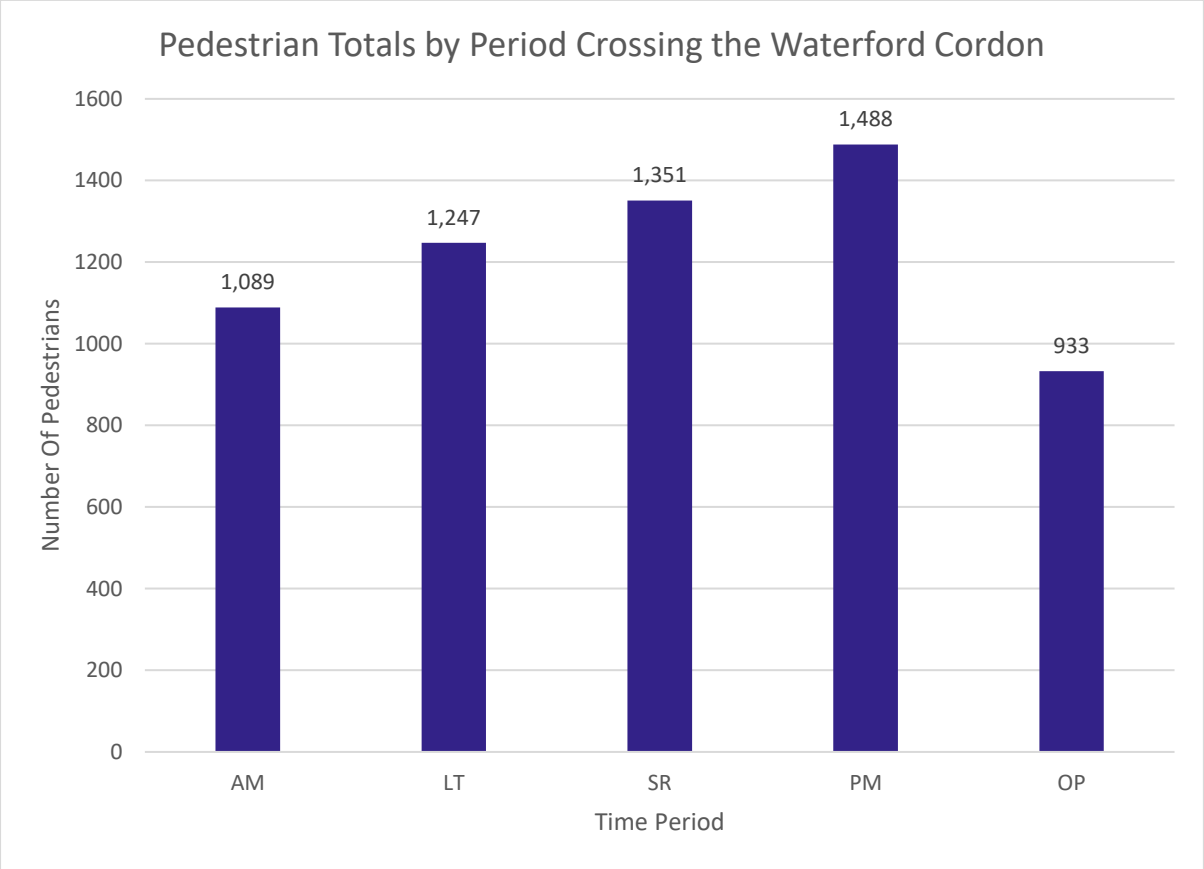


Figure 3-20:Total Pedestrians per Time Period

Figure 3-21 presents a further breakdown of the total number of pedestrian movements, with reference to each site location. The busiest location for pedestrians crossing the Waterford City Cordon was the R686/Cork Rd, with a total of 1,287 pedestrians travelling inbound through this junction over a 24-hour period.

Please also refer to Appendix A for further information on the total number of pedestrian movements, with reference to each individual time period and the classified pedestrian types (i.e. adult, OAP, child < 5, child < 16 and mobility impaired).

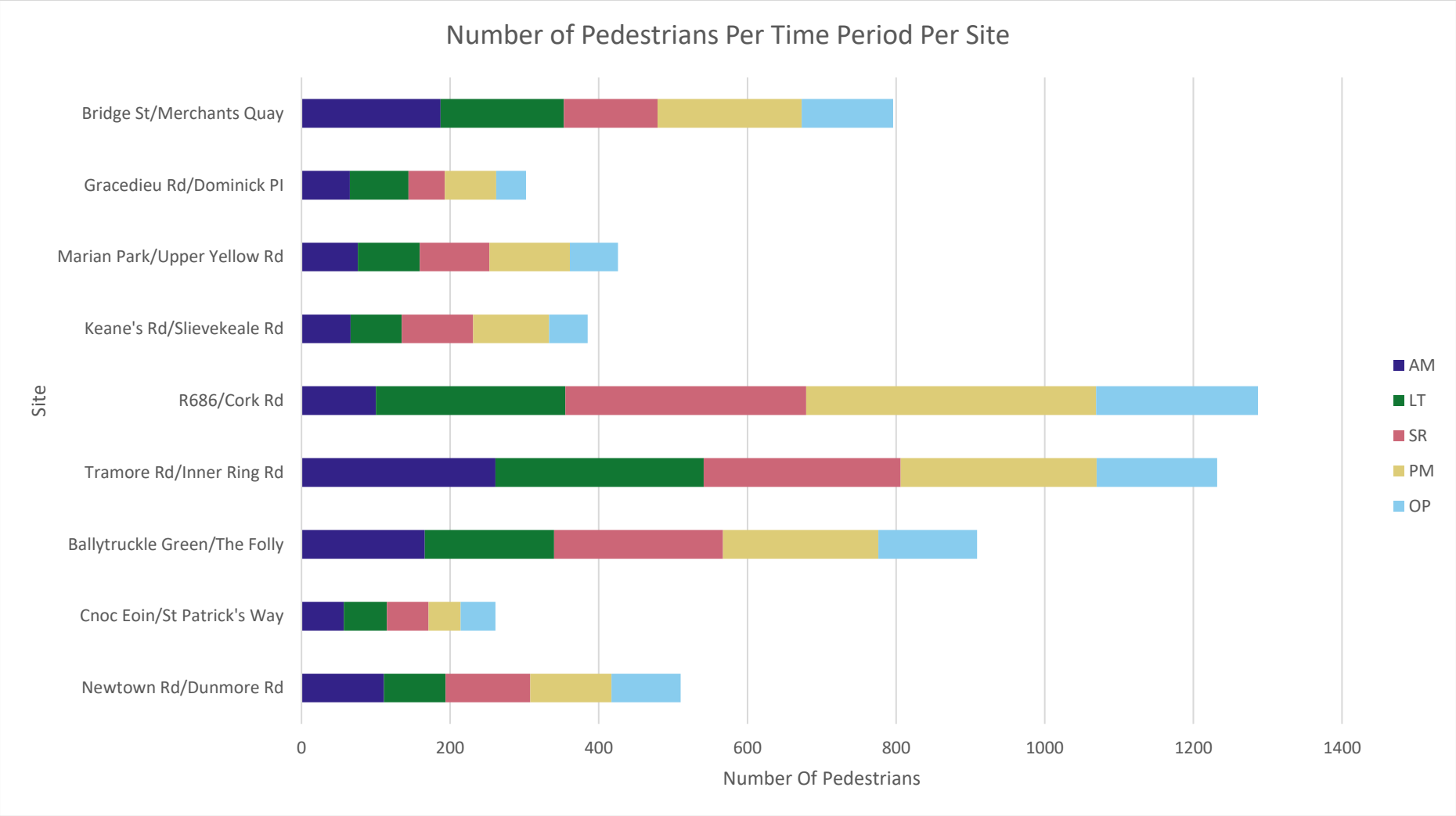


Figure 3-21:Total Pedestrians at all Sites per Time Period

3.1.3 Daily Movements Across the Waterford City Cordon

ATCs recorded traffic flows at 15-minute intervals at 10 sites on the main radial routes into and around the city for a period of two weeks to understand daily two-way traffic movements. These surveys were primarily used to provide insight into the variation in demand across the week. The results from these surveys show that the day with the highest number of vehicles is Friday, as can be seen in Figure 3-22.

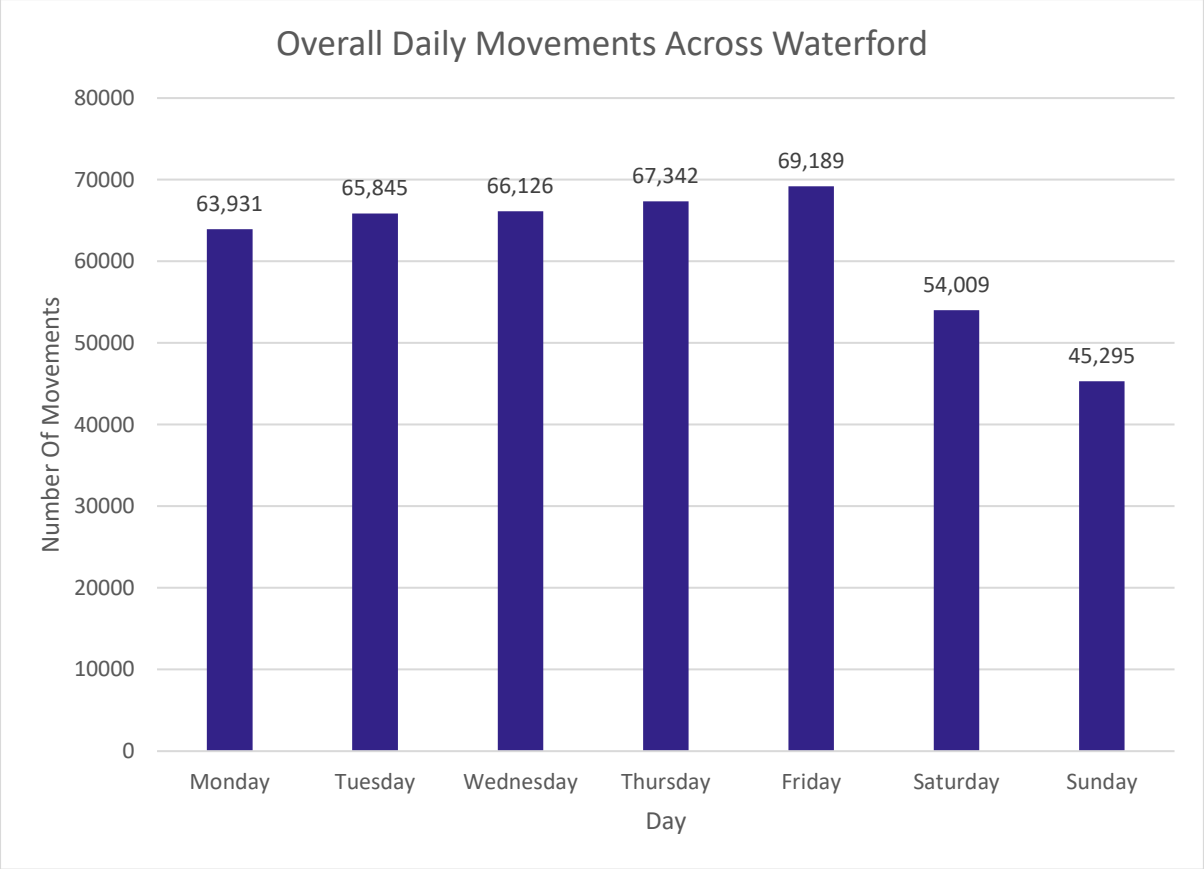


Figure 3-22:Average Daily Traffic at ATC Sites

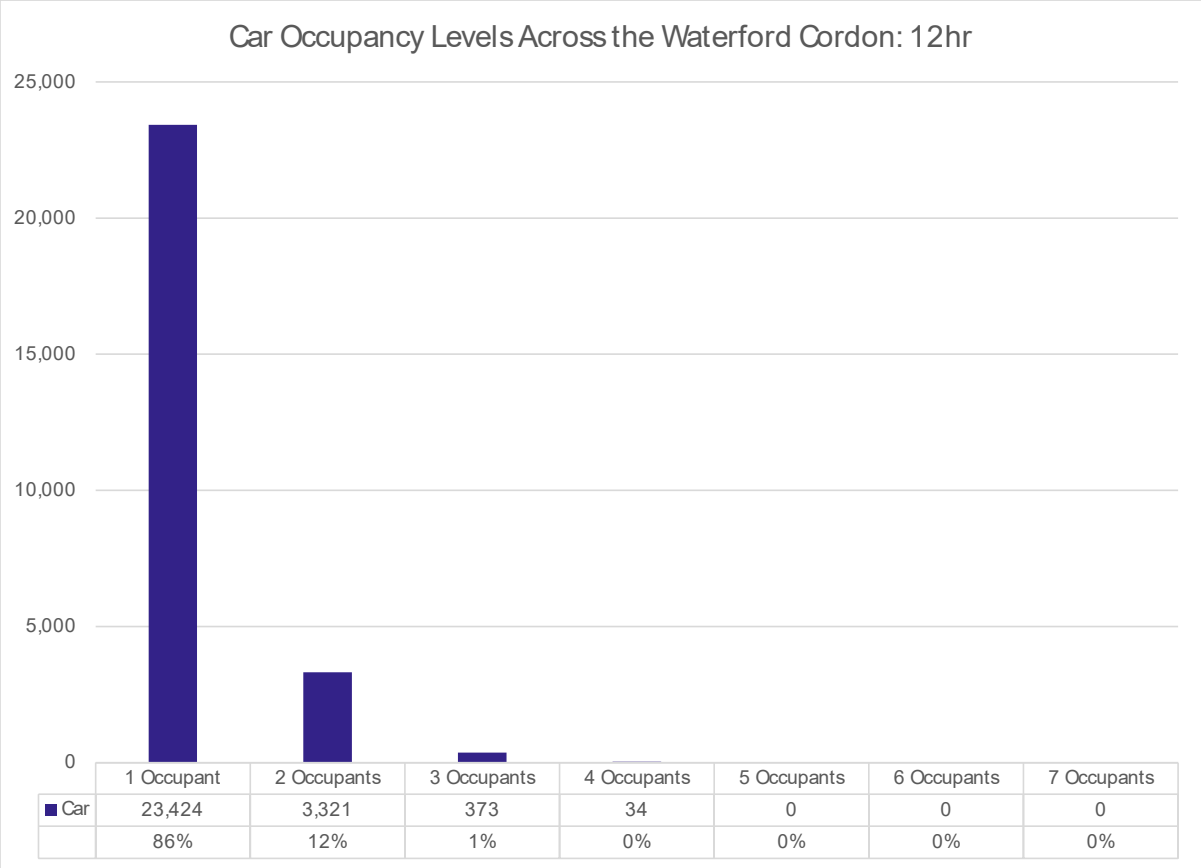
3.2 Vehicle Occupancy Data

3.2.1 Car Occupancy

In order to obtain accurate data reflective of a neutral weekday, car occupancy surveys were recorded in hourly intervals, over a 12-hour period (i.e. 07:00-19:00) on the day of the survey.

Figure 3-23, Figure 3-24, Figure 3-25, Figure 3-26 and Figure 3-27 display the observed vehicle occupancy for cars crossing the Waterford City Cordon inbound towards the city during the respective time periods. Please note these graphs display both the absolute values and the percentage occupancy for each time period.

During the 12-hour period (07:00 and 19:00) 86% of Cars crossing the Waterford City Cordon had one occupant, 12% had two occupants and 1% had three occupants.



	1 Occupant	2 Occupants	3 Occupants	4 Occupants	5 Occupants	6 Occupants	7 Occupants
Car	23,424	3,321	373	34	0	0	0
	86%	12%	1%	0%	0%	0%	0%

Figure 3-23:Car Occupancy: 12 Hour

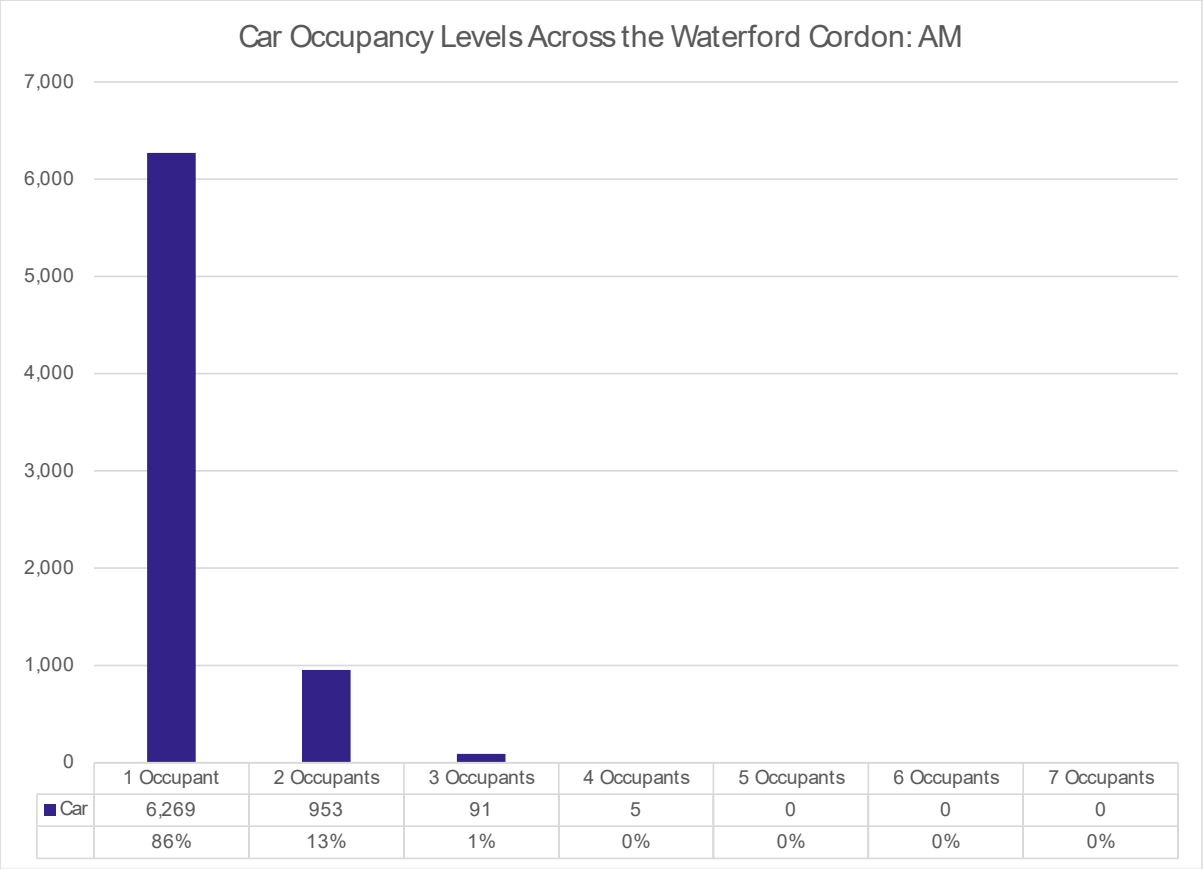
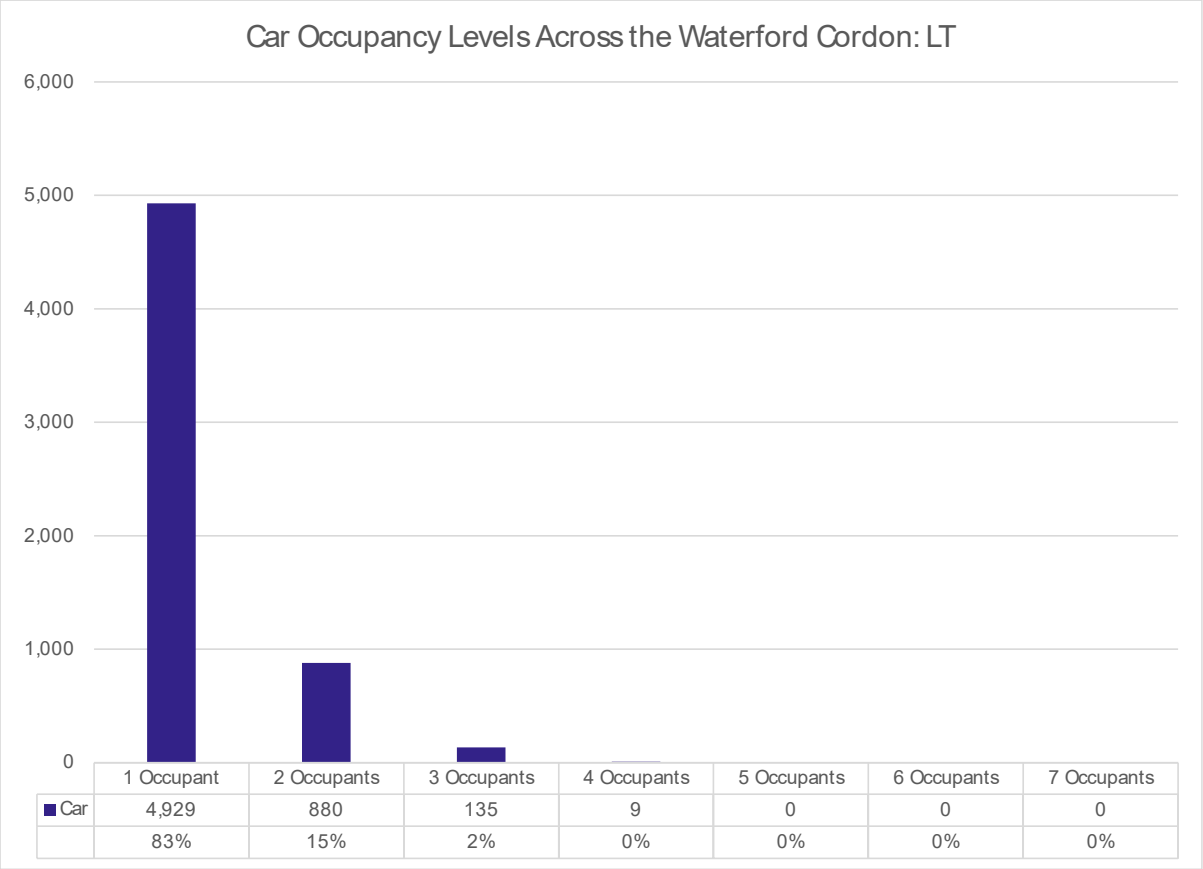


Figure 3-24:Car Occupancy: AM



	1 Occupant	2 Occupants	3 Occupants	4 Occupants	5 Occupants	6 Occupants	7 Occupants
Car	4,929	880	135	9	0	0	0
	83%	15%	2%	0%	0%	0%	0%

Figure 3-25:Car Occupancy: LT

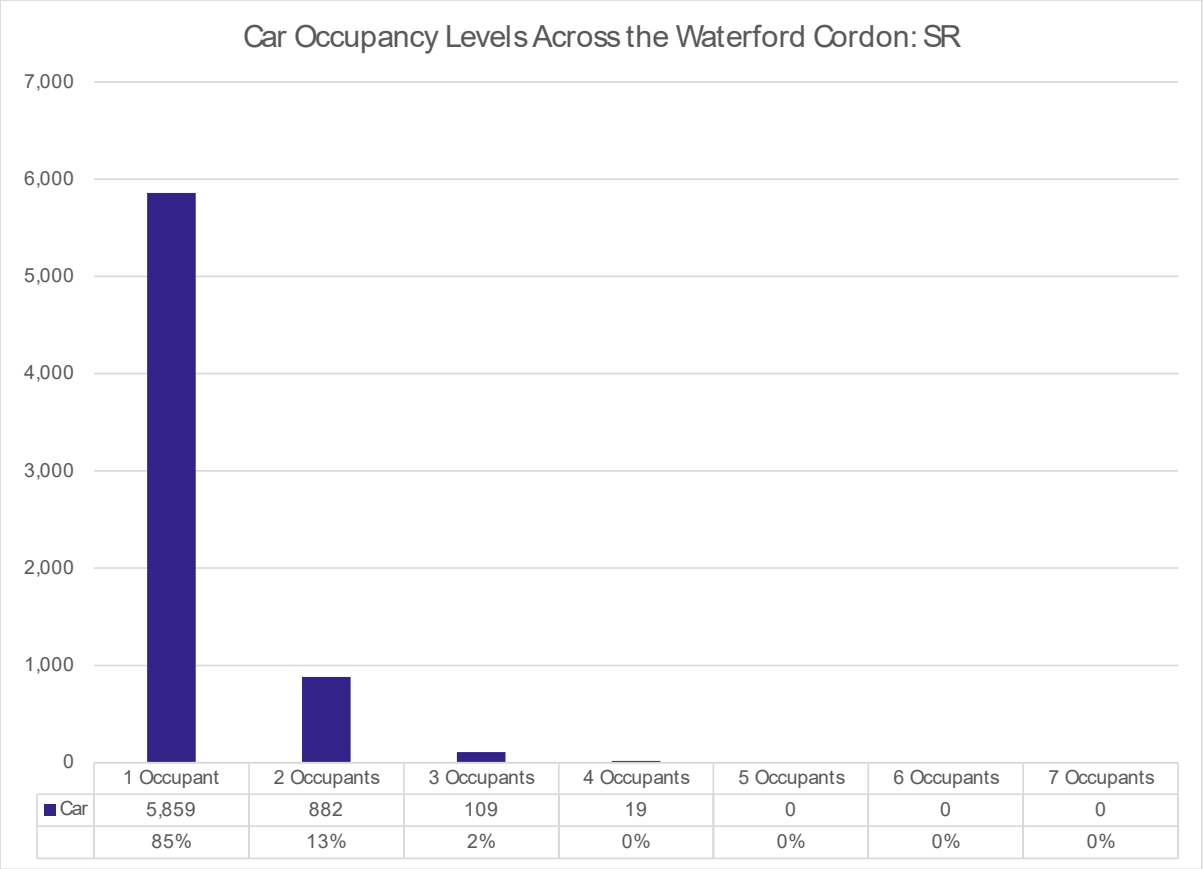


Figure 3-26:Car Occupancy: SR

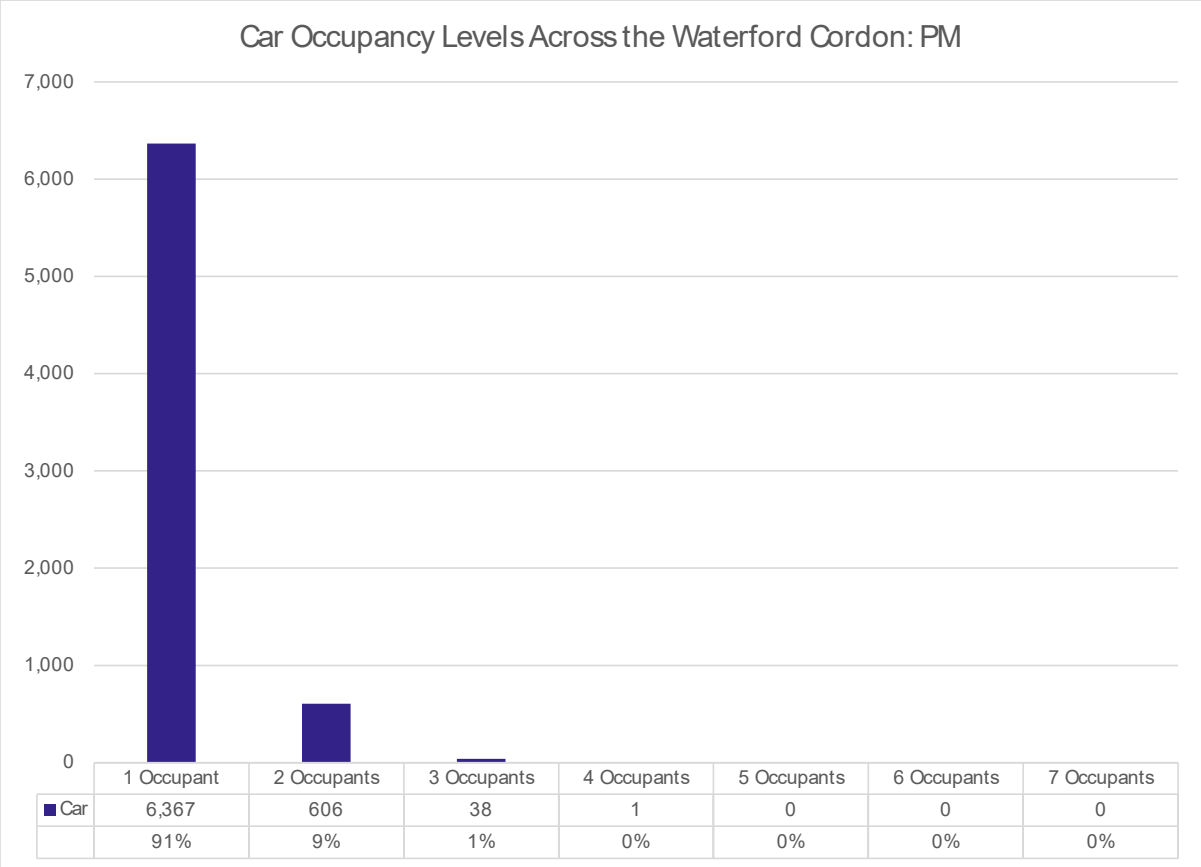


Figure 3-27:Car Occupancy: PM

Car Occupancy per site

Figure 3-28, Figure 3-29, Figure 3-30, Figure 3-31 and Figure 3-32 display the vehicle occupancy for cars crossing the Waterford City Cordon during the respective time periods, with further reference to each individual site location.

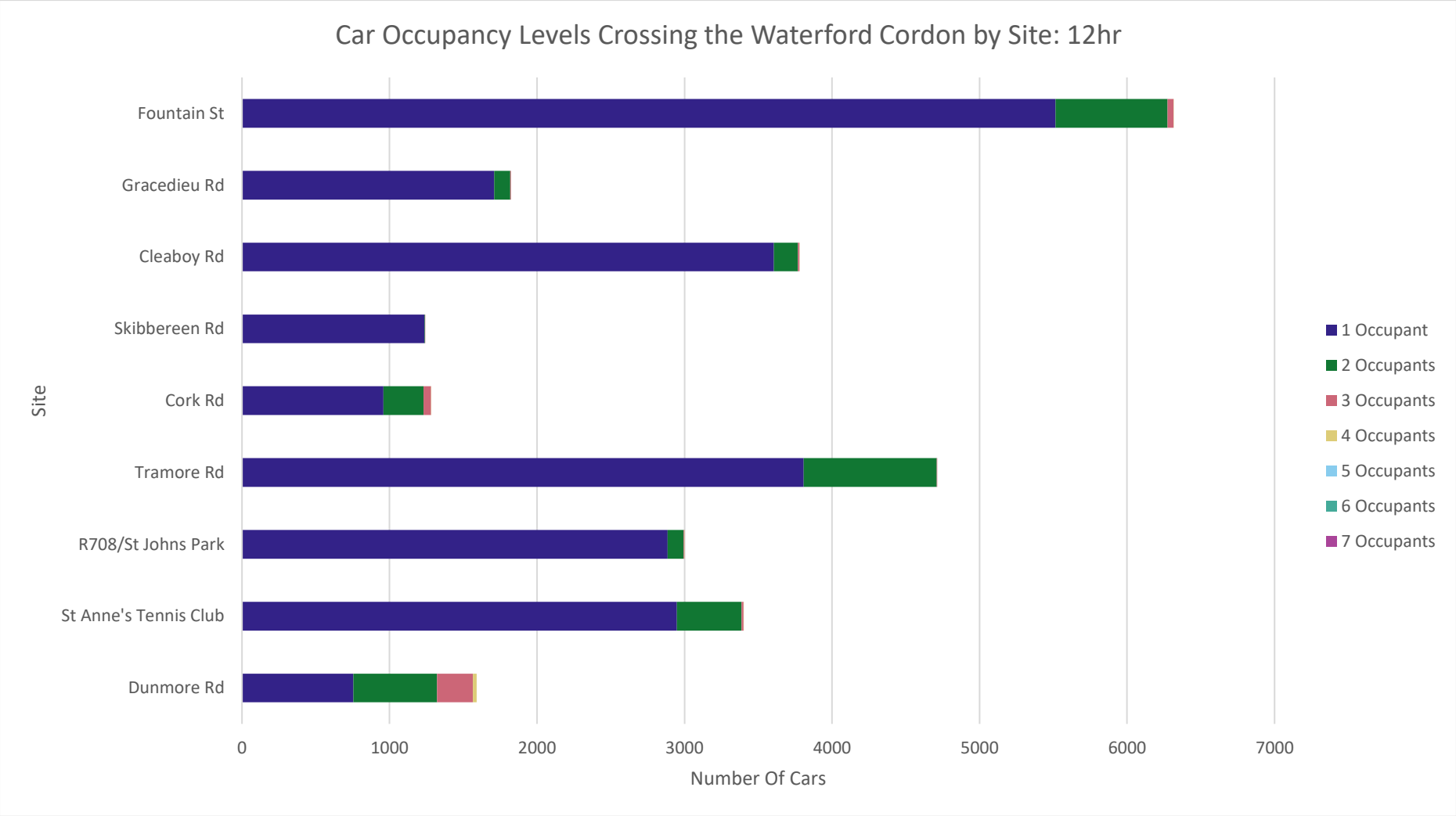


Figure 3-28:Car Occupancy per Site: 12 Hour

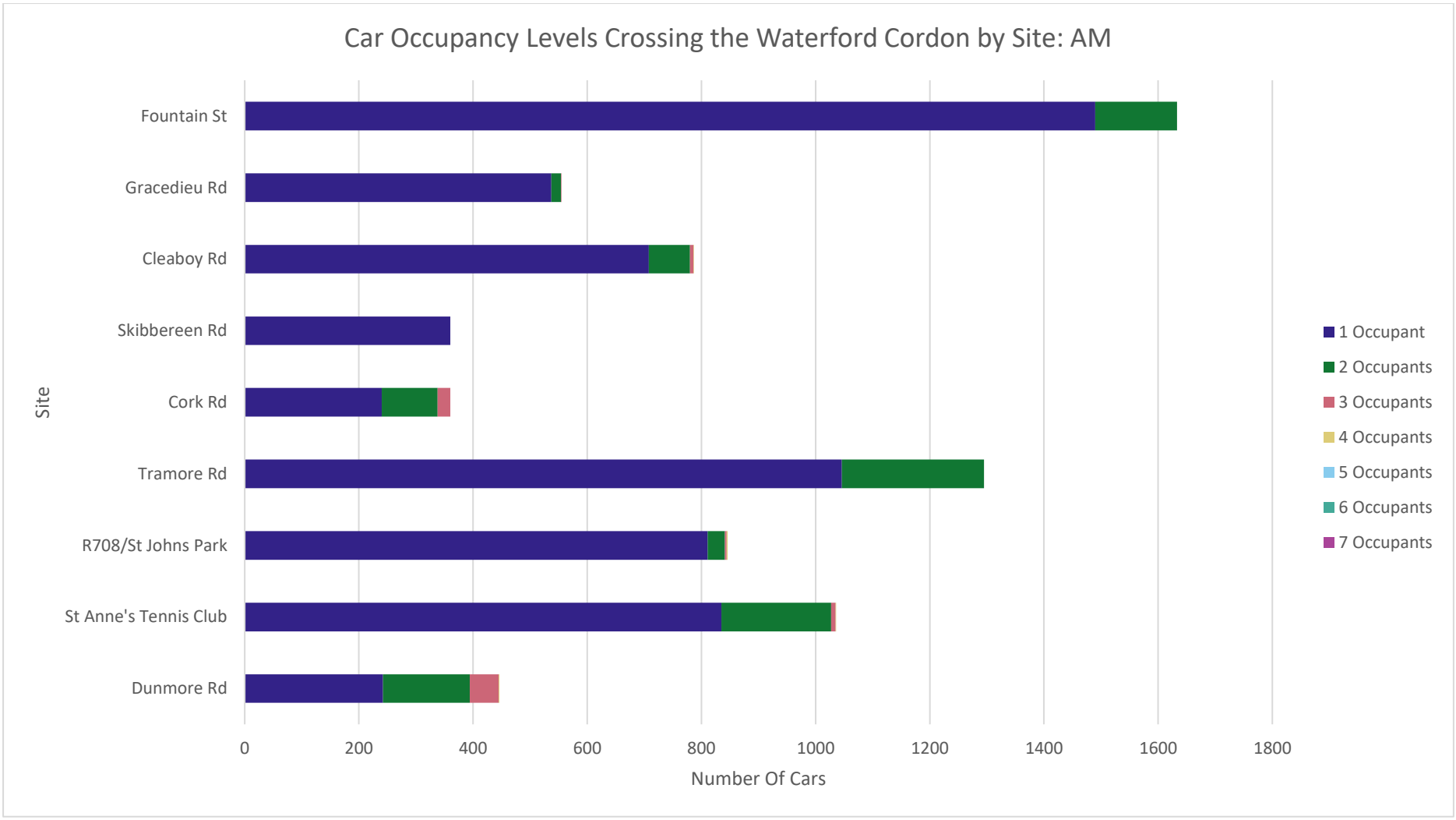


Figure 3-29:Car Occupancy per Site: AM

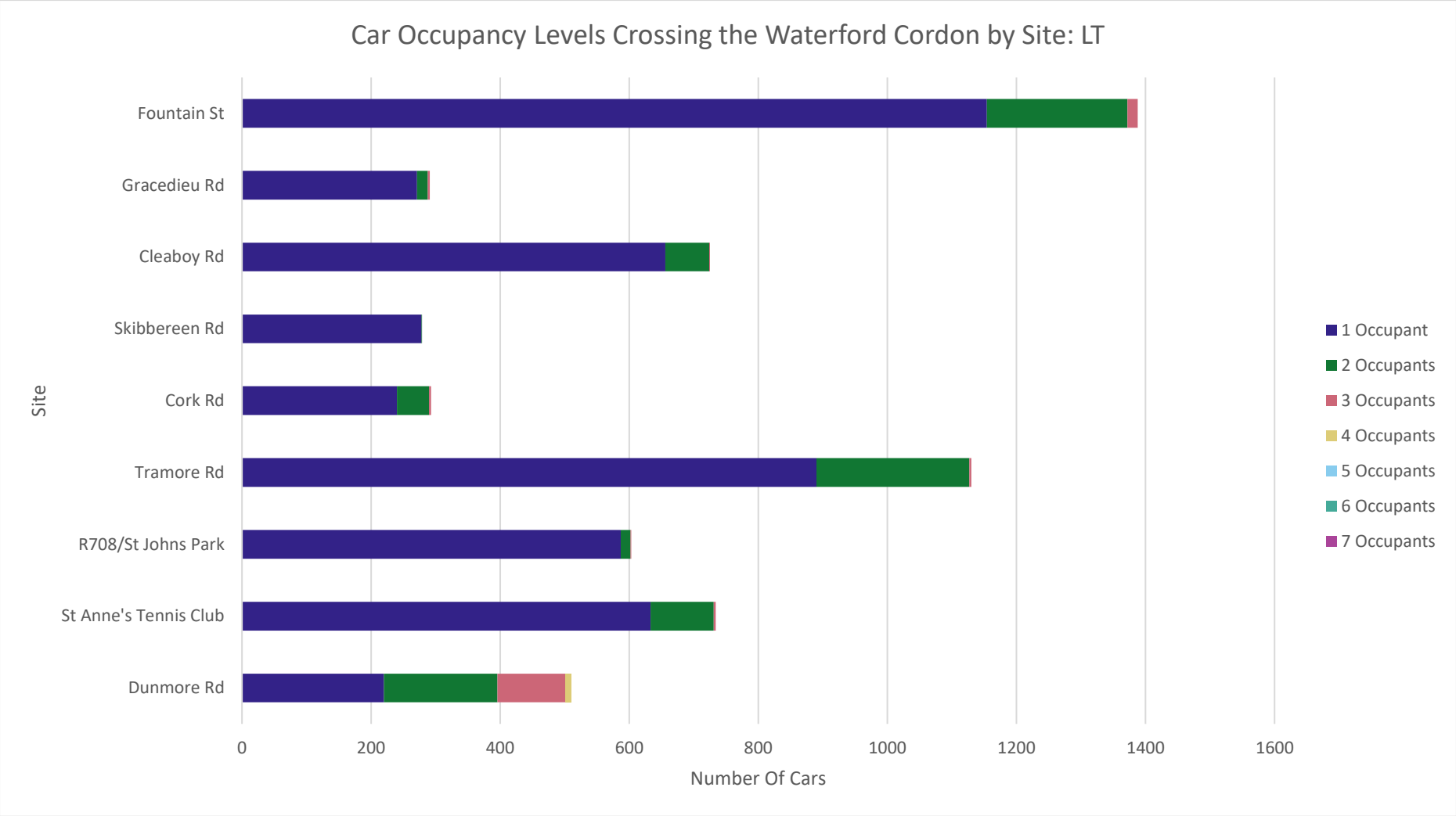


Figure 3-30:Car Occupancy per Site: LT

Figure 3-31:Car Occupancy per Site: SR

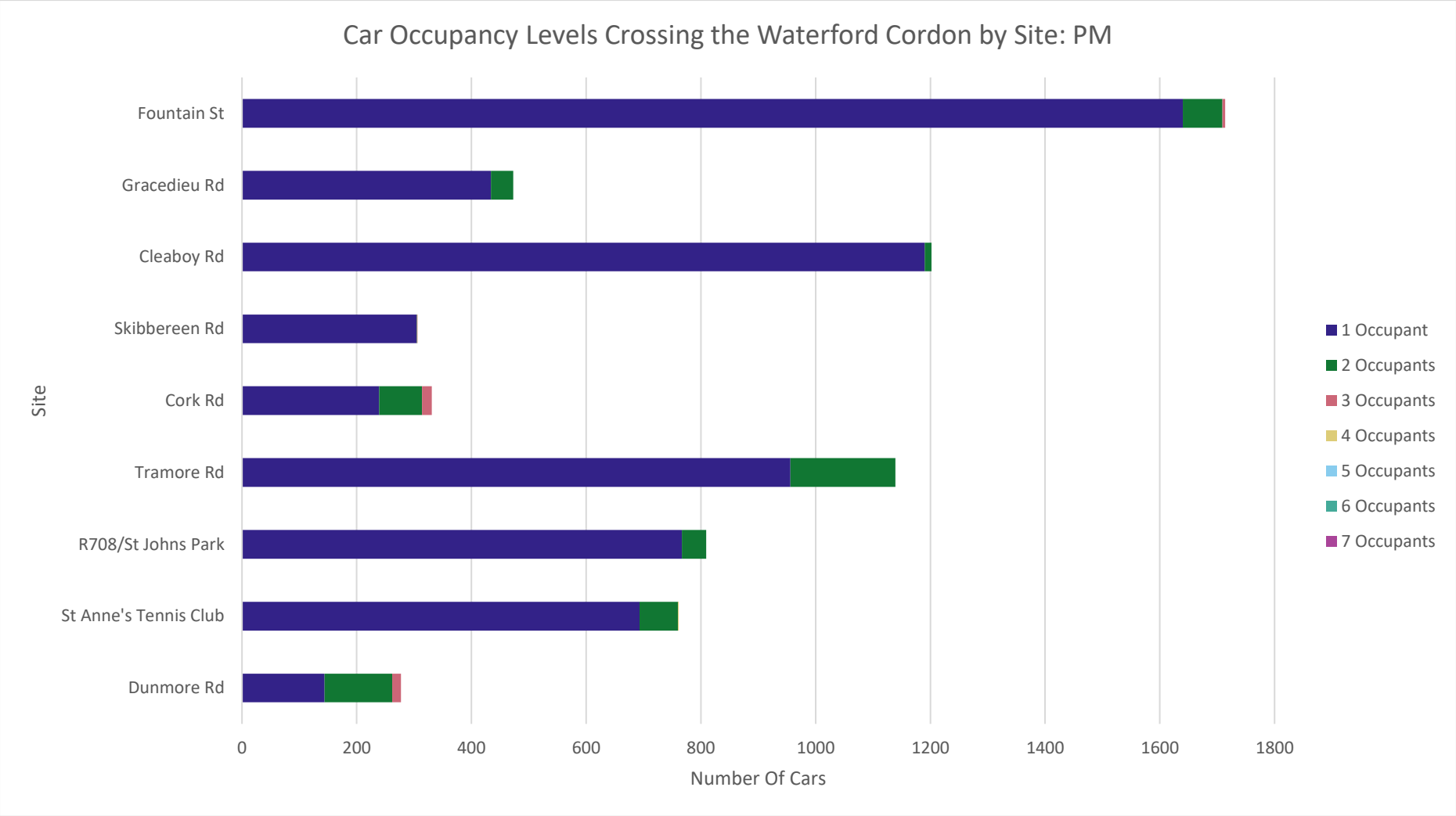


Figure 3-32:Car Occupancy per Site: PM

3.2.2 Taxi Occupancy

In order to obtain accurate data reflective of a neutral weekday, taxi occupancy surveys were recorded in hourly intervals, over a 12-hour period (i.e. 07:00-19:00) on the day of the survey.

Figure 3-33, Figure 3-34, Figure 3-35, Figure 3-36 and Figure 3-37 display the observed vehicle occupancy for taxis crossing the Waterford City Cordon inbound towards the city during the respective time periods. Please note these graphs display both the absolute values and the percentage occupancy for each time period.

During the 12-hour period (07:00 and 19:00) 49% of Taxis crossing the Waterford City Cordon had one occupant, 46% had two occupants and 6% had three occupants.

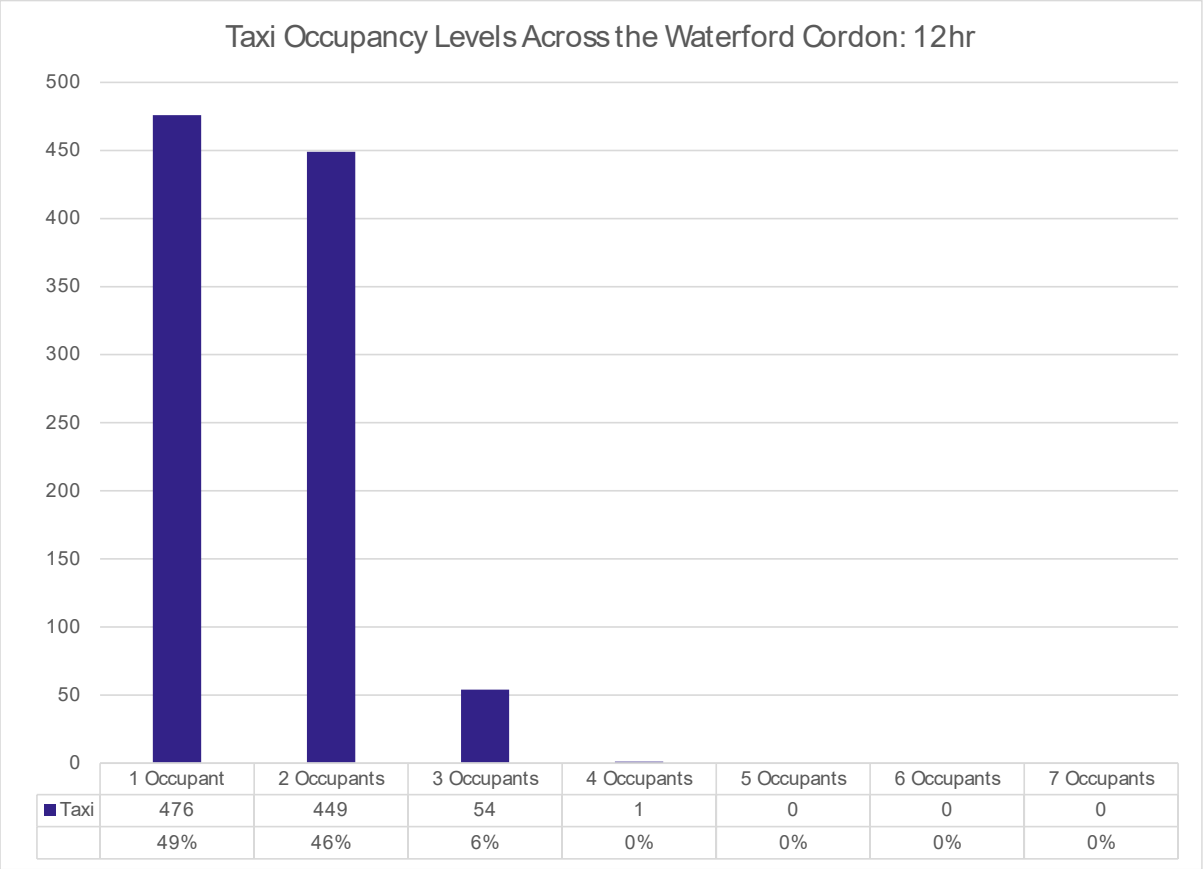


Figure 3-33:Taxi Occupancy: 12 Hour

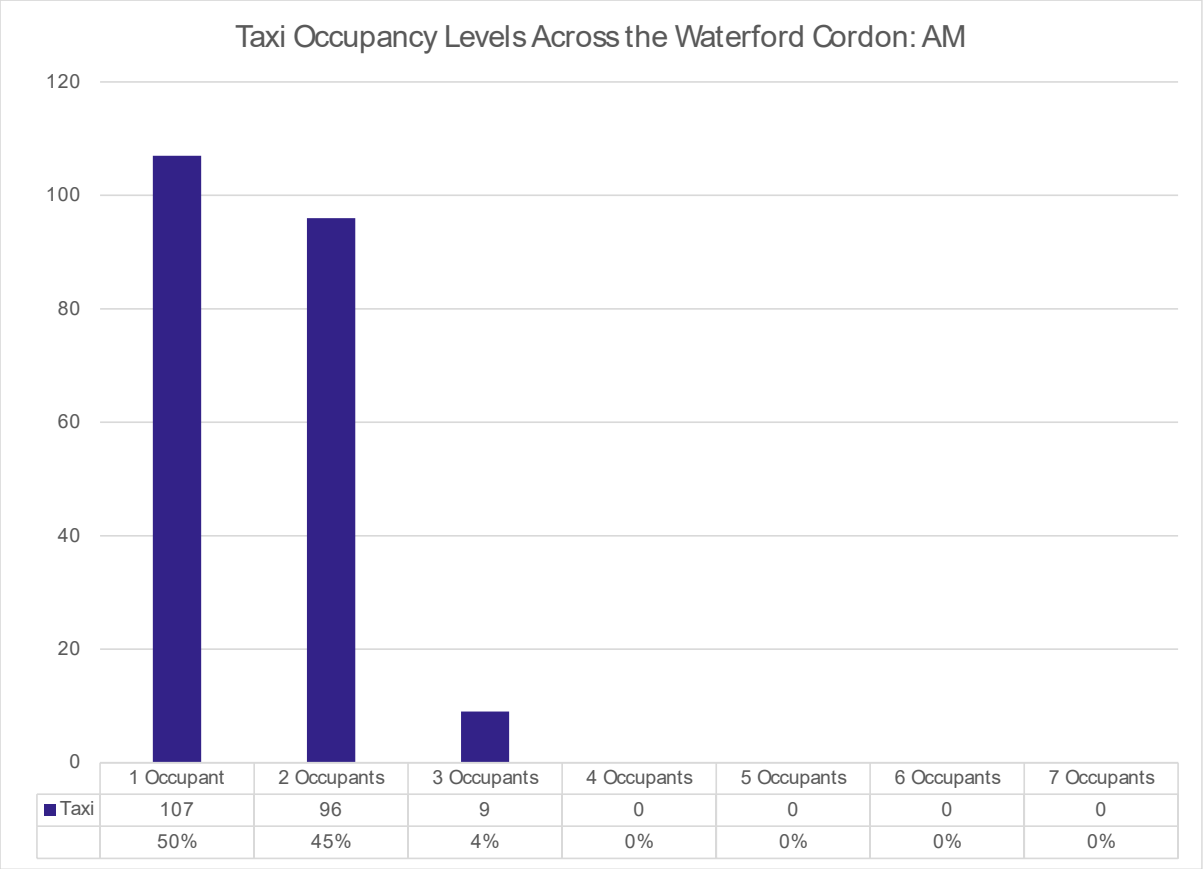


Figure 3-34:Taxi Occupancy: AM

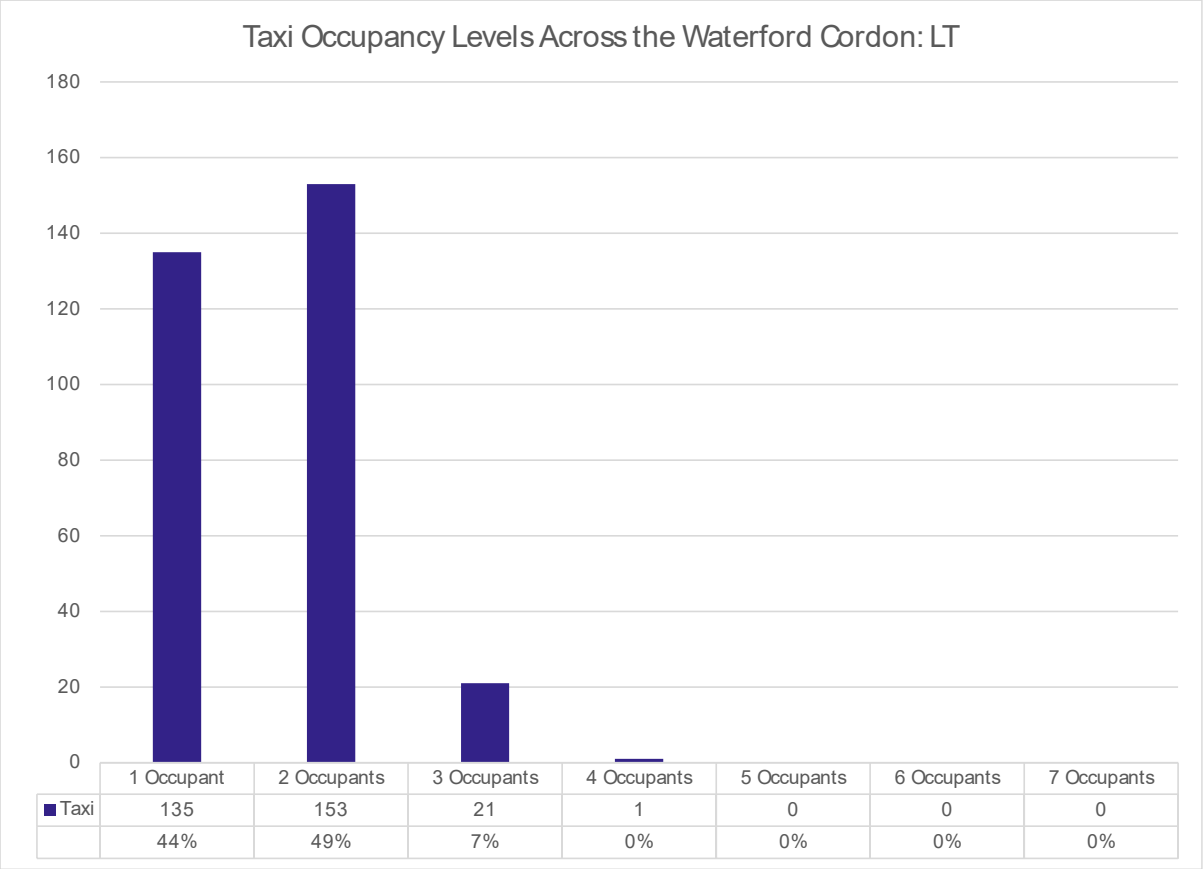


Figure 3-35:Taxi Occupancy: LT

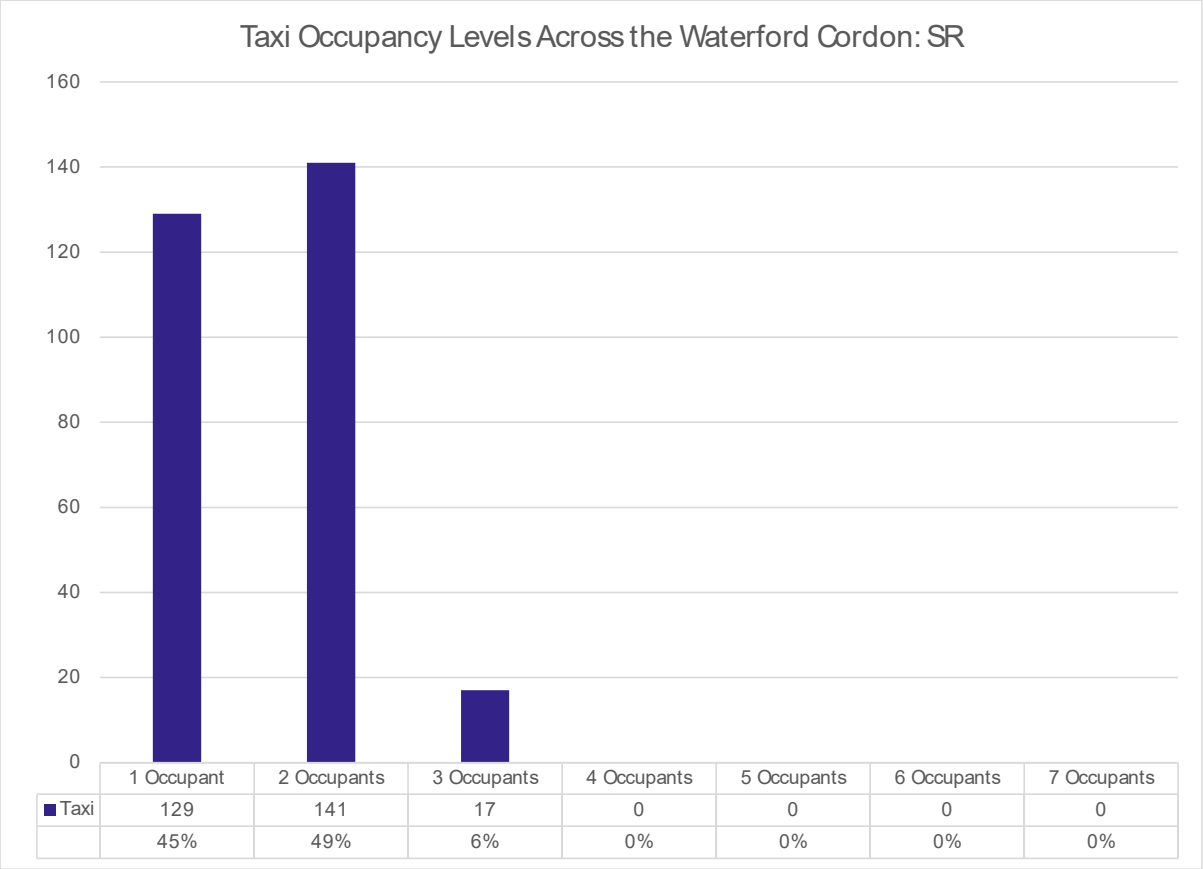


Figure 3-36:Taxi Occupancy: SR

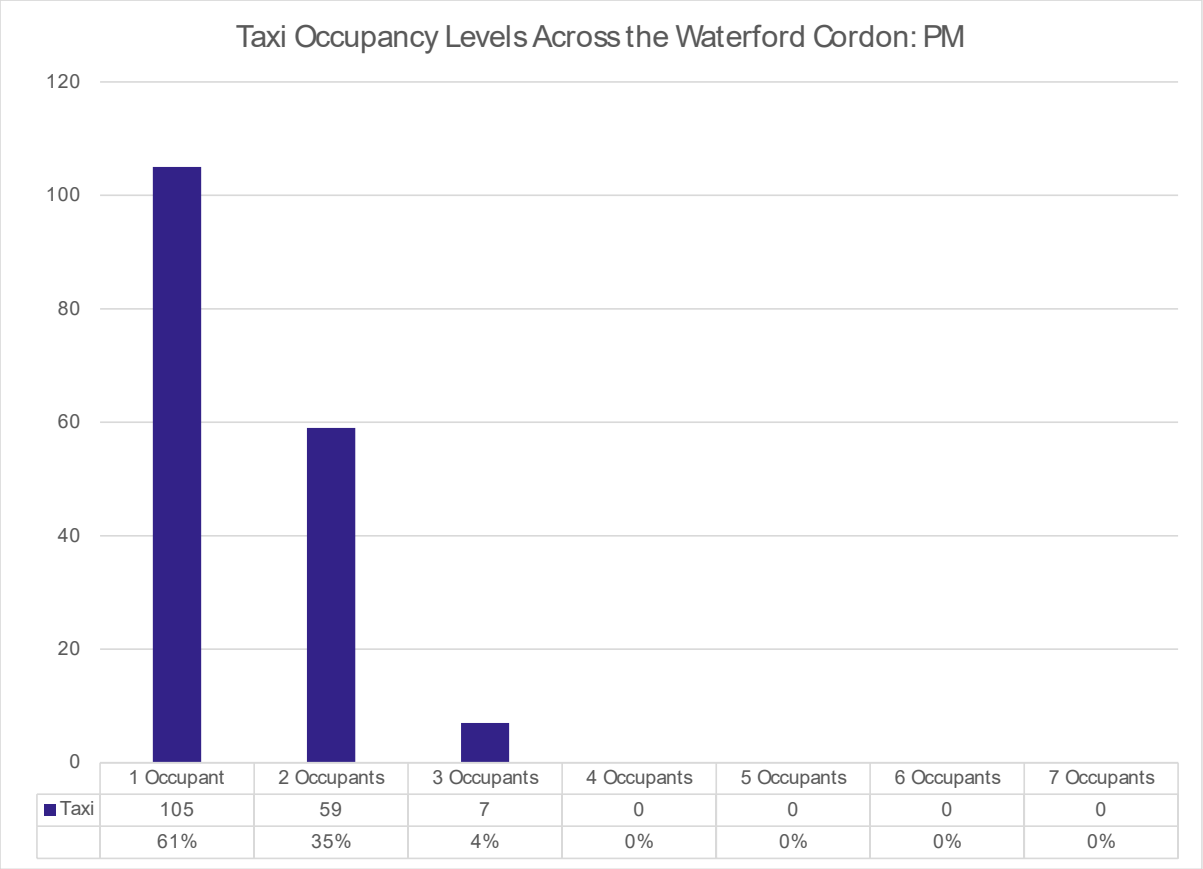


Figure 3-37:Taxi Occupancy: PM

Taxi Occupancy per site

Figure 3-38, Figure 3-39, Figure 3-40, Figure 3-41 and Figure 3-42 display the vehicle occupancy for taxis crossing the Waterford City Cordon during the respective time periods, with further reference to each individual site location.

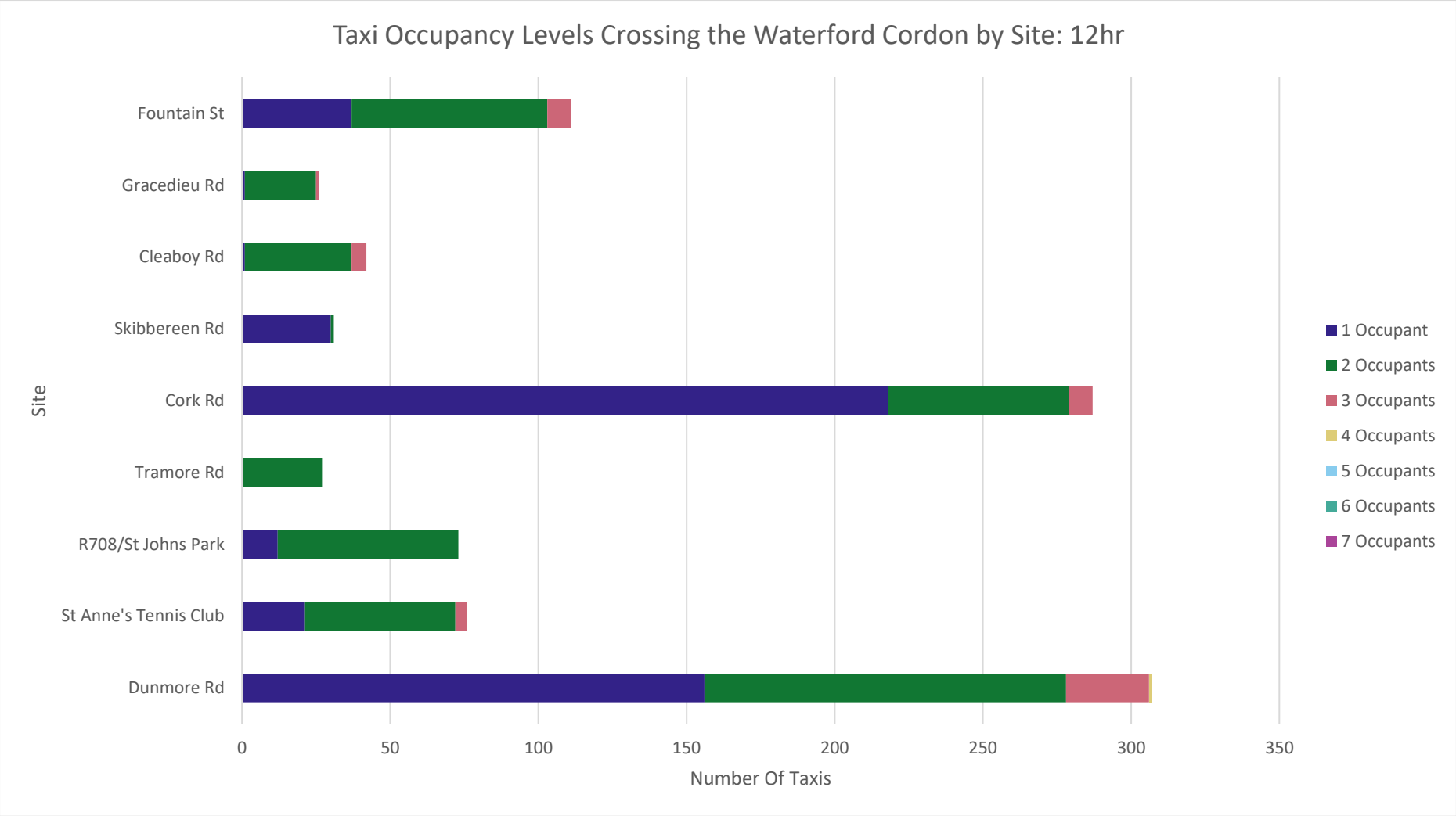


Figure 3-38:Taxi Occupancy per Site: 12 Hour

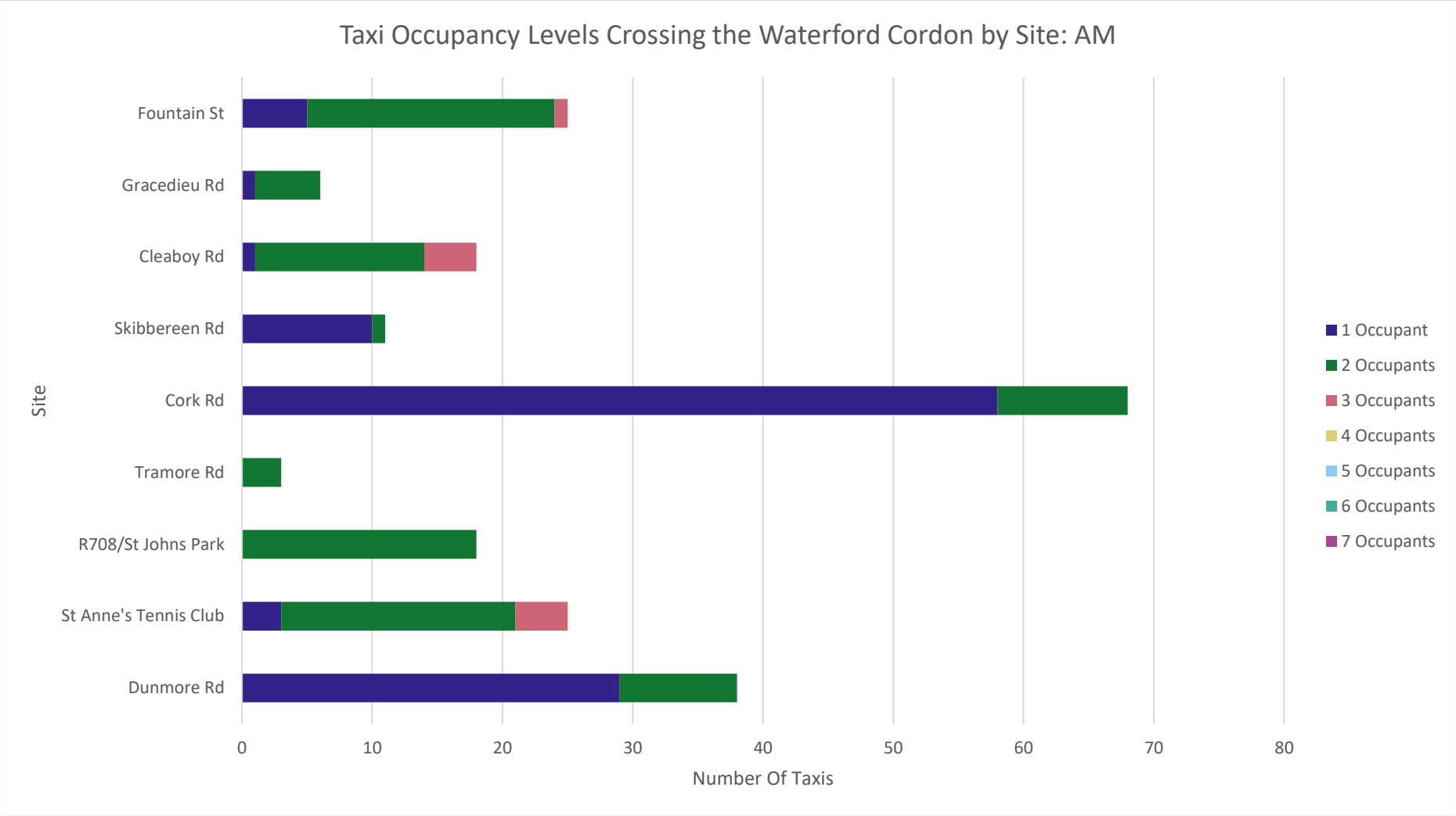


Figure 3-39:Taxi Occupancy per Site: AM

Figure 3-40:Taxi Occupancy per Site: LT

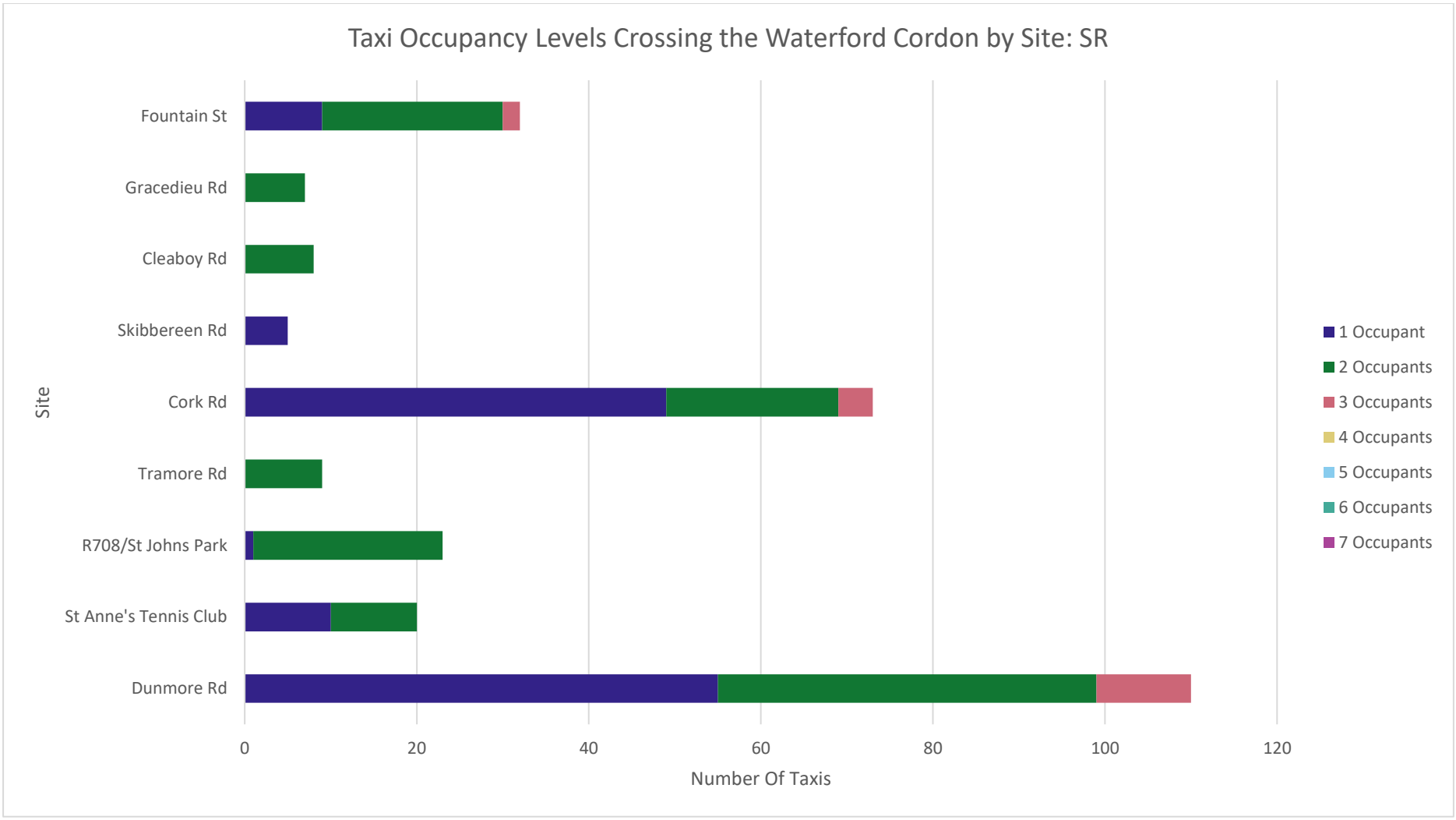


Figure 3-41:Taxi Occupancy per Site: SR

Figure 3-42:Taxi Occupancy per Site: PM

3.2.3 Bus Occupancy

Bus occupancy information was obtained from 9 bus stop survey locations, recorded at hourly intervals over a 12-hour period (i.e. 07:00 - 19:00) on the day of the survey.

Figure 3-43, Figure 3-44, Figure 3-45, Figure 3-46 and Figure 3-47 display the recorded bus occupancies crossing the Waterford City Cordon inbound towards the city during the respective time periods. The bus occupancies are displayed in terms of 5 different capacity bands (0-24%, 25-49%, 50-74%, 75-99% and 100%). Please note that these graphs display both the absolute values and the percentage occupancy for each time period. The figure below shows that, over the full 12-hour survey period, approximately 9% of buses were at less than 25% capacity, 48% were at between 25% and 49% capacity, 30% were at between 50% and 74% capacity, 11% were at between 75% and 99% capacity and approximately 2% were full.

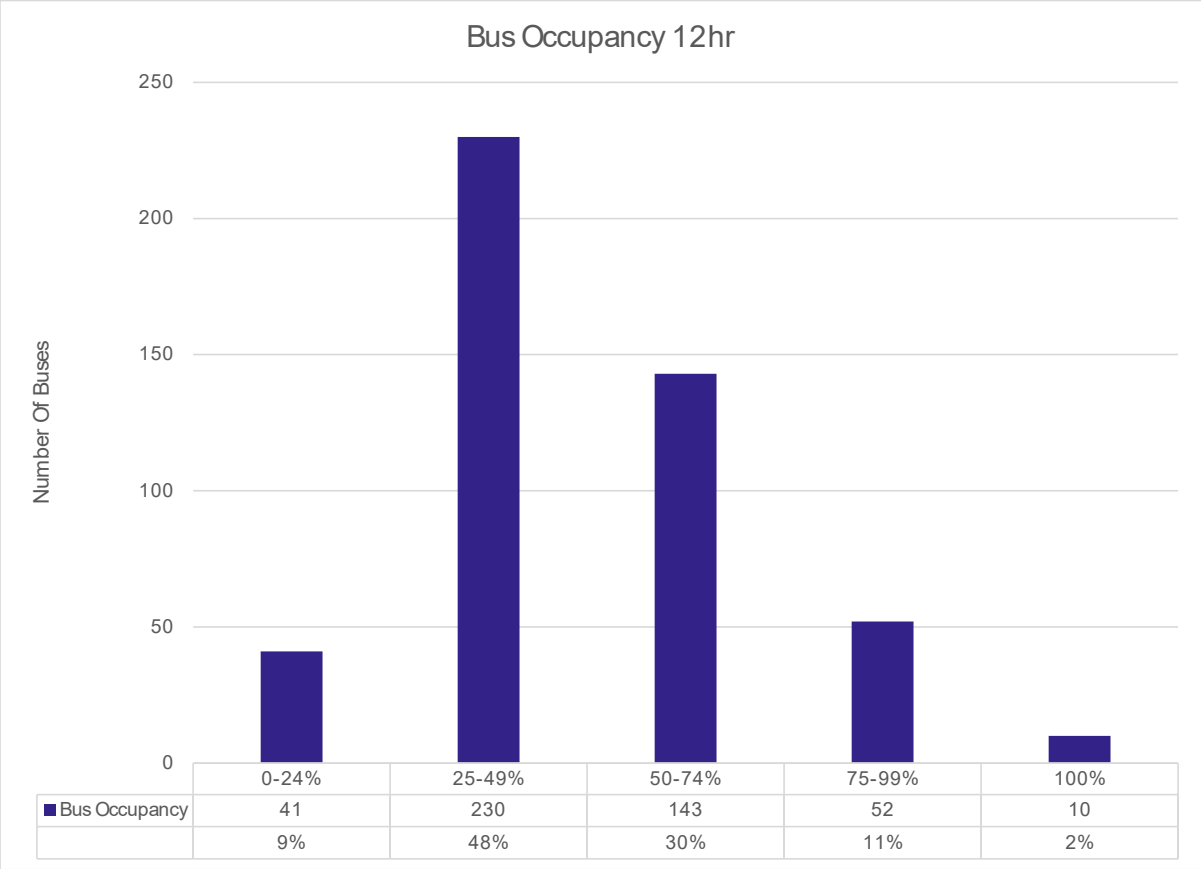


Figure 3-43:Bus Occupancy: 12 Hour

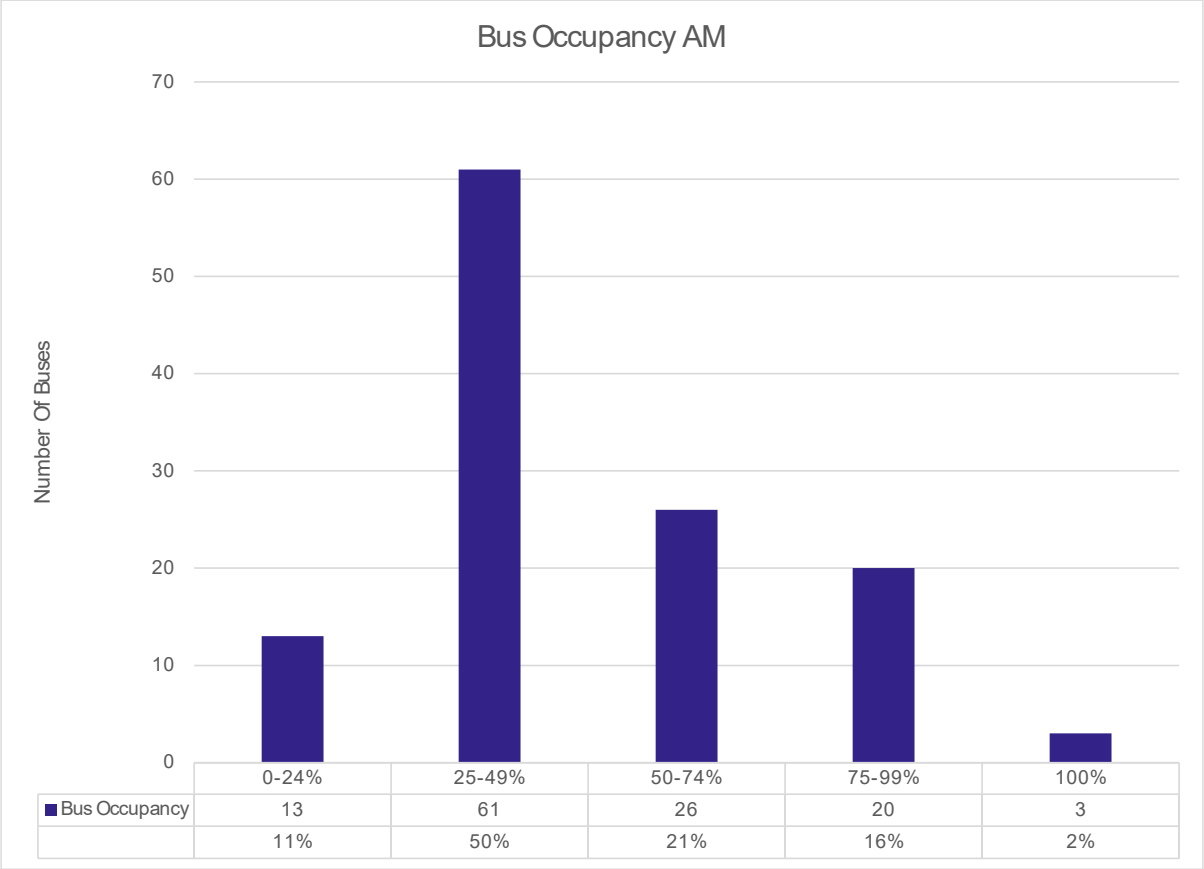


Figure 3-44:Bus Occupancy: AM

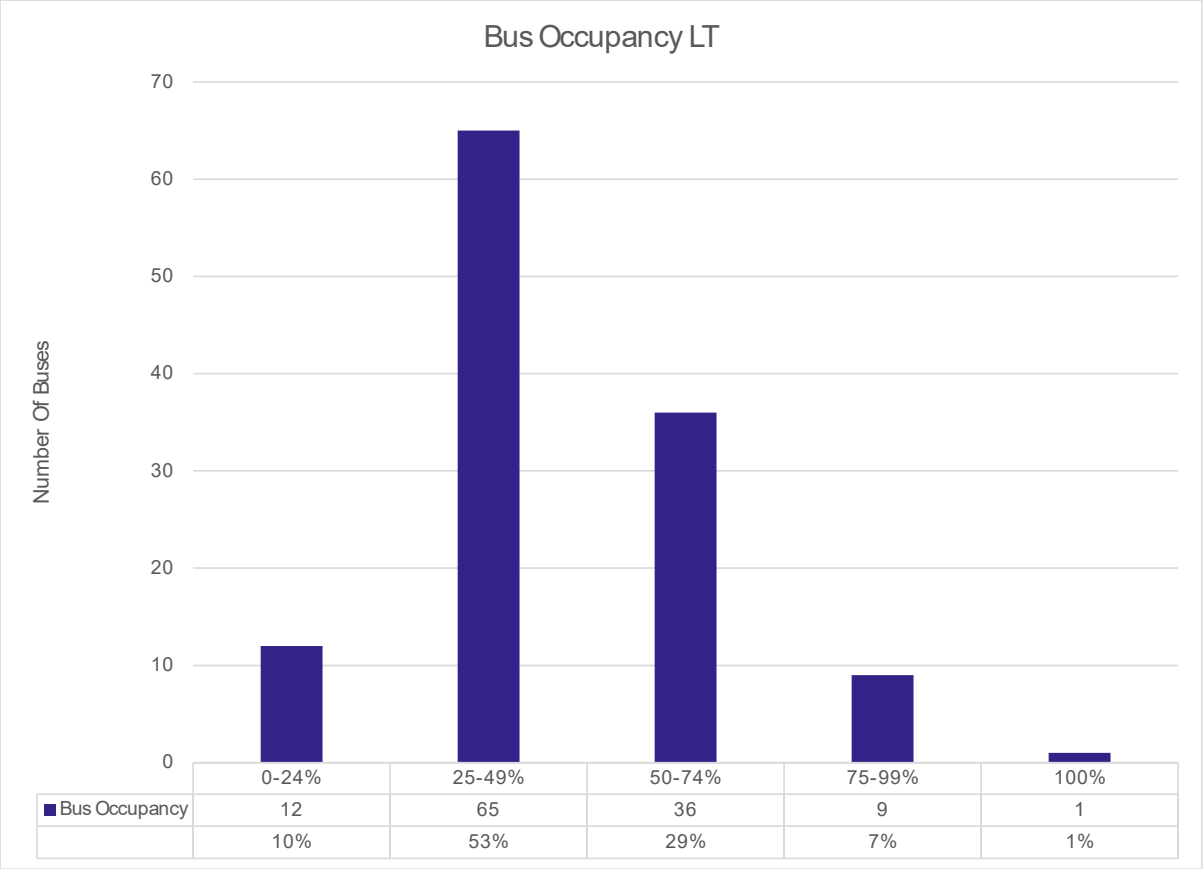


Figure 3-45:Bus Occupancy: LT

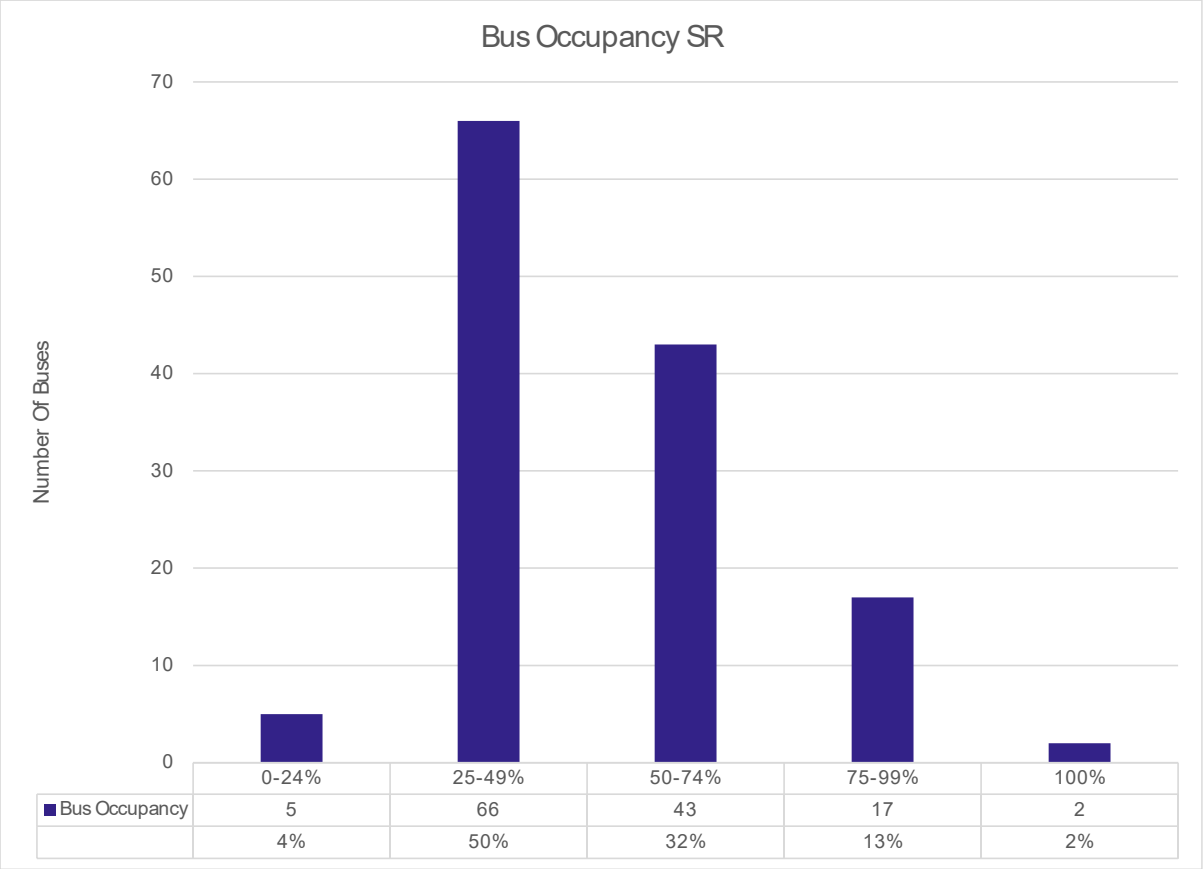


Figure 3-46:Bus Occupancy: SR

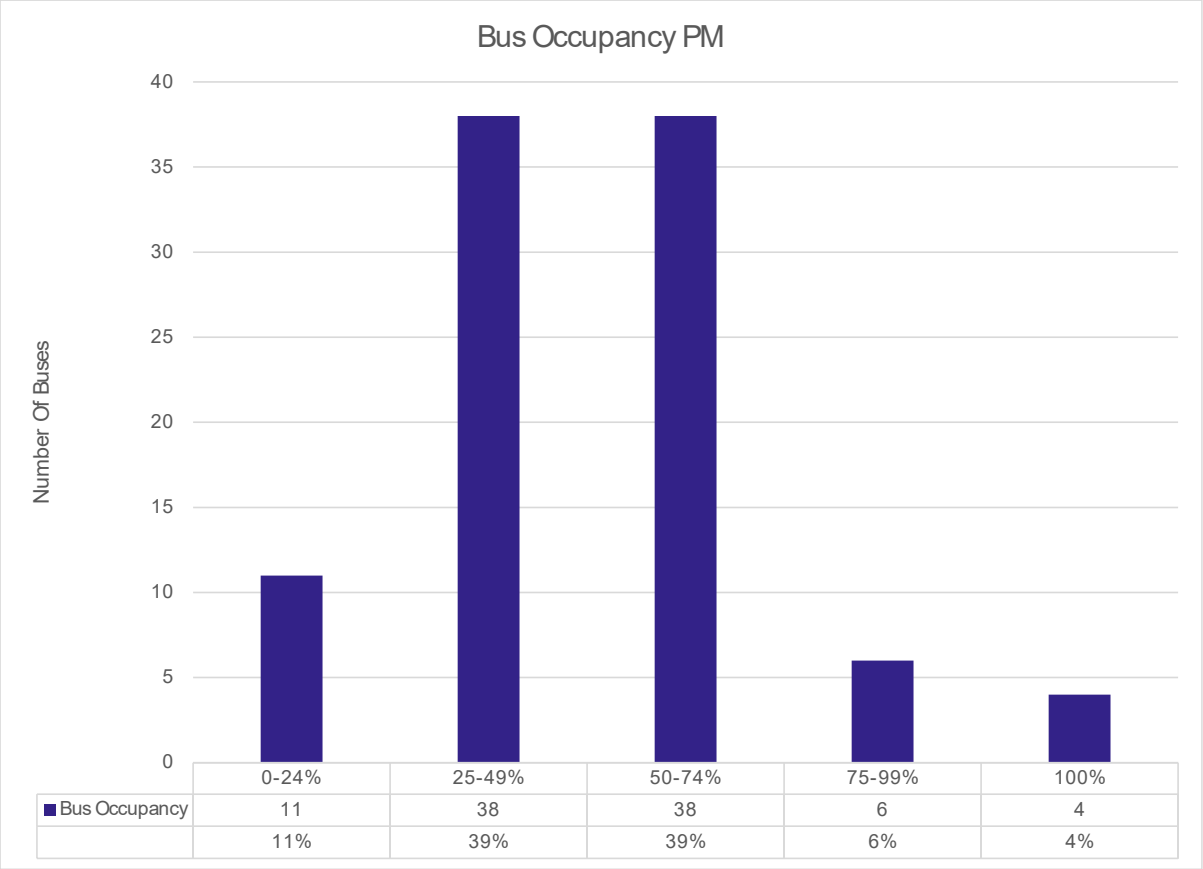


Figure 3-47:Bus Occupancy: PM

Bus Occupancy per Site

Figure 3-48, Figure 3-49, Figure 3-50, Figure 3-51 and Figure 3-52 display the vehicle occupancy for buses crossing the Waterford City Cordon during the respective time periods, with further reference to each individual bus stop location.

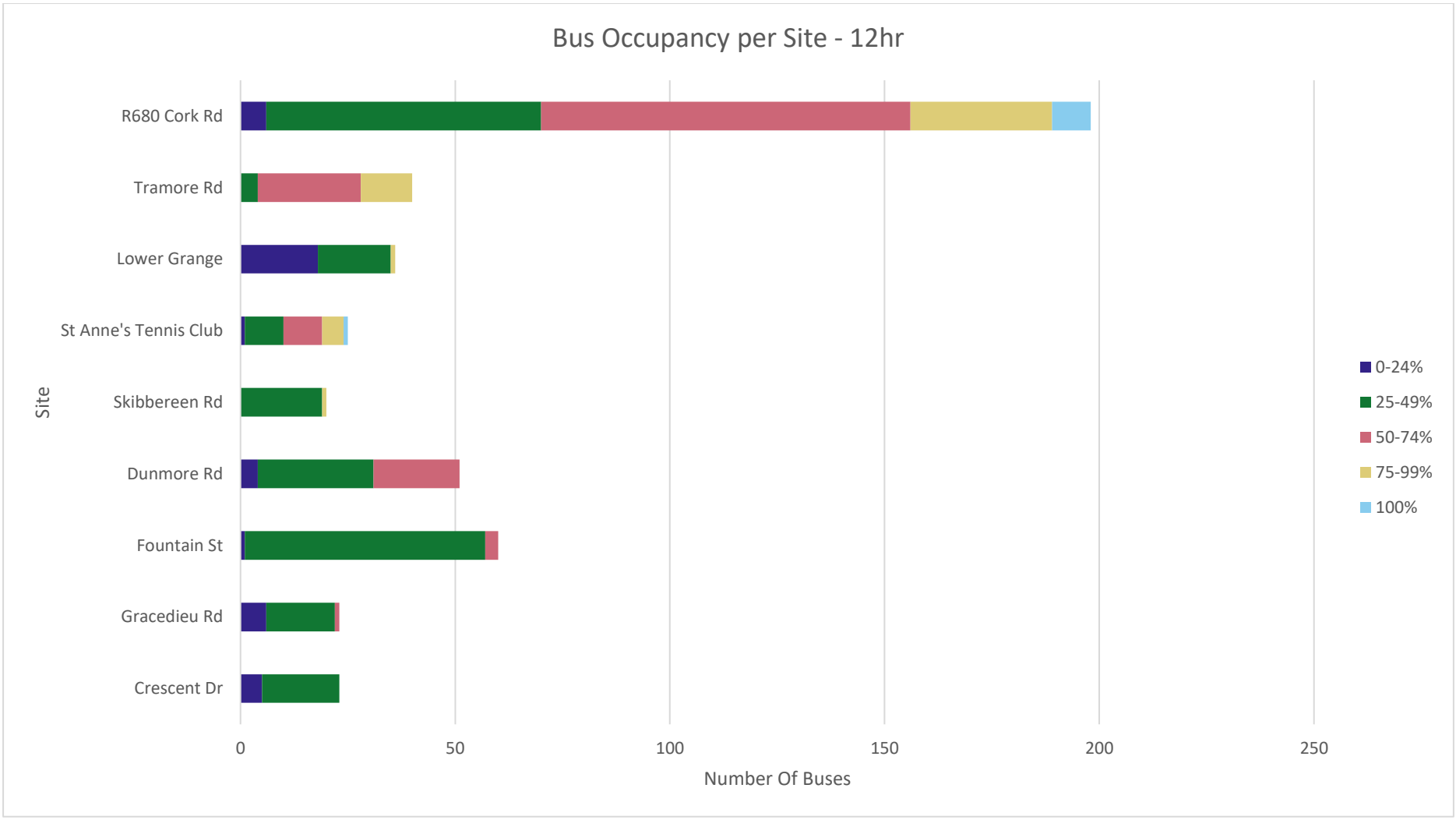


Figure 3-48:Bus Occupancy per Site: 12 Hour

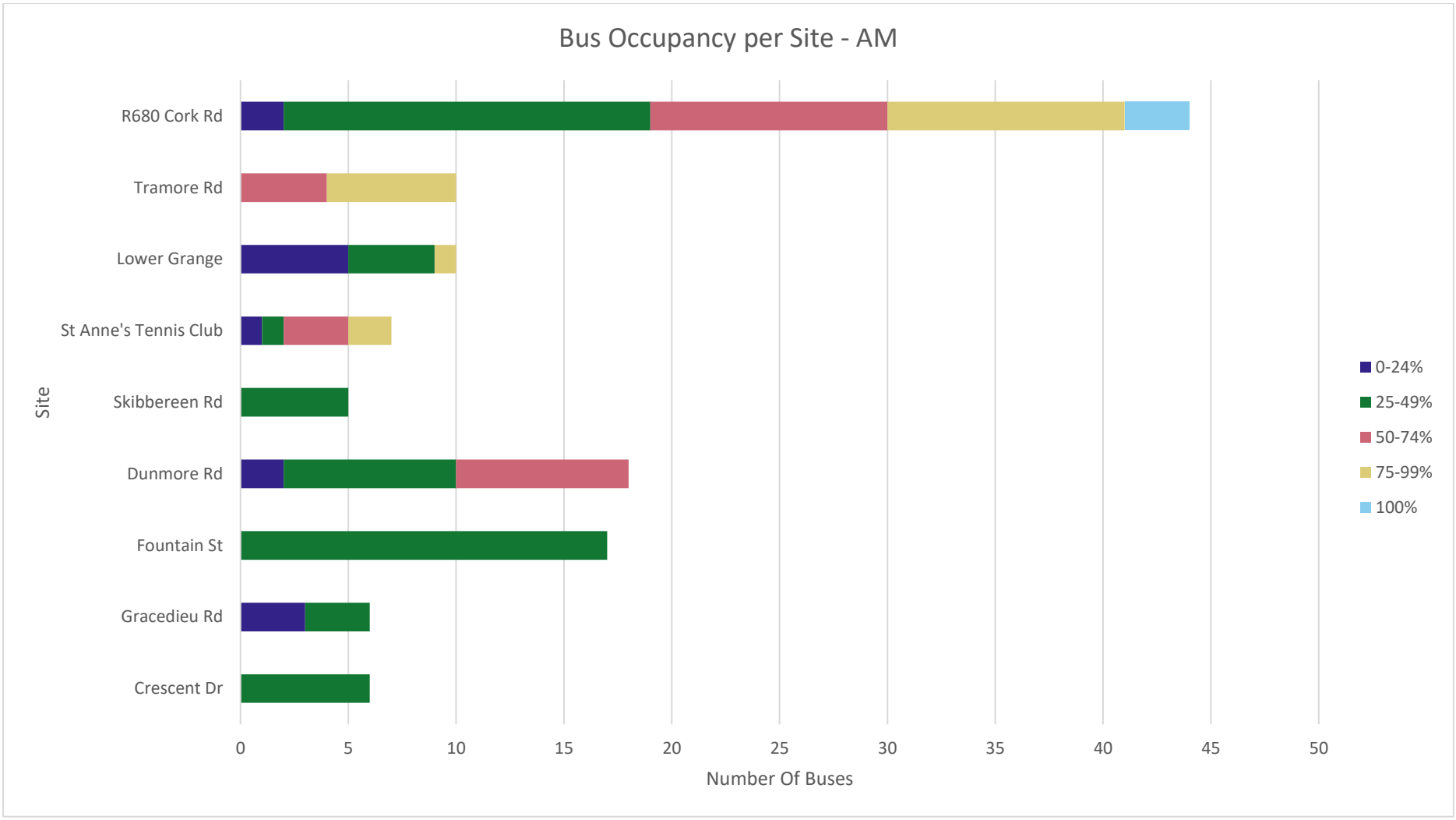


Figure 3-49:Bus Occupancy per Site: AM

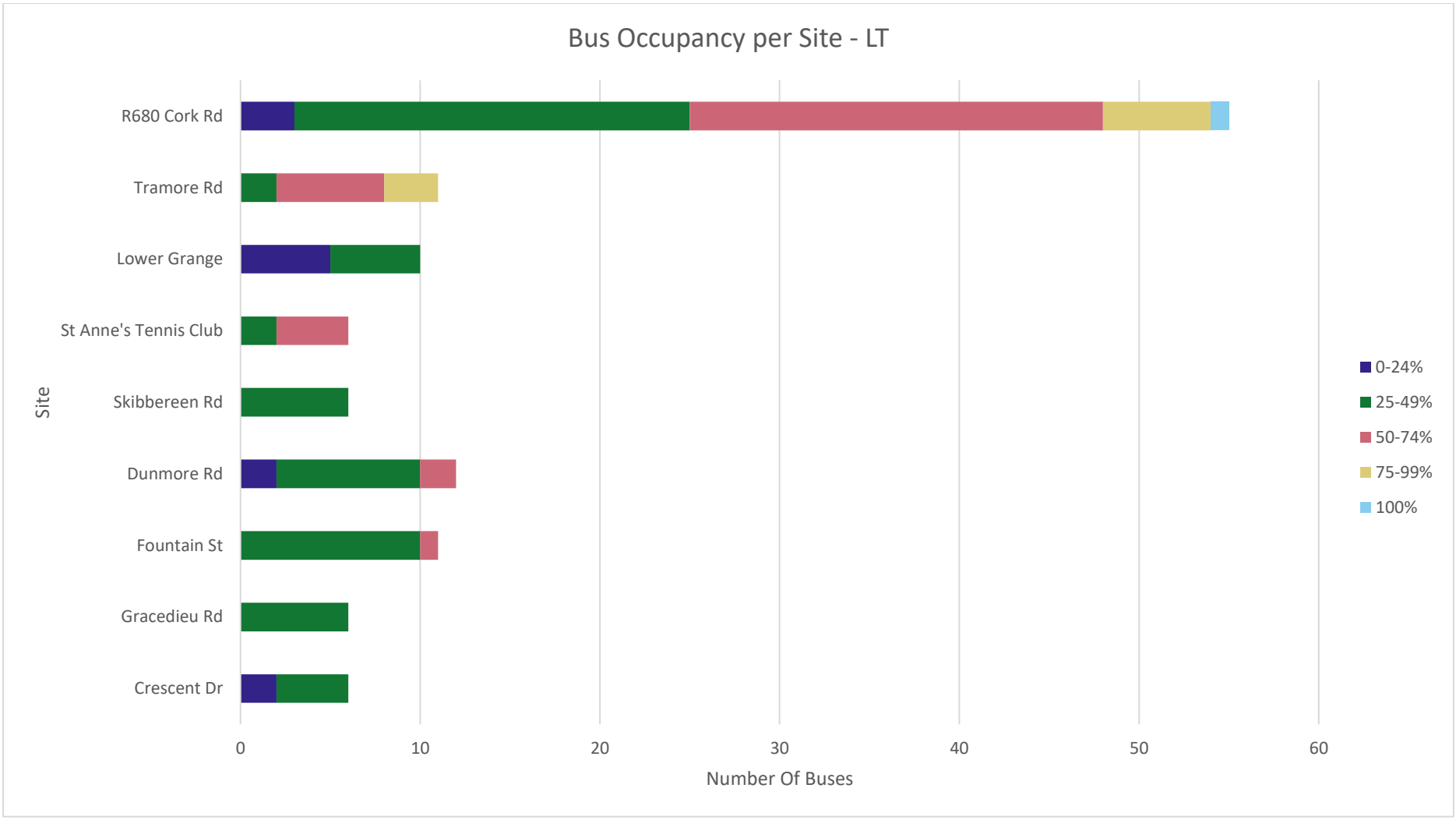


Figure 3-50:Bus Occupancy per Site: LT

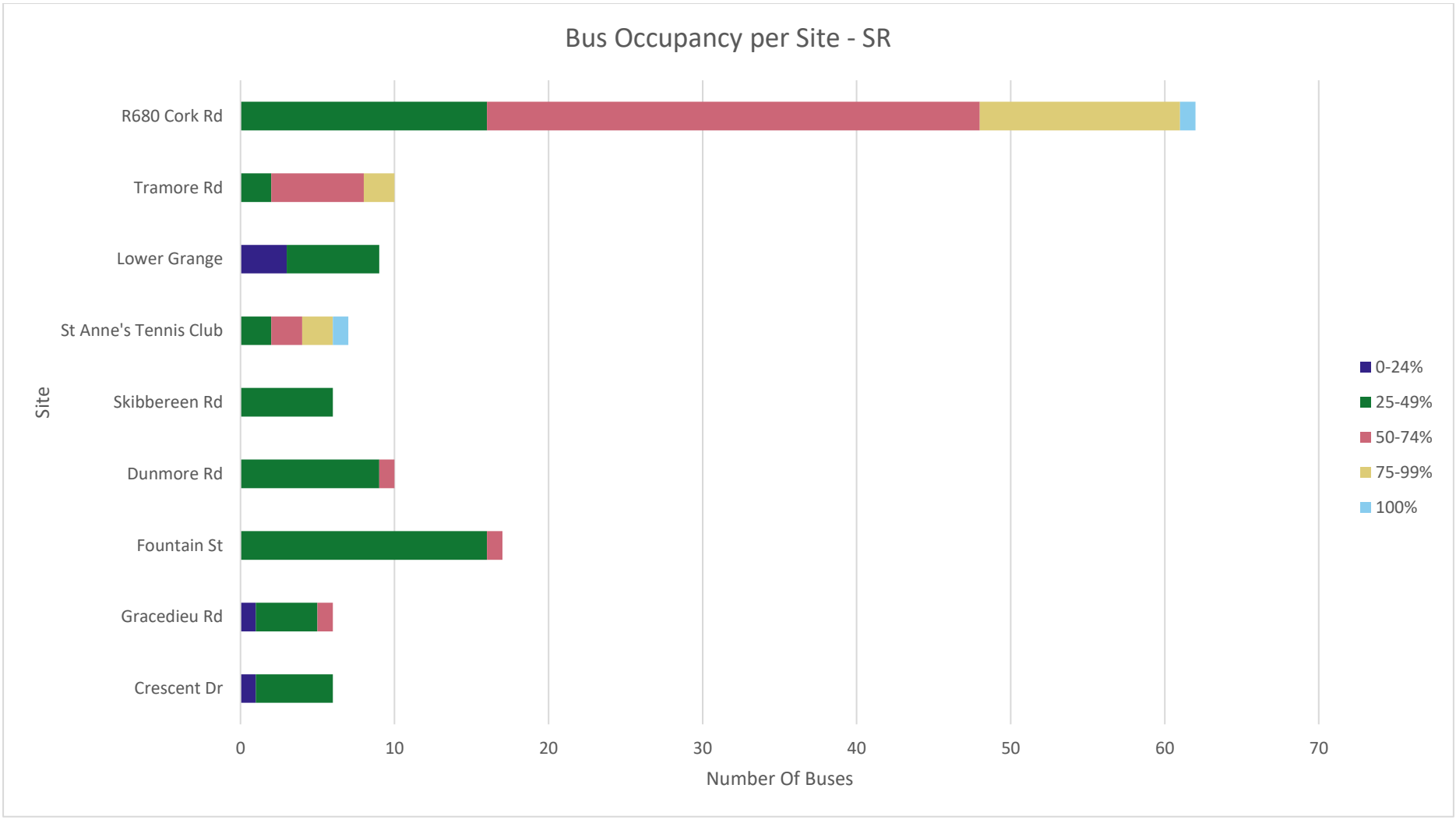


Figure 3-51:Bus Occupancy per Site: SR

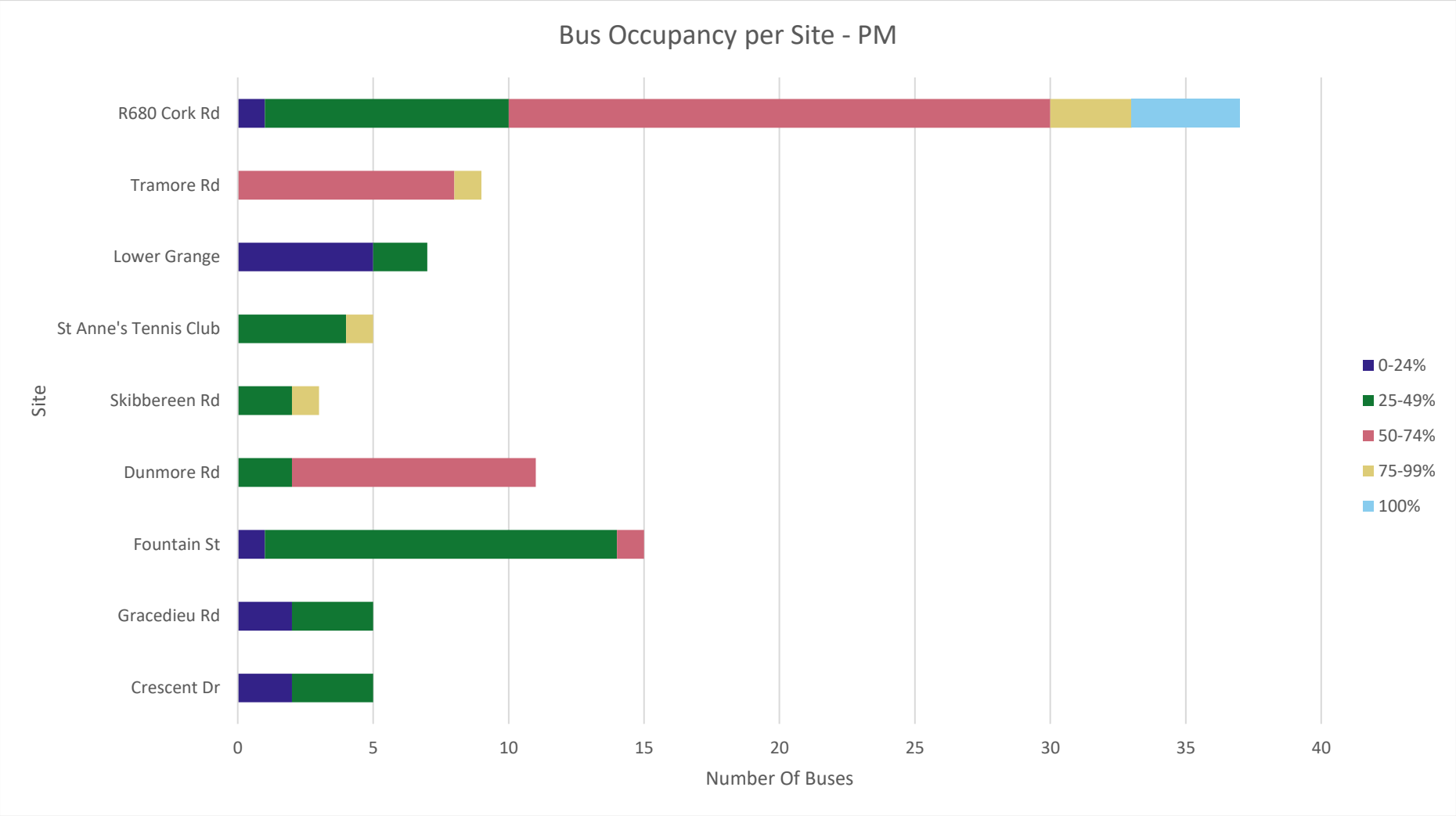


Figure 3-52:Bus Occupancy per Site: PM

4 People Movements

4.1 Methodology

Chapter 3 provided details on the number of vehicles, pedestrians and cyclists crossing the Waterford City Cordon. In order to convert these to total person trips crossing the cordon, it is necessary to estimate the occupancy of each vehicle type. Further details on how this was done is outlined below.

- Road Passenger Movements were calculated in the following ways:
    - Car and taxi people movements were calculated by taking the number of vehicles in the JTC surveys for each vehicle classification and multiplying these by a site-specific occupancy factor that was calculated by dividing the number of passengers by the number of vehicles. Where no equivalent site was available, an average factor from all sites was used.
    - Total bus passenger movements were calculated by applying average bus occupancy factors (as outlined in Appendix B) to the number of buses observed in the bus occupancy surveys.
    - Cyclist and pedestrian people movements were taken directly from the JTC surveys.
- Rail Passenger Movements were calculated in the following ways:
    - Rail movements include passengers crossing the cordon inbound from the National Rail Census, which is a boarding and alighting survey conducted by Iarnród Éireann on a single day each year at every rail station throughout the country. The most recent survey was performed during November 2024. While this is different to the dates of the other surveys, the Rail Census is considered representative of rail movements.

The resulting people movements, by mode, are discussed in the following sections of this Chapter.

4.2 Road Passenger Movements

Figure 4-1, Figure 4-2, Figure 4-3, Figure 4-4 and Figure 4-5 show the number of passenger trips for pedal cycle, pedestrian, car, taxi and bus crossing the Waterford City Cordon over the 12-hour survey period.

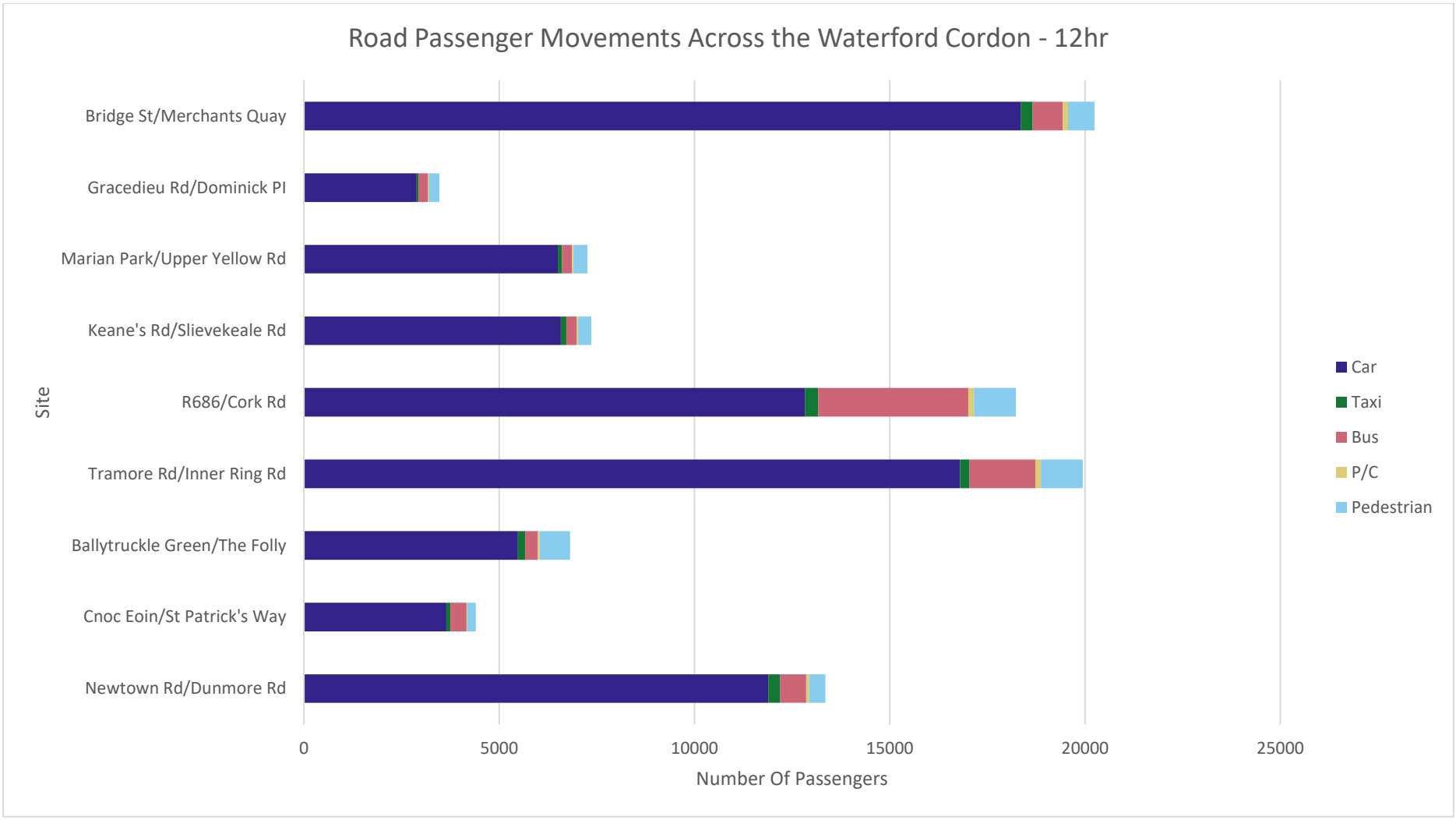


Figure 4-1:Road Passenger Movements per Mode per Site: 12 Hour

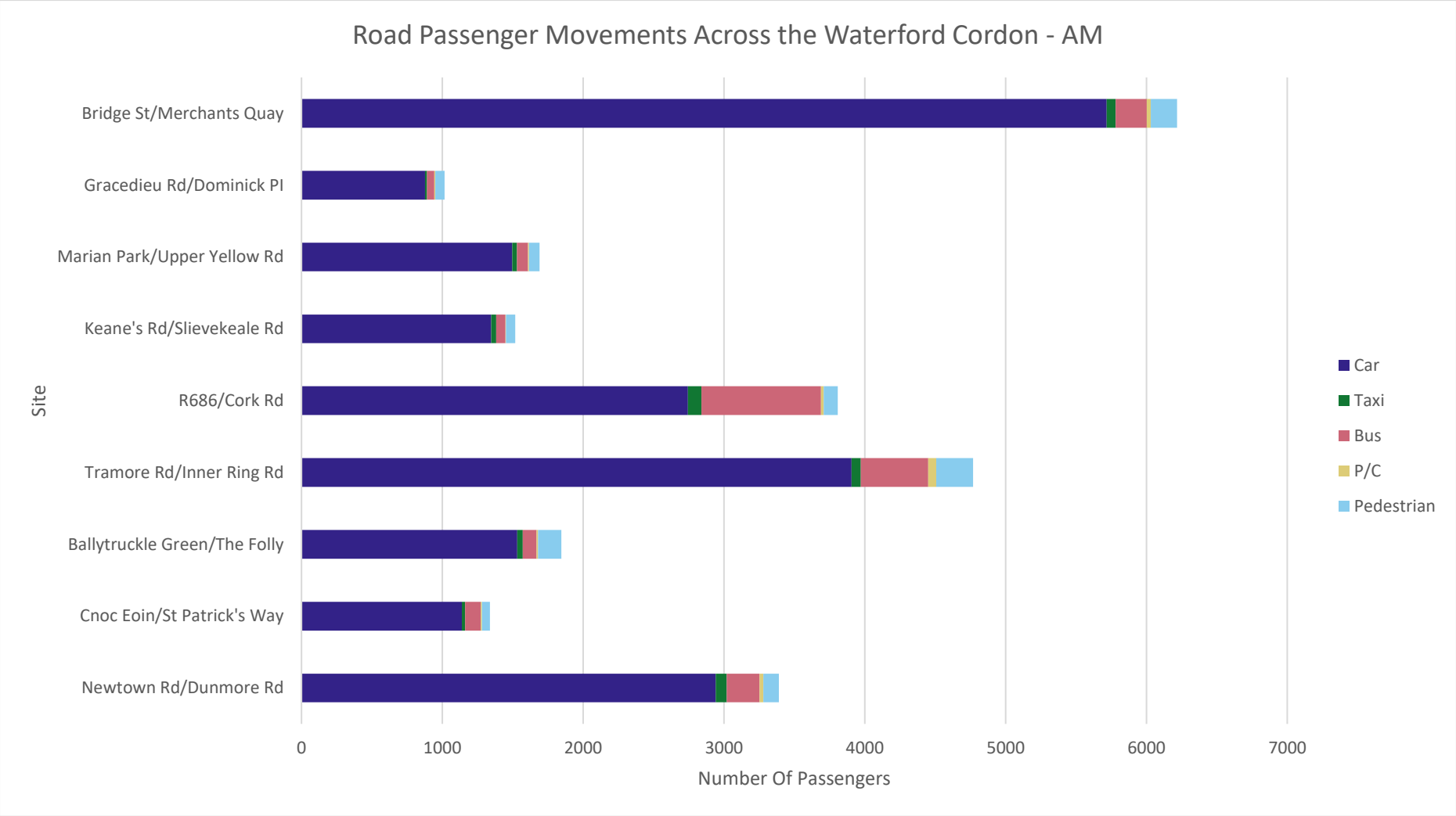


Figure 4-2:Road Passenger Movements per Mode per Site: AM

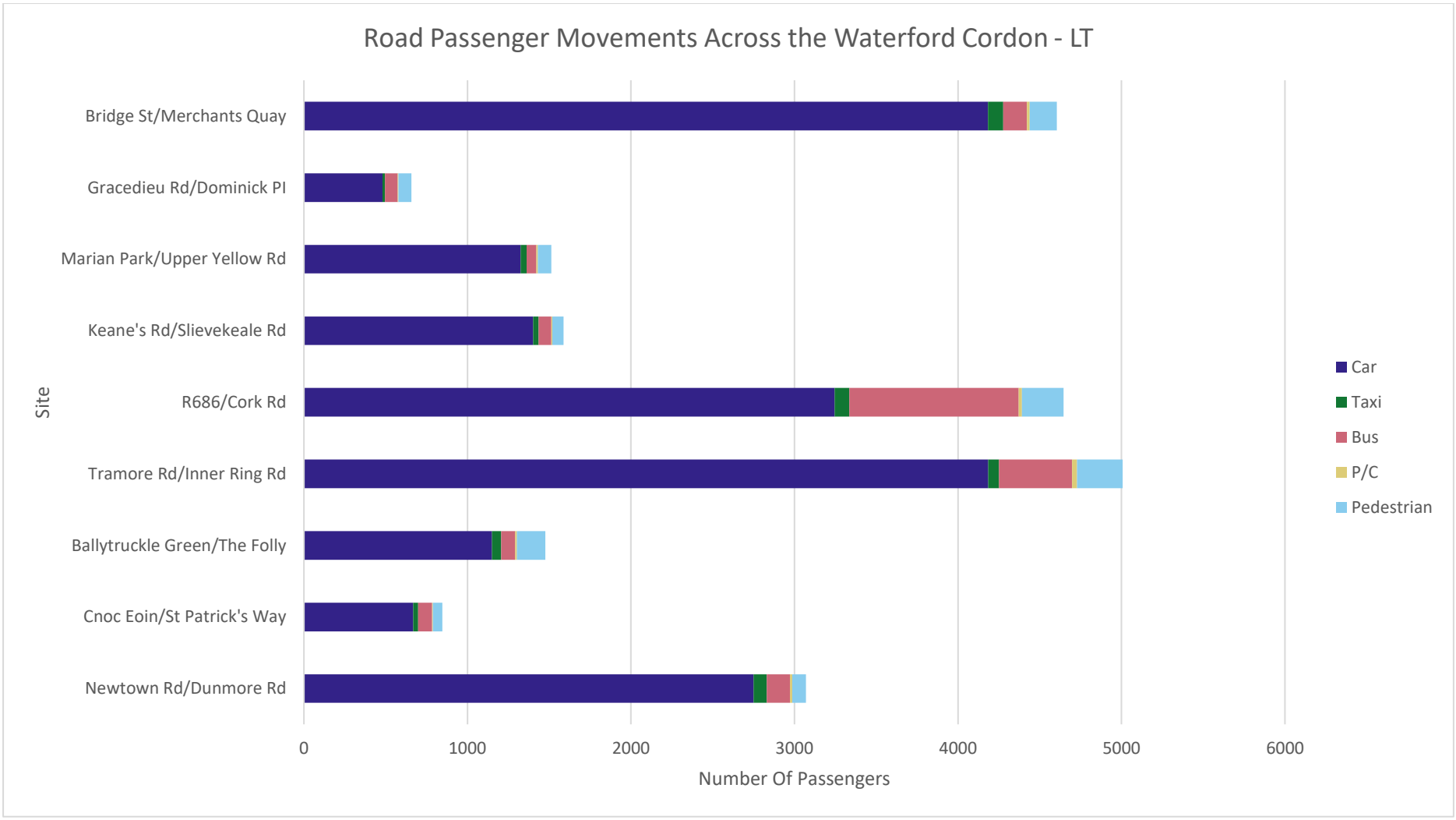


Figure 4-3:Road Passenger Movements per Mode per Site: LT

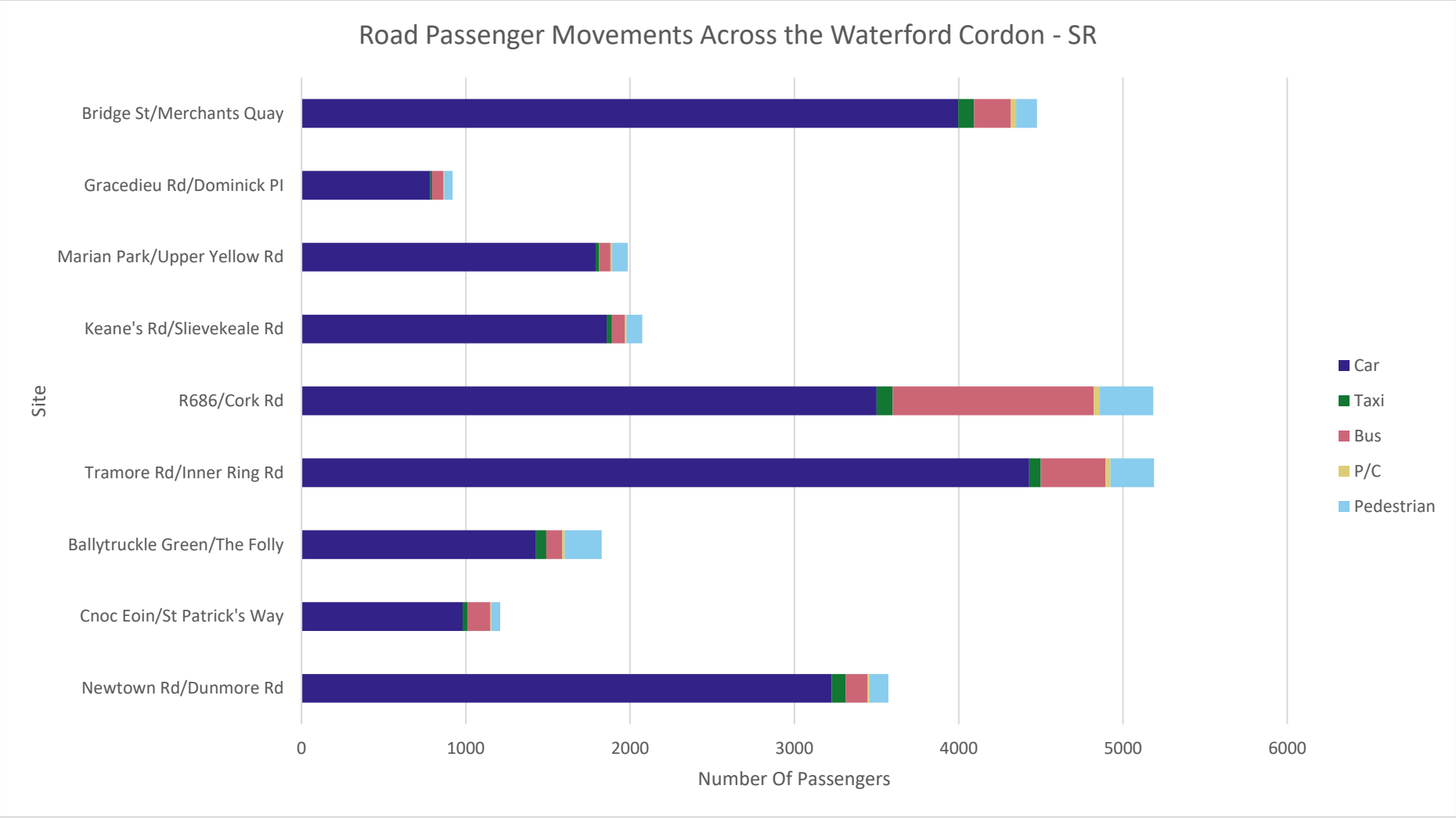


Figure 4-4:Road Passenger Movements per Mode per Site: SR

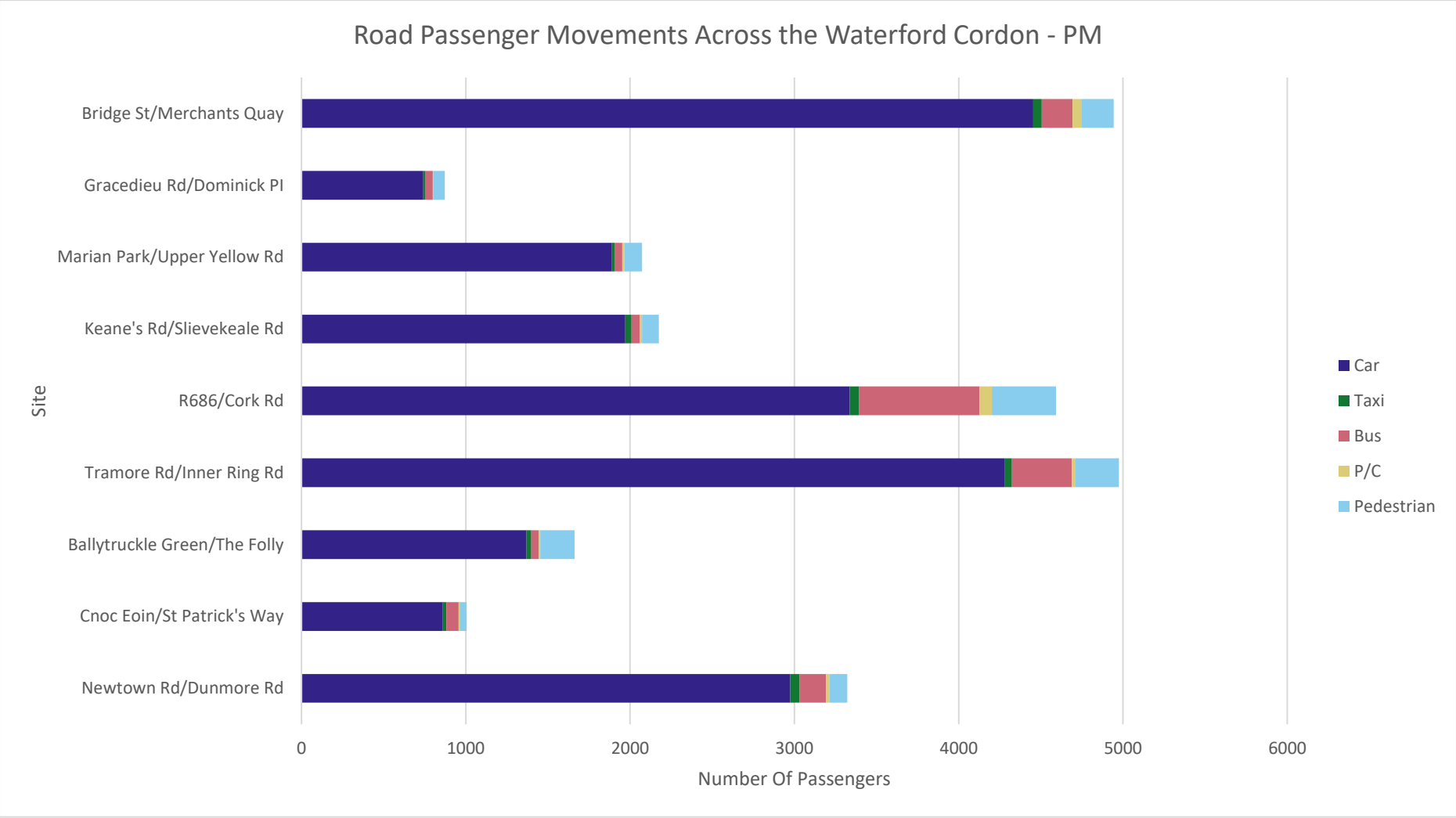


Figure 4-5:Road Passenger Movements per Mode per Site: PM

4.3 Rail Passenger Movements

4.3.1 Heavy Rail Passenger Movements

The National Rail Census is a survey carried out by Iarnród Éireann every year which records the boardings and alightings at every rail station in the country during November 2024. This report extracts the number of alighting passengers at Waterford Plunkett Station from that survey.

Waterford Plunkett Station is served by trains on the Dublin Heuston - Waterford line and those on the Galway - Clonmel - Limerick Junction line, offering connections with Dublin, Cork, Limerick and Galway. It is served by 7 direct trains a day from Heuston, and 2 trains a day from Limerick Junction.

Figure 4-6 shows the total number of people alighting at Waterford station grouped by the origin of the service. In total, 344 people alighted at Waterford Train Station over the 12-hour survey period.

Note that Limerick Junction is a key interchange station for trains serving Waterford, and thus trips from this station likely have their ultimate origin at another station.

Appendix D presents the breakdown of heavy rail passenger movements in further detail.

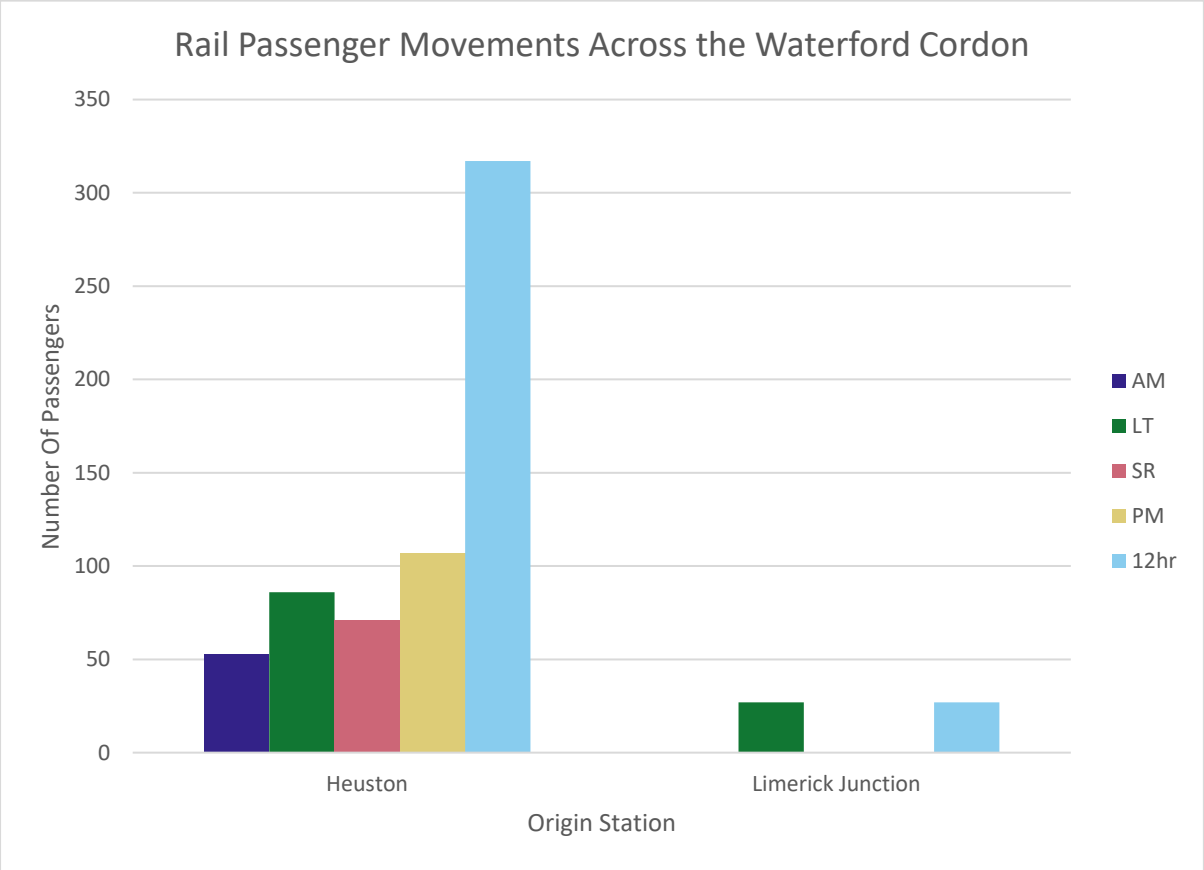


Figure 4-6:Heavy Rail Services - Passengers Inbound

4.4 Total Person Movements

Figure 4-7 and Figure 4-8 display the total number of passengers crossing the Waterford City Cordon by pedal cycle, pedestrian, car, taxi, bus and rail for each time period.

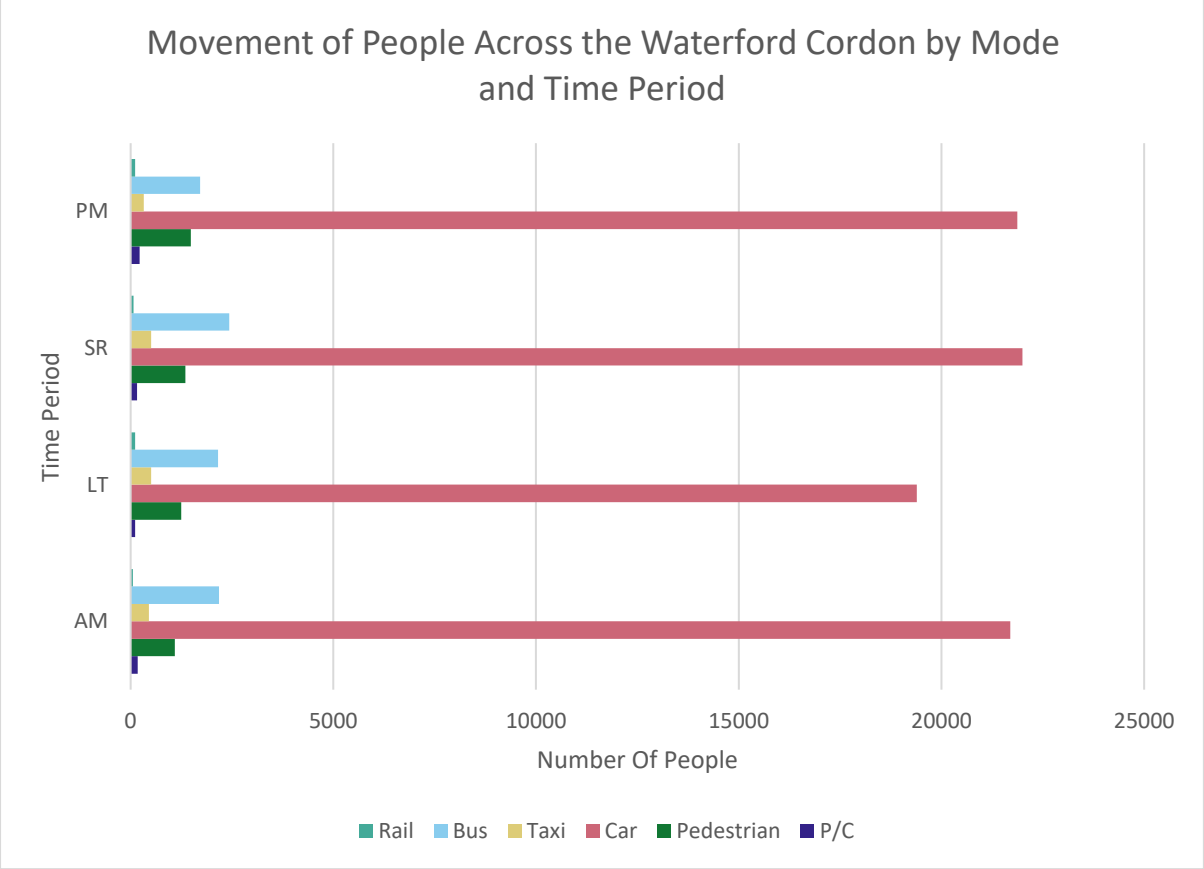


Figure 4-7:Car, Cycle, Taxi, Pedestrian and Rail Trips Inbound Across the Waterford City Cordon During Each Time Period

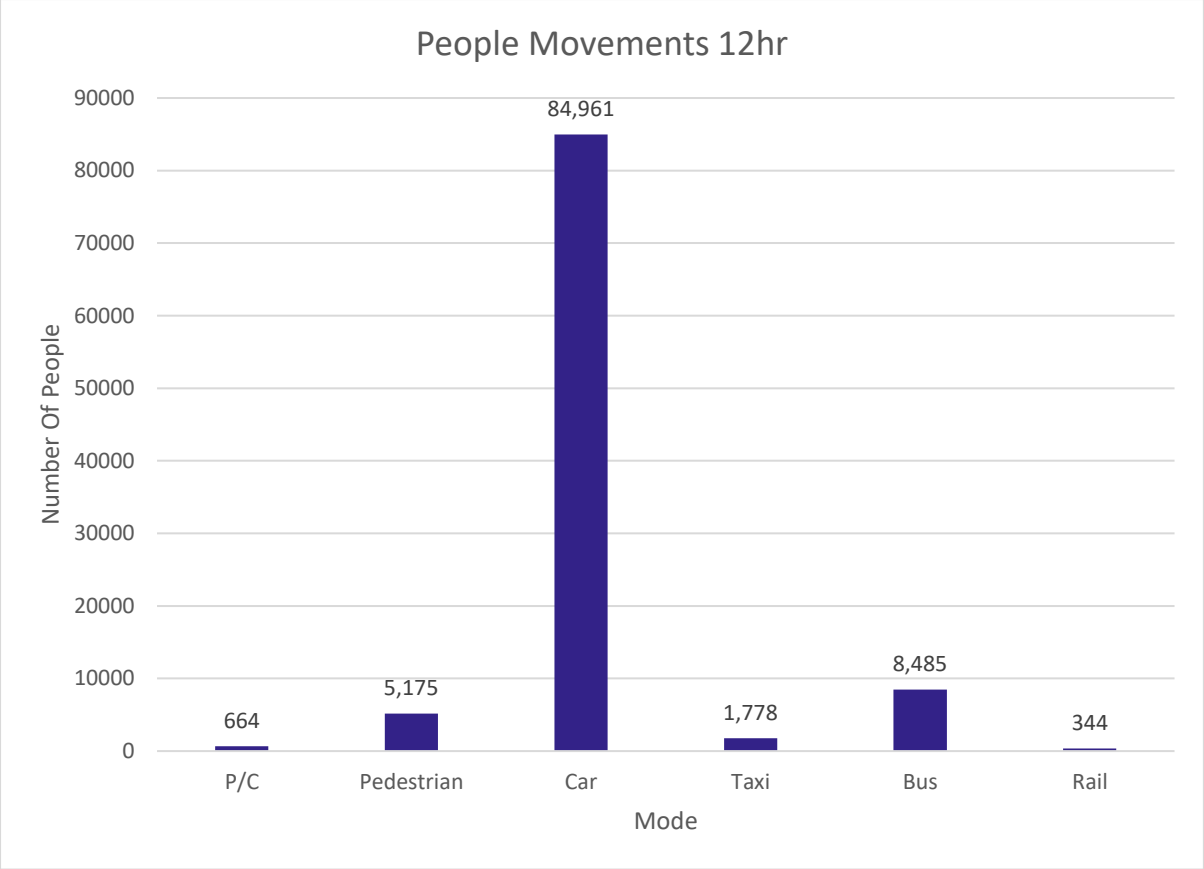


Figure 4-8:Trips Inbound across the Waterford City Cordon: 12 Hour

4.5 Modal Split

Table 4-1 shows the number and percentage of people, by mode, crossing the Waterford City Cordon during the 12-hr survey period.

Table 4-1:Number of Journeys Across the Waterford City Cordon by Mode

Mode	Trips	% Trips
P/C	664	1%
Pedestrian	5,175	5%
Car	84,961	84%
Taxi	1,778	2%
Bus	8,485	8%
Rail	344	0%

As can be seen from Figure 4-9, the mode with the highest share over a 12-hr period is Car with 84%.

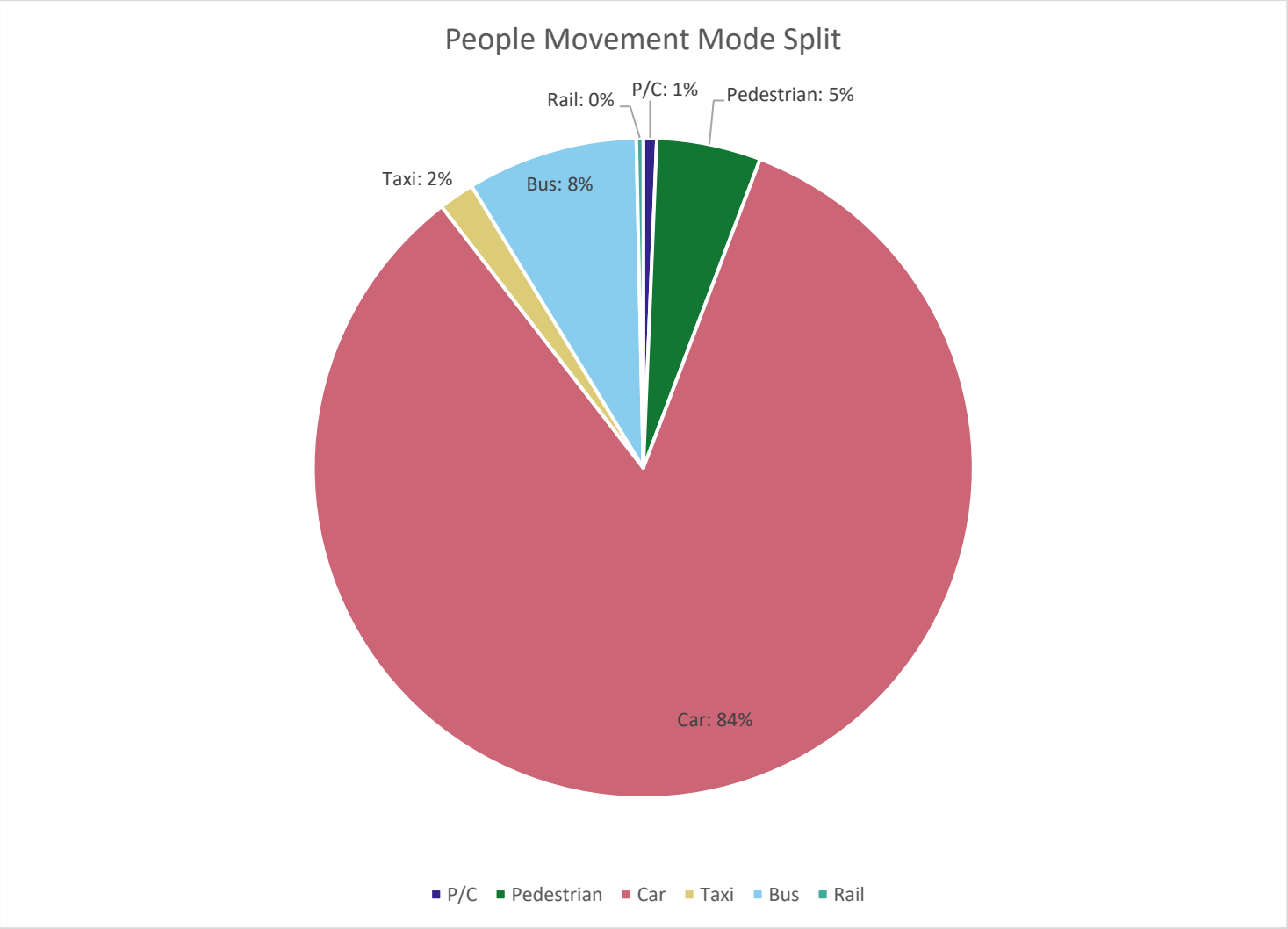


Figure 4-9:Mode share of people crossing the Waterford City Cordon by Sustainable and Vehicular Modes

4.6 Trend Analysis

As the surveys used for this report have been repeated every year since 2022, a historical trend analysis of people movements for 2022, 2023 and 2024 can be performed. **Table 4-2** and Figure 4-10 show the number of people crossing the Waterford Cordon inbound by mode and year over the 12-hour time period.

People movements across all modes increased by 2,021, or 2%, between 2023 and 2024. Both cars and taxis saw a decrease in the number of people of -1% and -4%, respectively.

Walking and cycling saw an increase in the number of users. Walking increased by 371 people, or 8%, and cycling increased by 73, or 12%. Similarly, public transport patronage also increased with bus passengers rising by 2,381 (39%) and rail passengers rising by 6%.

Sustainable (i.e. walking, cycling, bus and rail) mode share increased from 12% in 2023 to 14% in 2024. This is also up from 10% in 2022. In total, 14,668 people out of a total of 101,407 used sustainable modes in the 2024 surveys, an increase of 2,844 over 2023.

Table 4-2 People Movements (12 hour totals) Inbound Across the the Waterford Cordon by Year

Mode	2022 Trips	2023 Trips	2024 Trips	% Difference between 2023 and 2024
P/C	484	591	664	12%
Pedestrian	4,537	4,804	5,175	8%
Car	85,457	85,706	84,961	-1%
Taxi	1,710	1,856	1,778	-4%
Bus	4,908	6,104	8,485	39%
Rail	230	325	344	6%
Total	**97,326**	**99,386**	**101,407**	**2%**

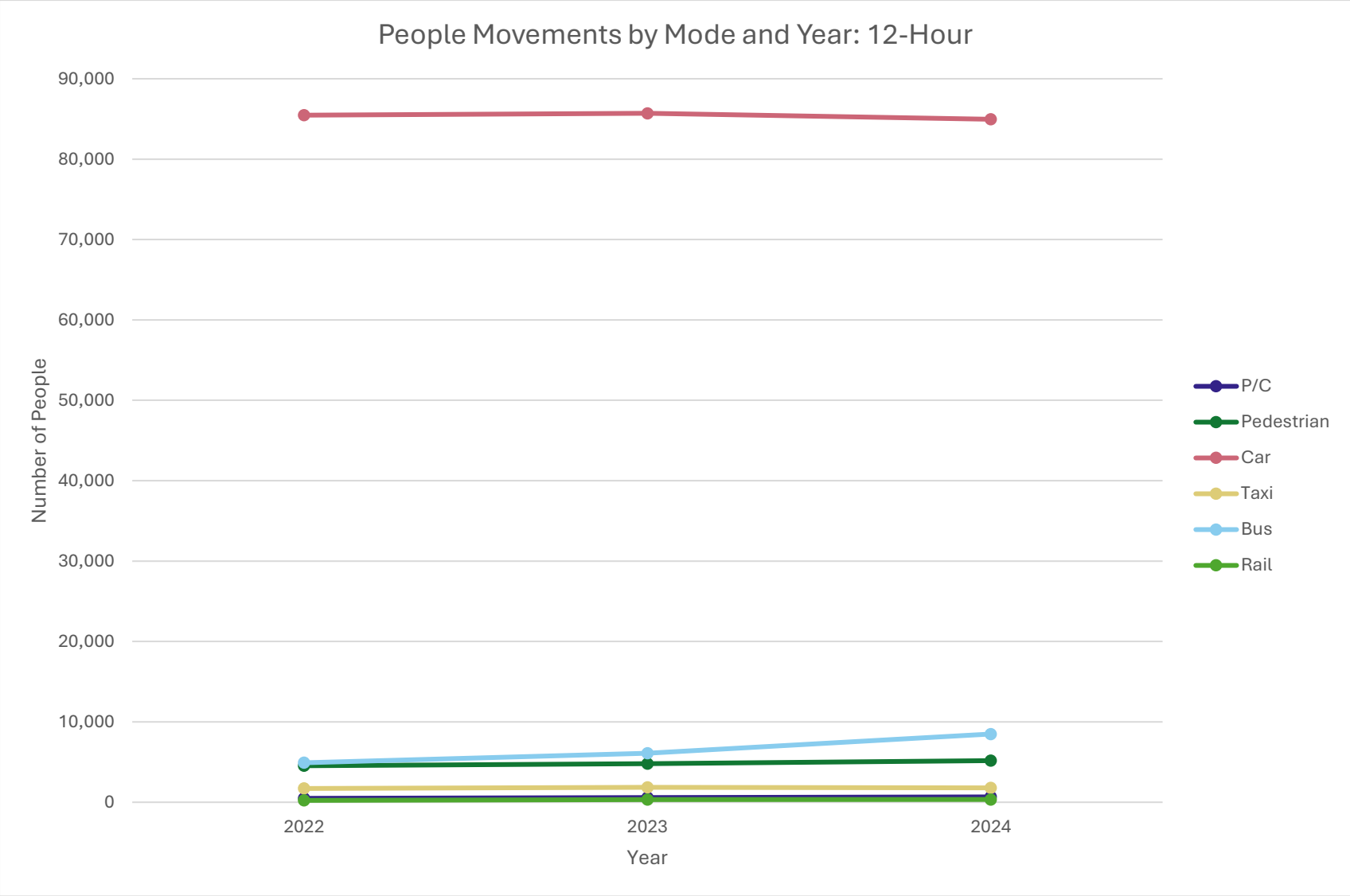


Figure 4-10 Number of People Crossing the Waterford Cordon Inbound by Year and Mode

5 Summary Results

Based on the analysis of the 2024 traffic surveys, this report demonstrates the following:

- In terms of overall people movements, 14,668 (14%) of a total of 101,407 people travelling inbound towards the City between 07:00 and 19:00 used sustainable modes of travel, i.e. pedal cycle, pedestrian, bus and rail.
- The total number of vehicles, pedestrians and cyclists that crossed the Waterford Cordon inbound was 86,850 on the day of the survey.
- The busiest time period for vehicles and cyclists was the AM peak with 17,157 crossing the Waterford City Cordon inbound towards the city. The busiest time period for Pedestrians was the PM peak with 1,488 crossing the Waterford City Cordon inbound.
- Between the hours of 07:00 and 19:00, cars were recorded to have the highest vehicular traffic split, with 79% of the total inbound flows. Light Goods Vehicles (LGVs) recorded 8%, Ordinary Goods Vehicles 1 (OGV1) recorded 1%, Ordinary Goods Vehicles 2 (OGV2) recorded <1% and taxis recorded 2%. The remaining vehicle classifications recorded 2% or less of the total flows.
- Between 07:00 and 19:00, 48% of buses were at 25-49% capacity. Approximately 9% of buses were at 0-24%. 30% were at 50-74% capacity, 11% were at 75-99% capacity and 2% were at 100% capacity.

Appendix A - Additional Graphs

Car Movements by Site and Period

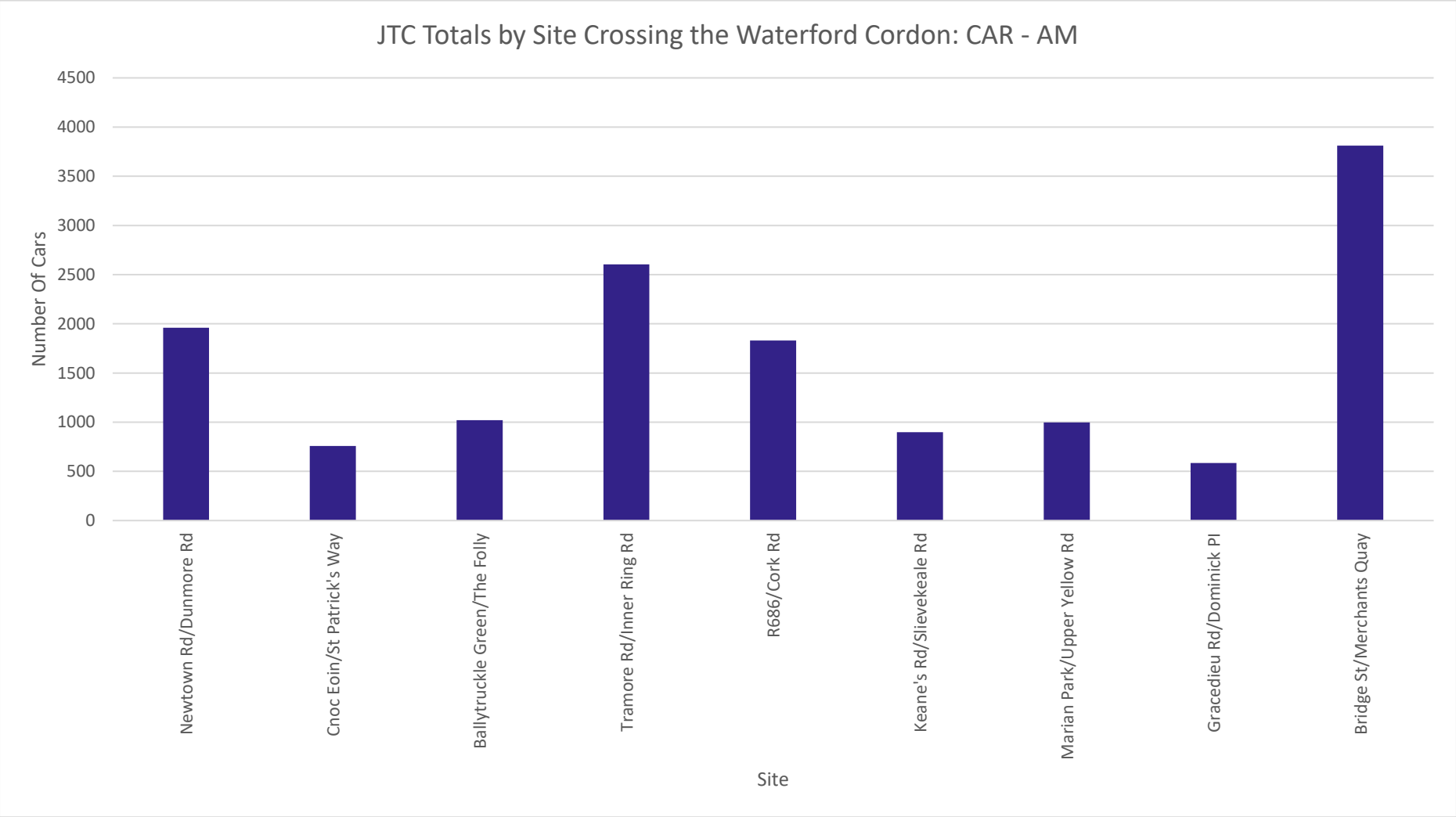


Figure A-1:Number of Car Journeys for JTC Surveys for AM per Site

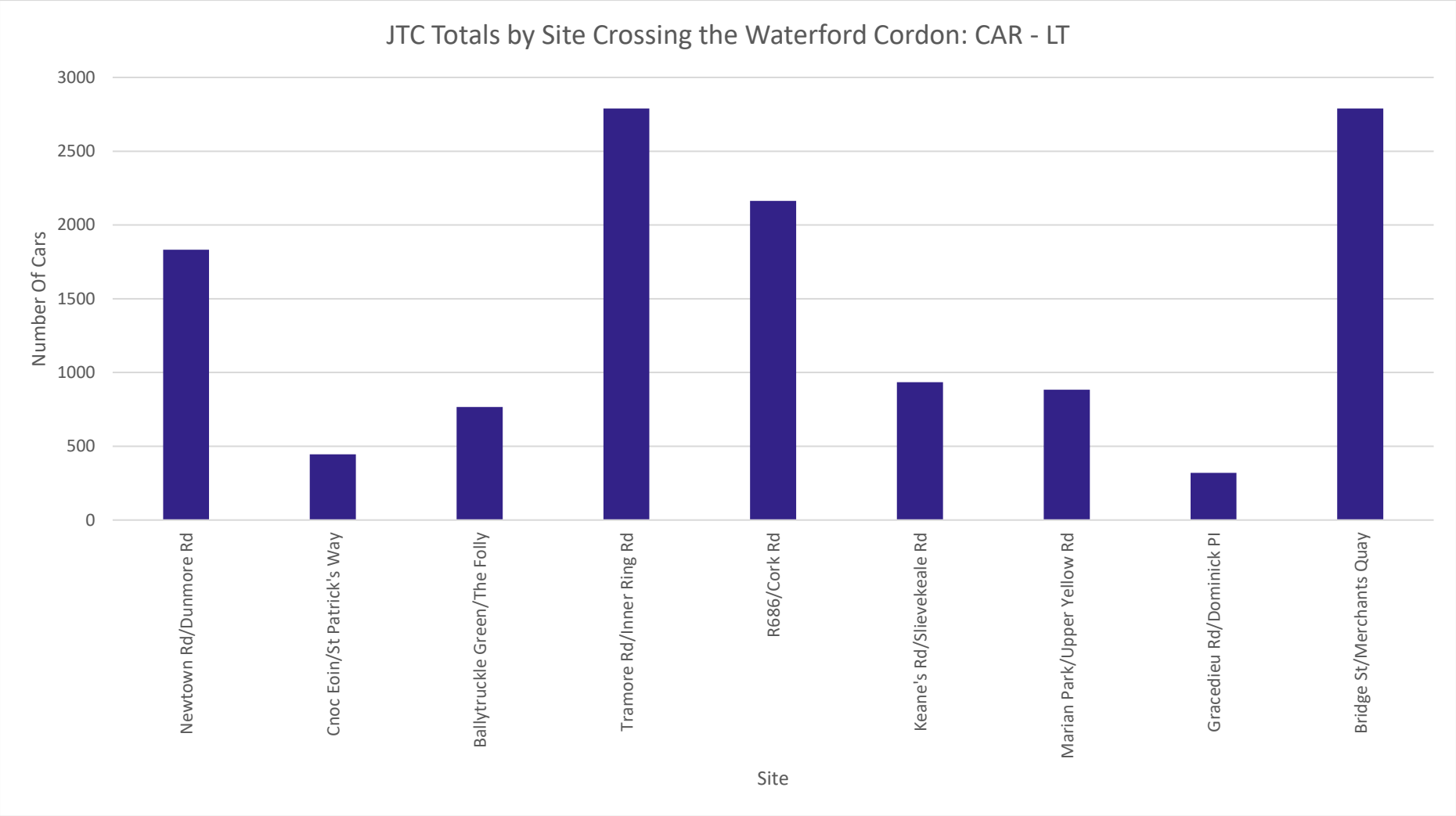


Figure A-2:Number of Car Journeys for JTC Surveys for LT per Site

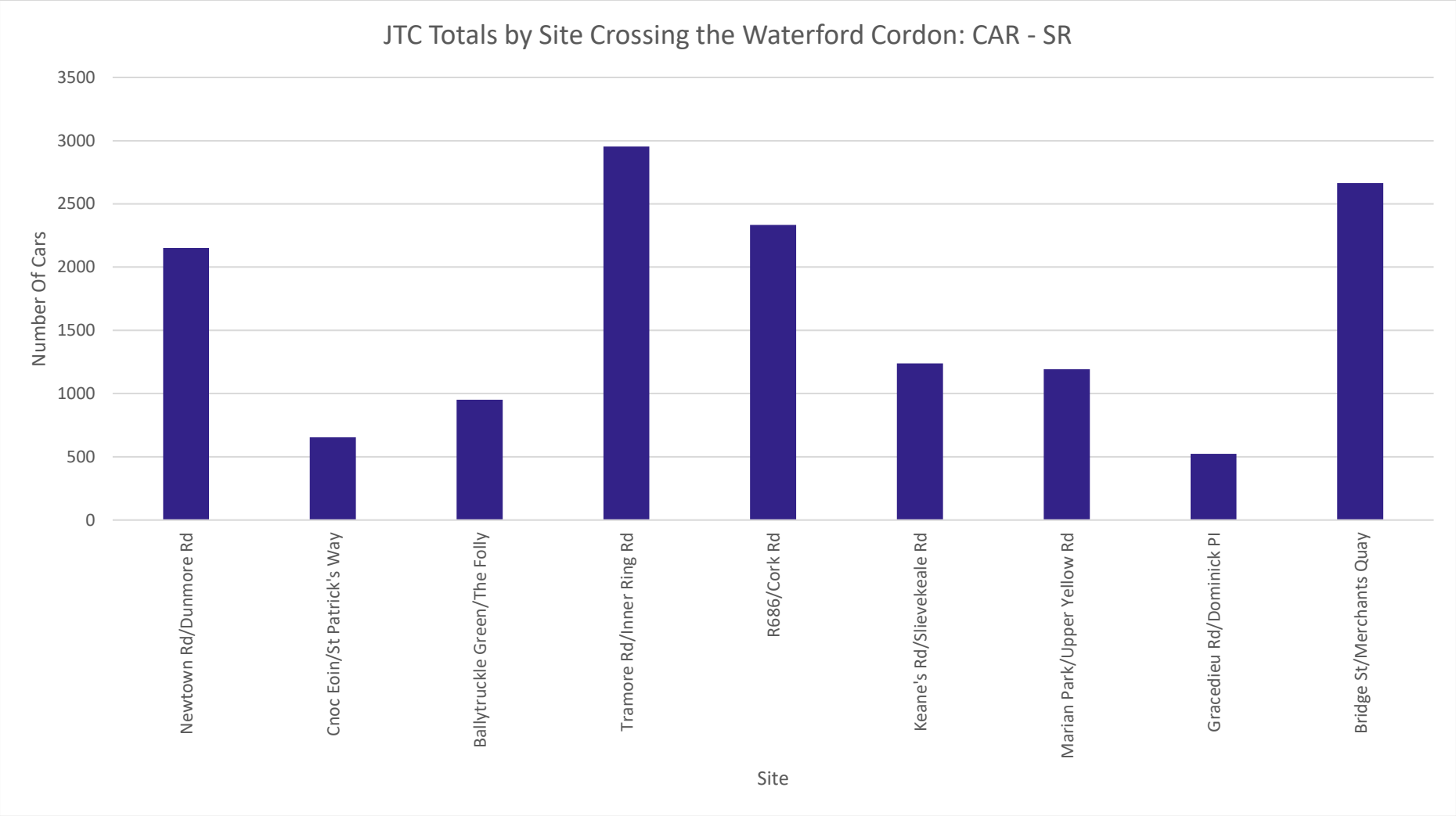


Figure A-3:Number of Car Journeys for JTC Surveys for SR per Site

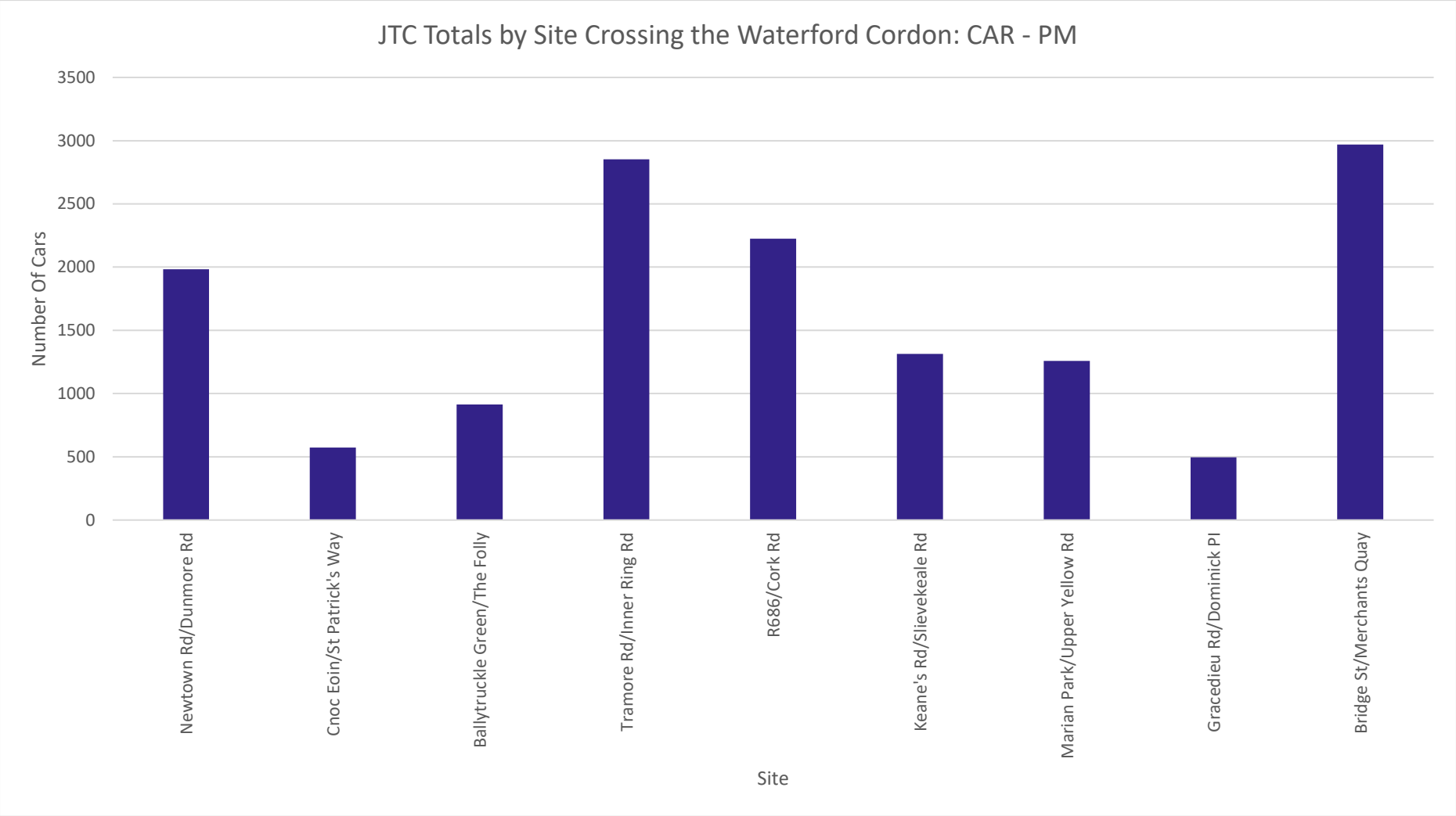


Figure A-4:Number of Car Journeys for JTC Surveys for PM per Site

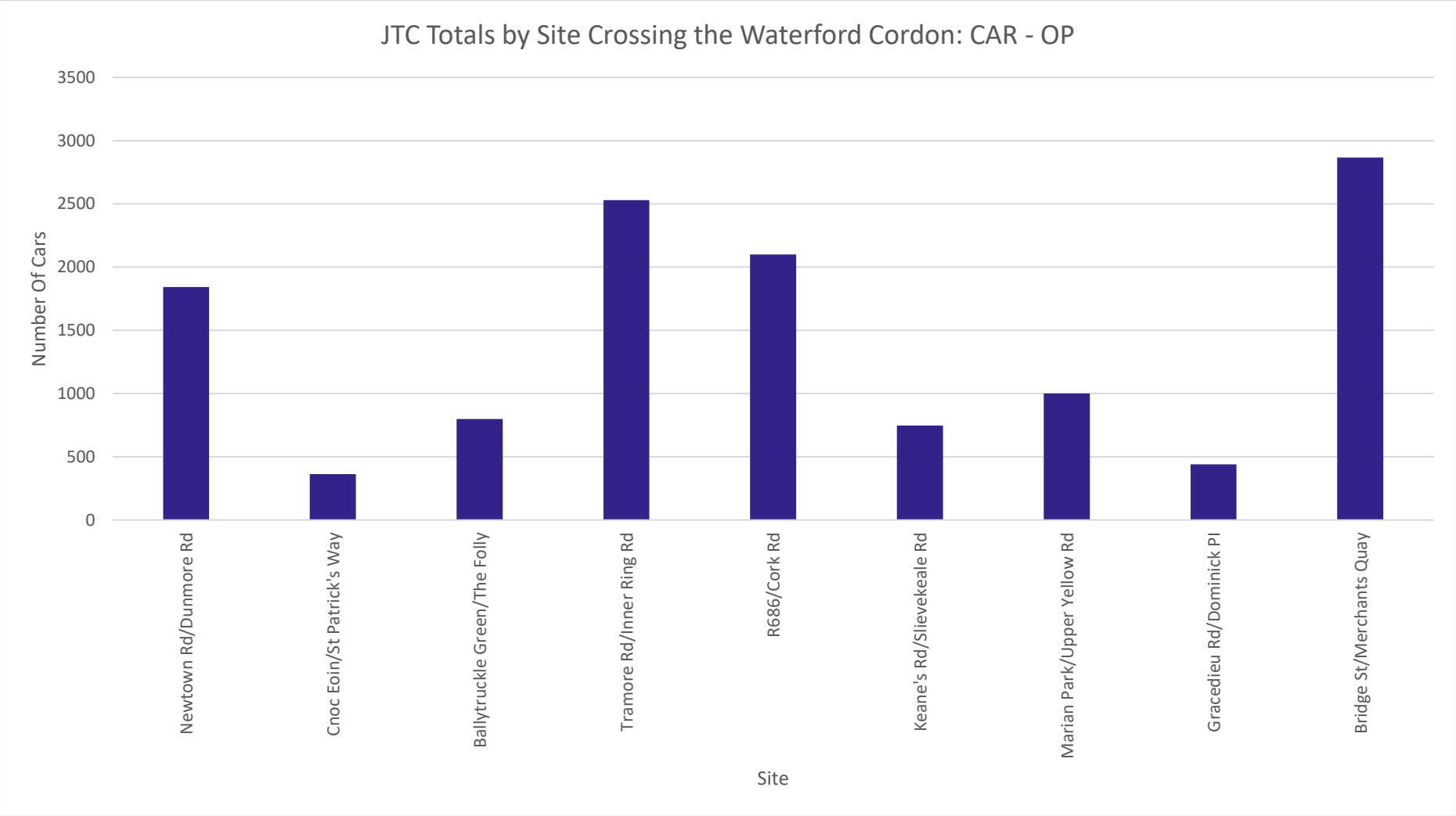


Figure A-5:Number of Car Journeys for JTC Surveys for OP per Site

Light Goods Vehicle Movements by Site and Period

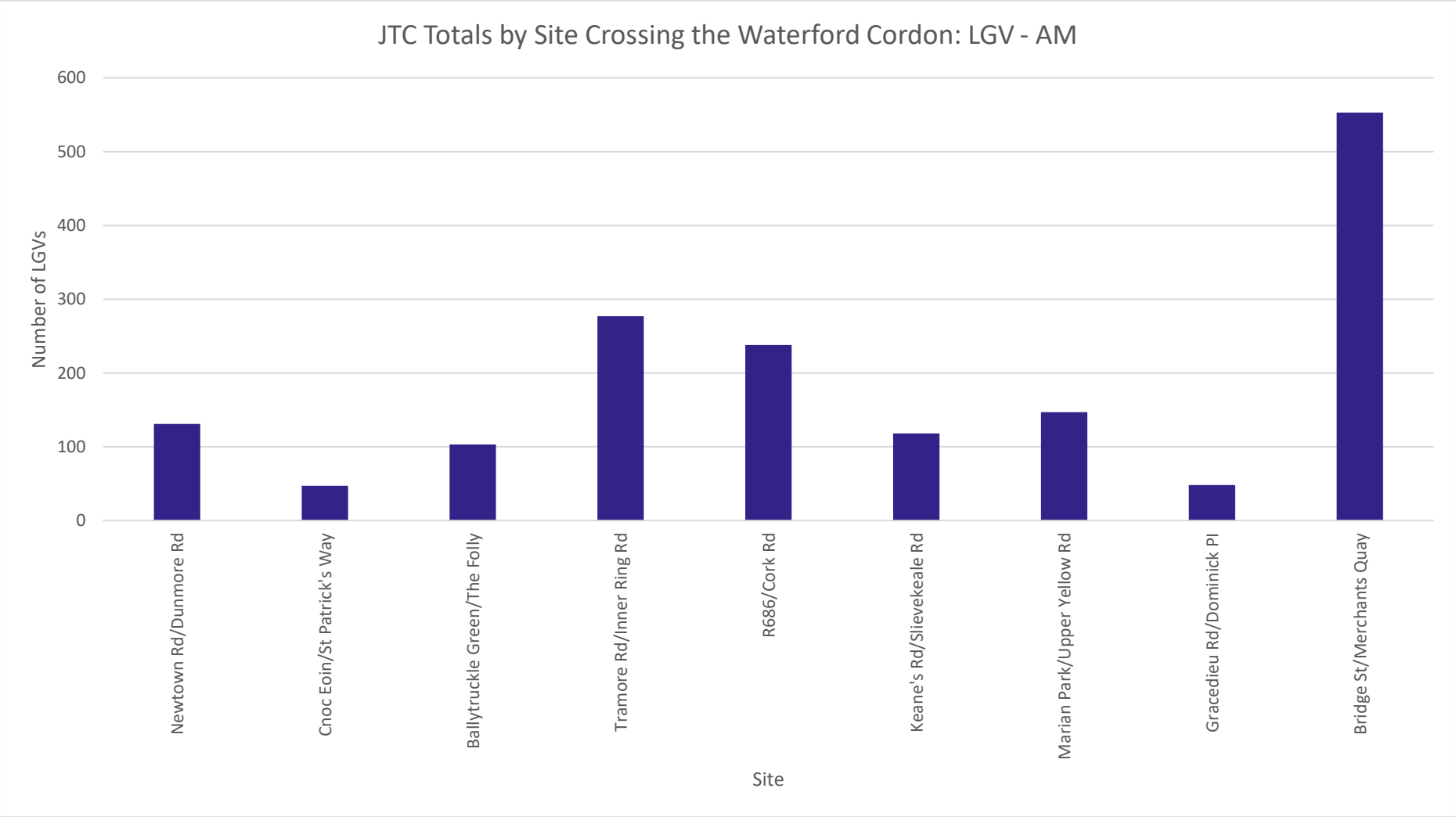


Figure A-6:Number of Light Goods Vehicle Journeys for JTC Surveys for AM per Site

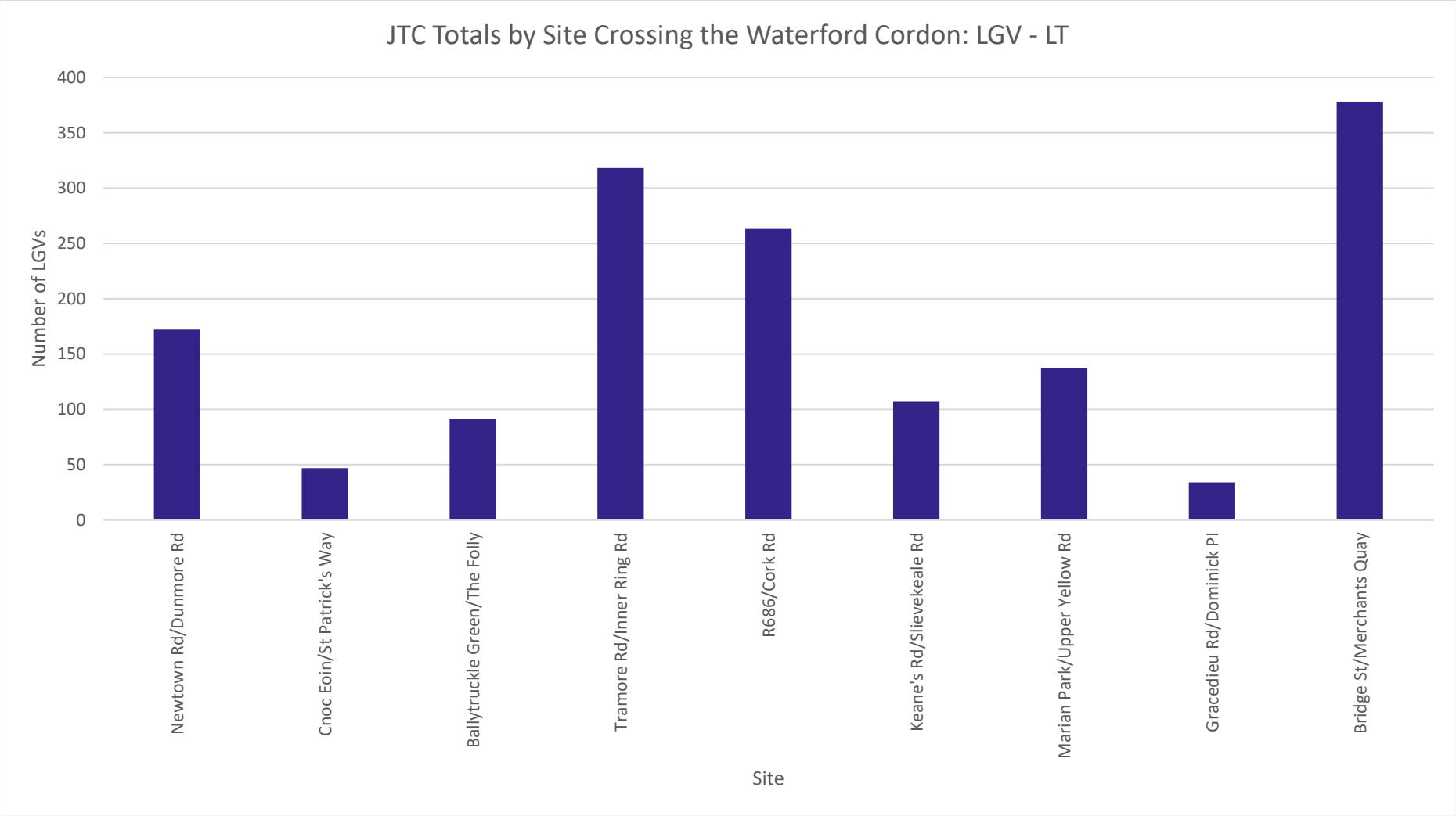


Figure A-7: Number of Light Goods Vehicle Journeys for JTC Surveys for LT per Site

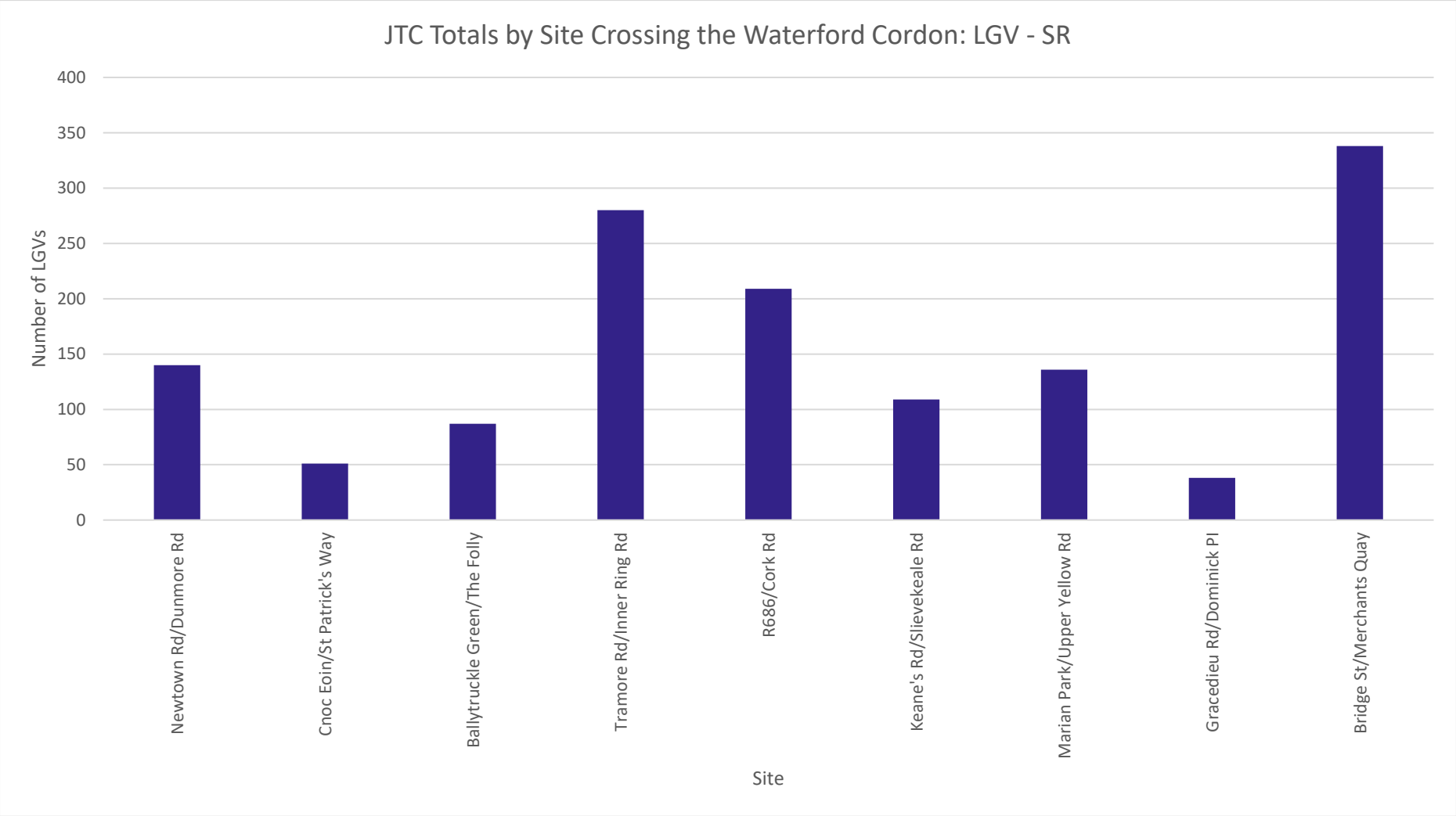


Figure A-8: Number of Light Goods Vehicle Journeys for JTC Surveys for SR per Site

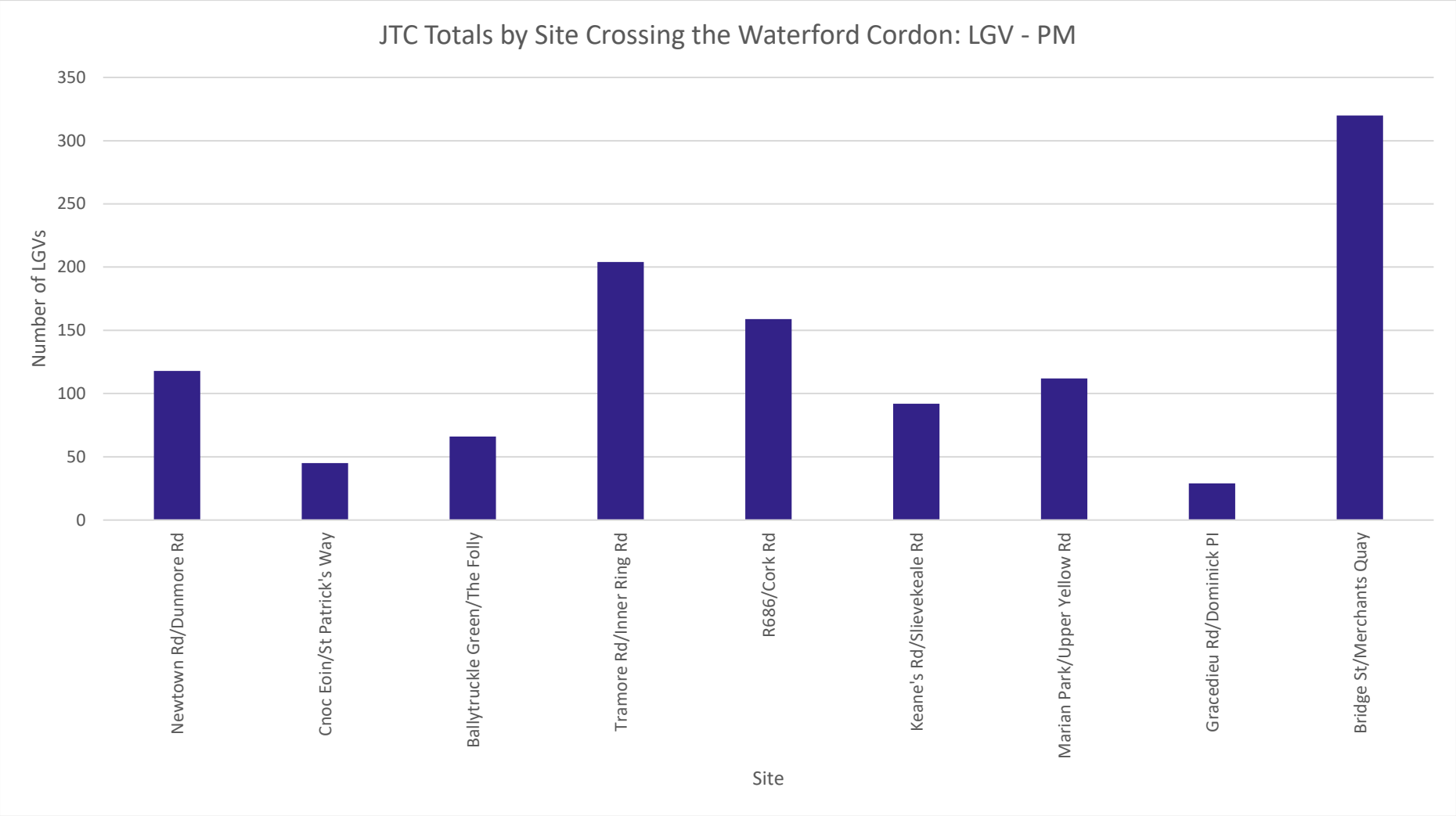


Figure A-9: Number of Light Goods Vehicle Journeys for JTC Surveys for PM per Site

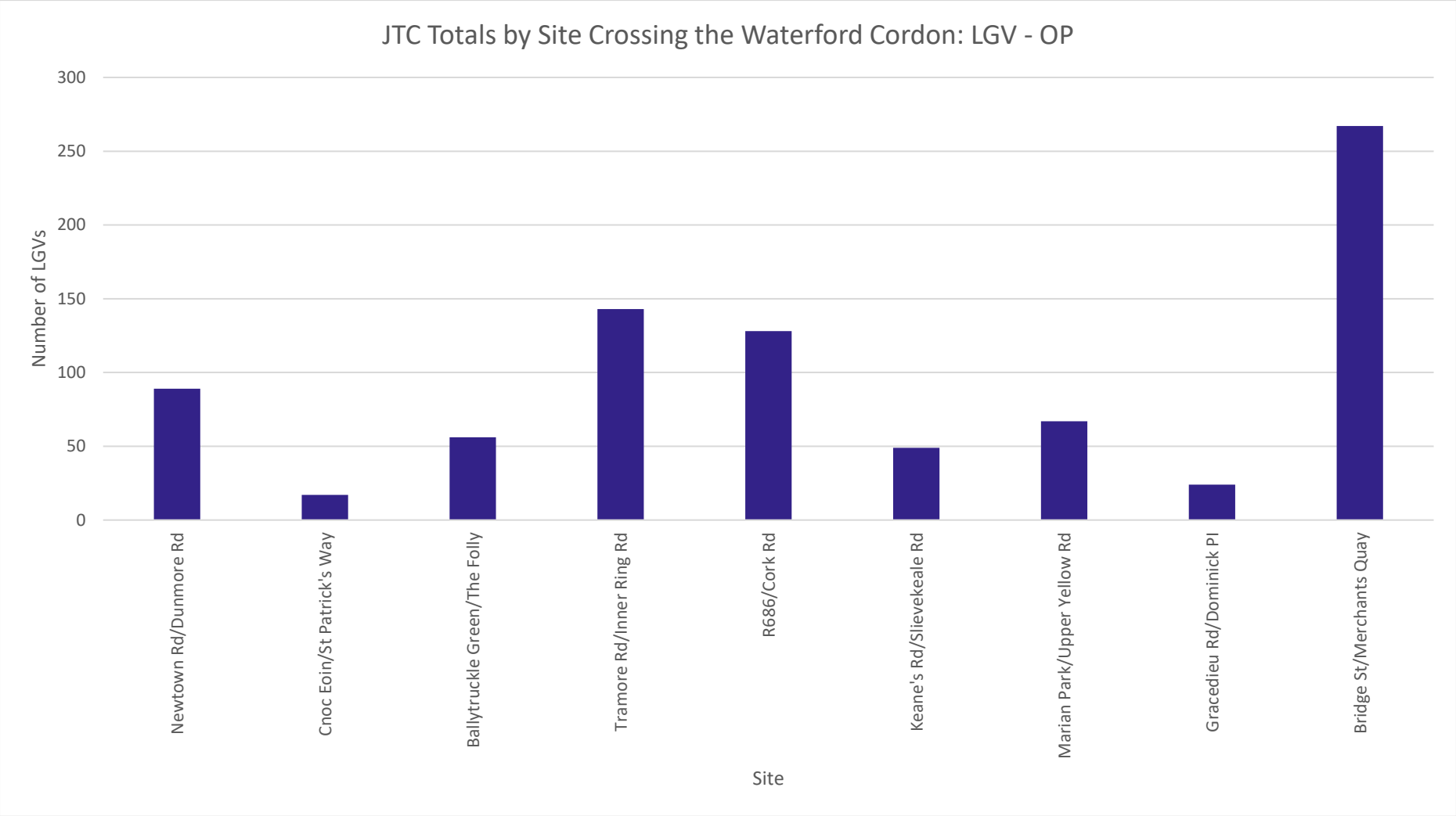


Figure A-10: Number of Light Goods Vehicle Journeys for JTC Surveys for OP per Site

Ordinary Goods Vehicle 1 Movements by Site and Period

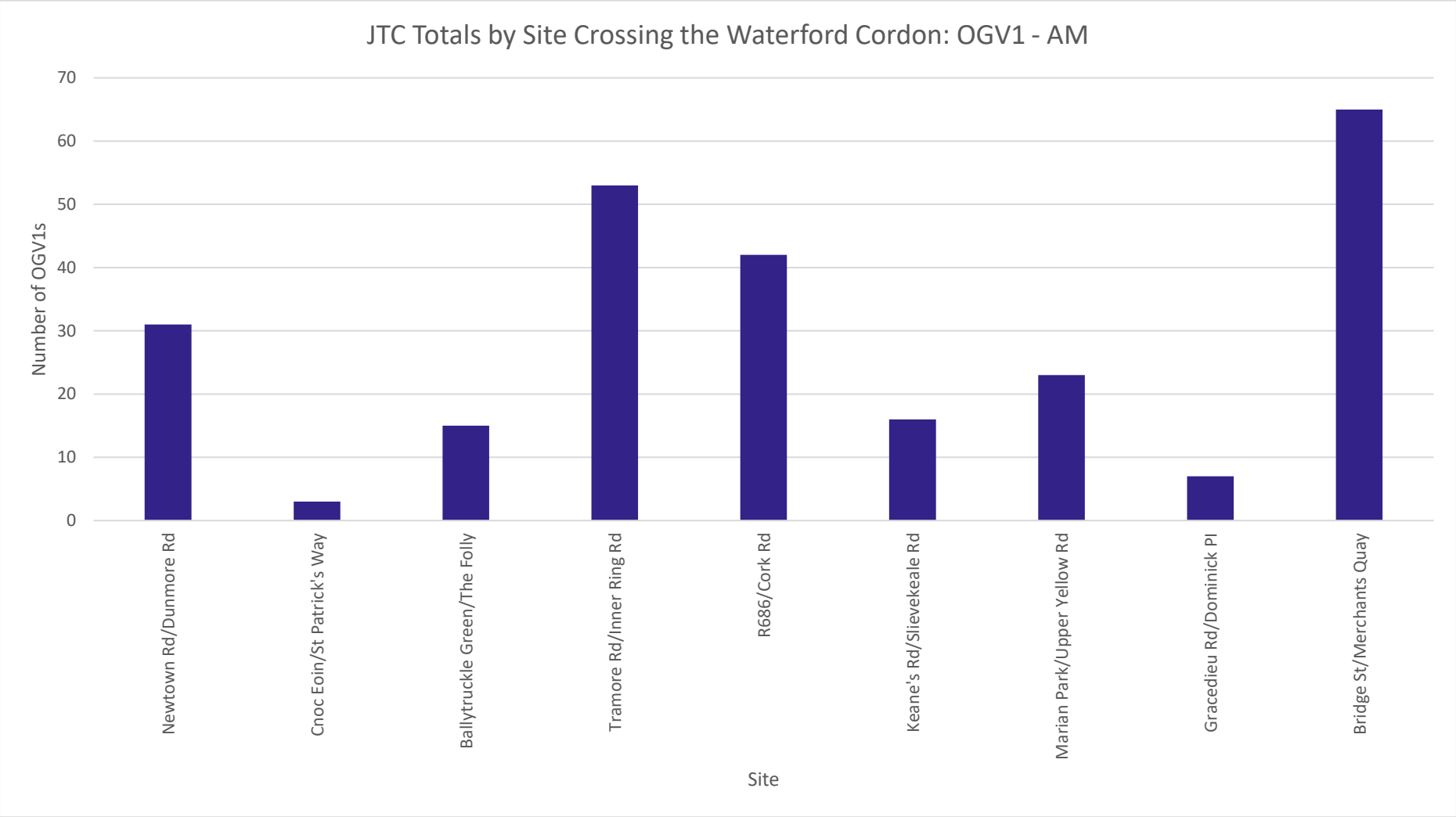


Figure A-11: Number of Ordinary Goods Vehicle 1 Journeys for JTC Surveys for AM per Site

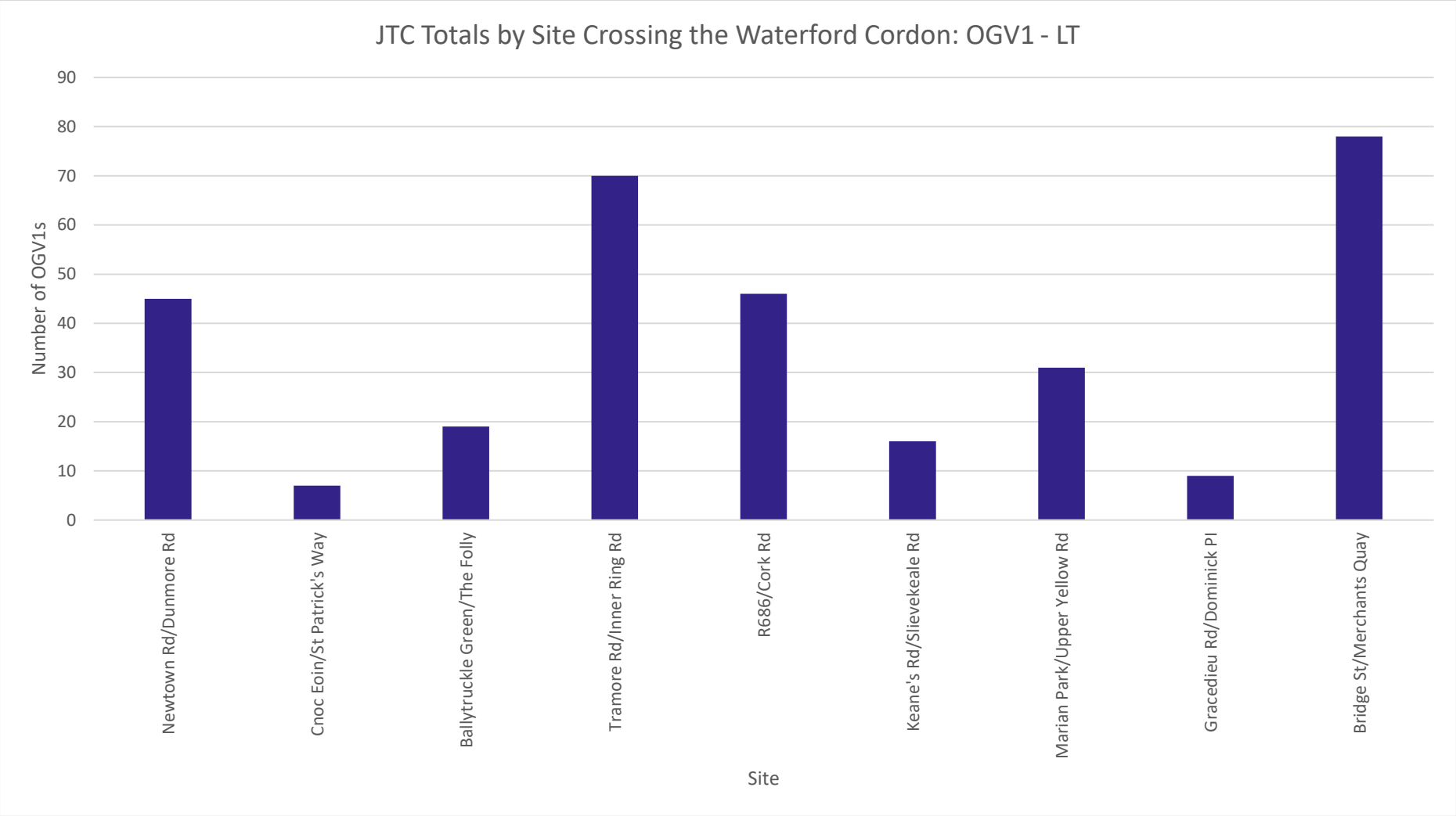


Figure A-12: Number of Ordinary Goods Vehicle 1 Journeys for JTC Surveys for LT per Site

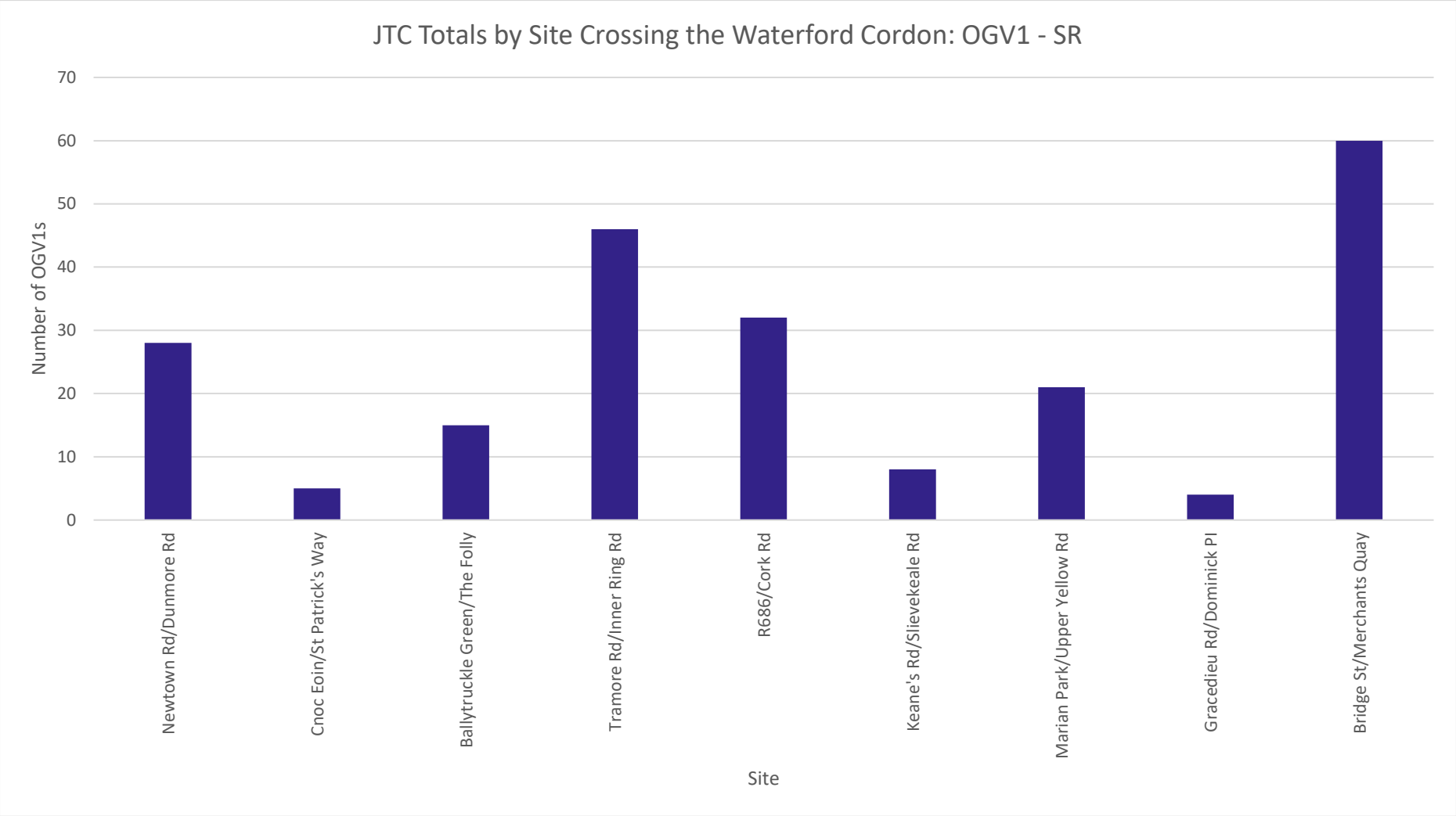


Figure A-13: Number of Ordinary Goods Vehicle 1 Journeys for JTC Surveys for SR per Site

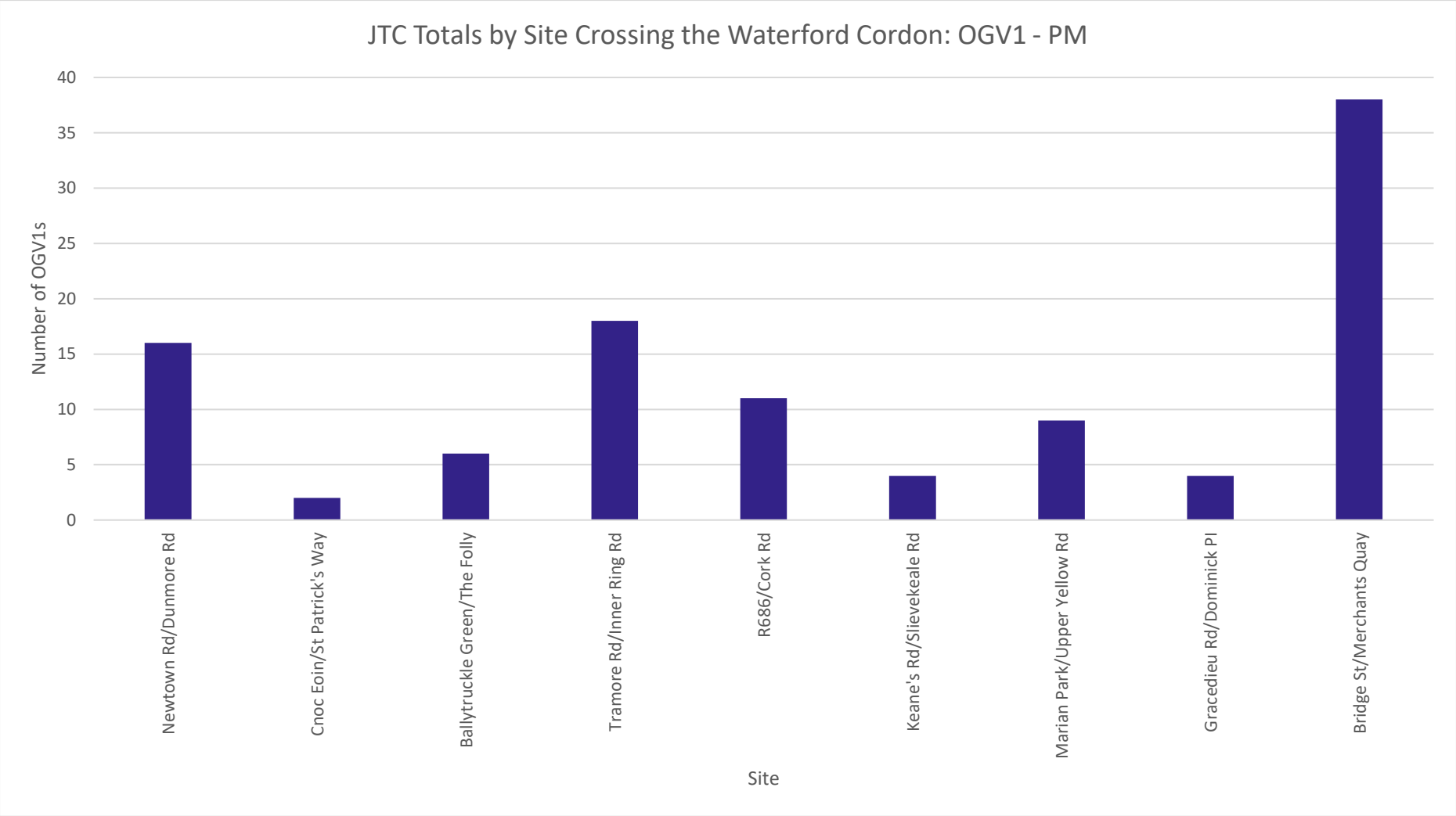


Figure A-14: Number of Ordinary Goods Vehicle 1 Journeys for JTC Surveys for PM per Site

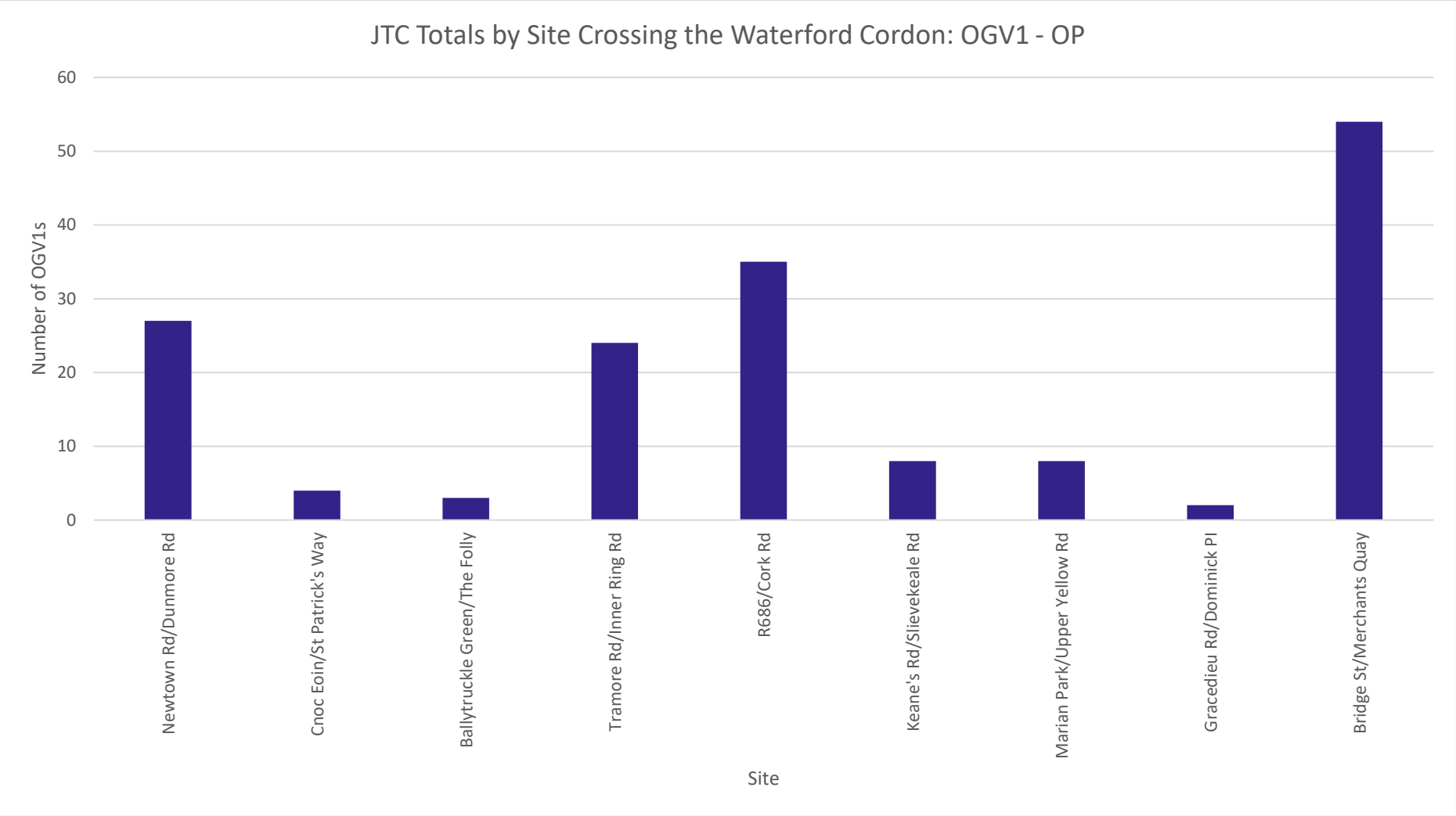


Figure A-15: Number of Ordinary Goods Vehicle 1 Journeys for JTC Surveys for OP per Site

Ordinary Goods Vehicle 2 Movements by Site and Period

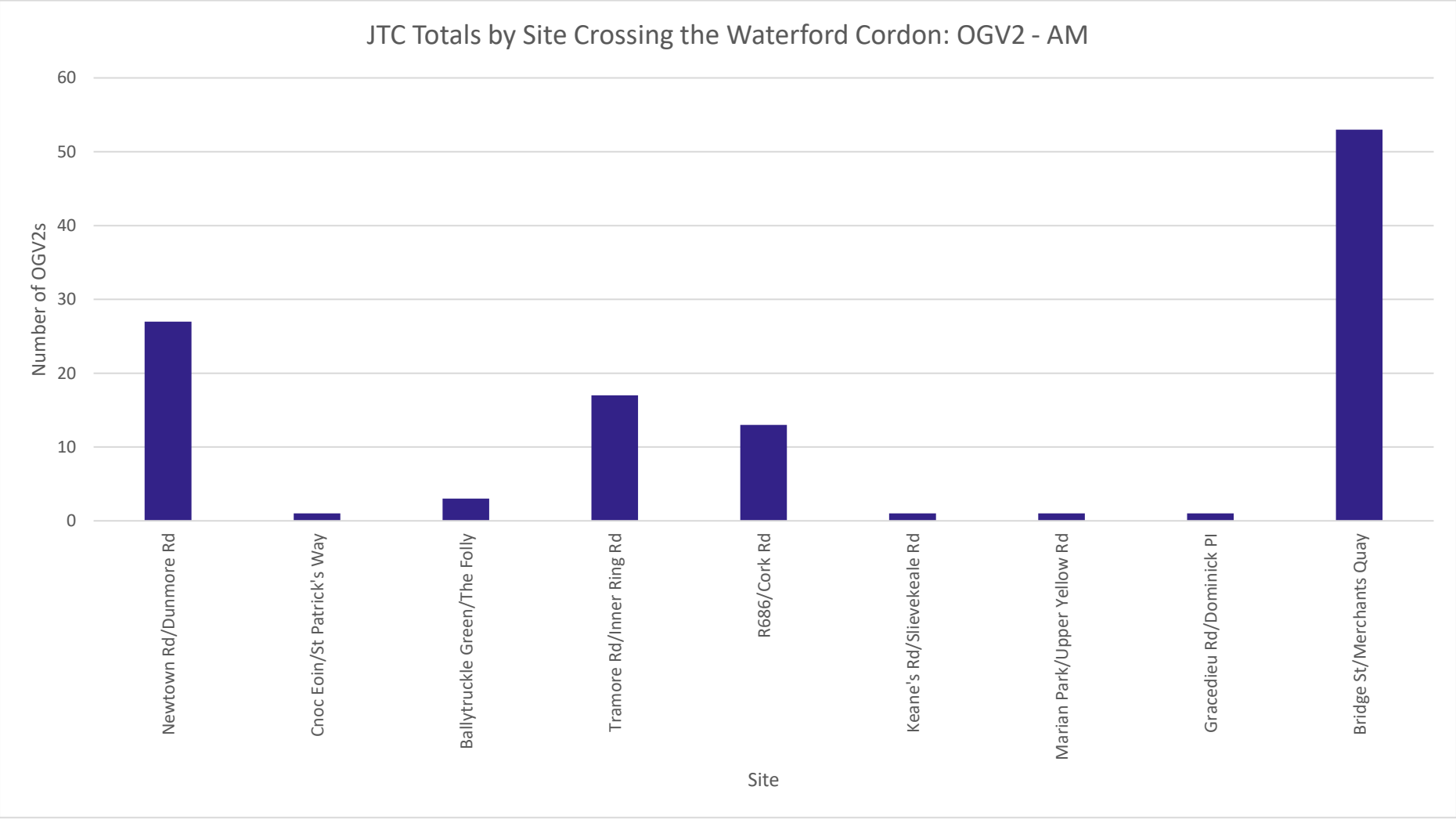


Figure A-16:Number of Ordinary Goods Vehicle 2 Journeys for JTC Surveys for AM per Site

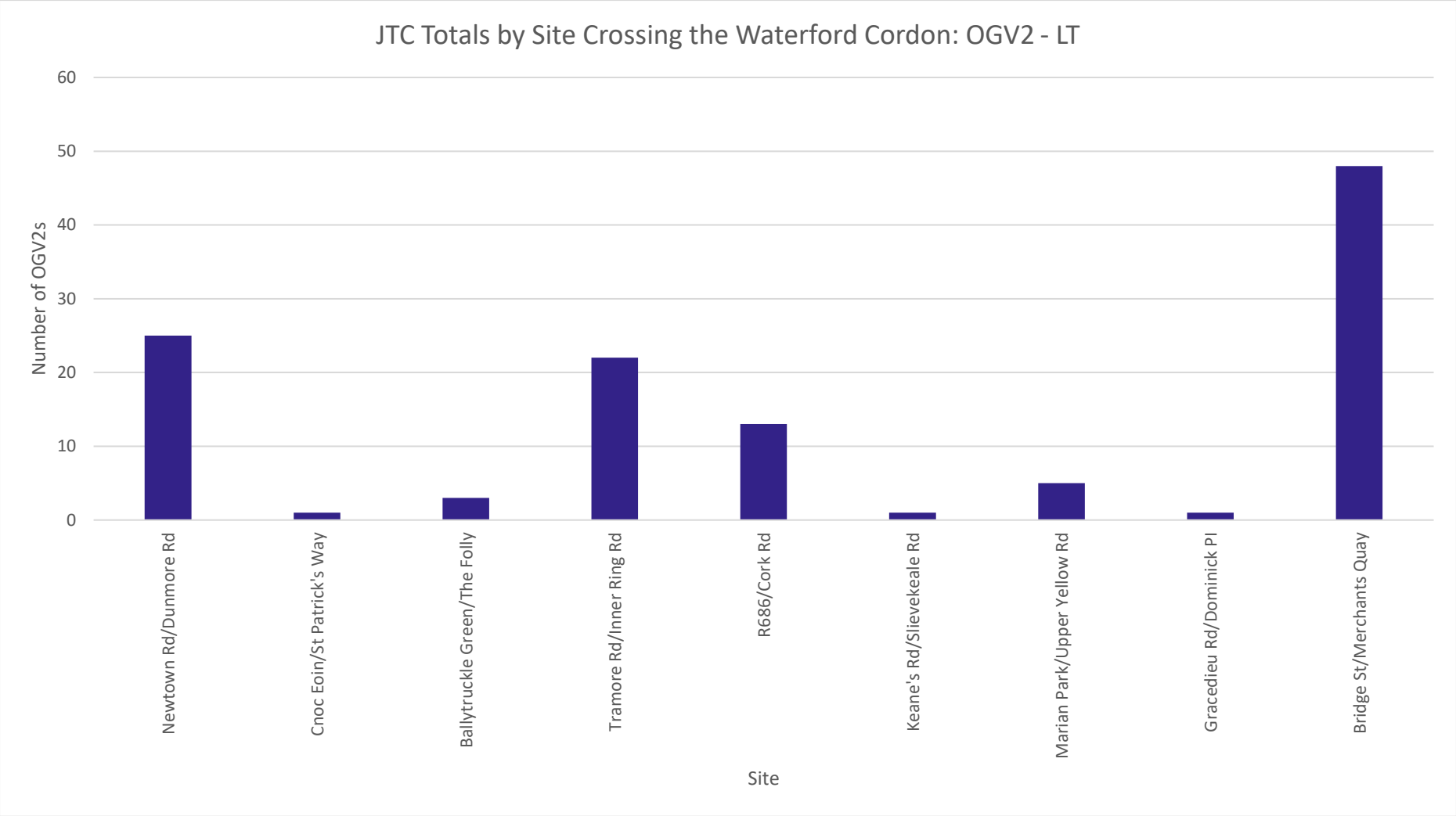


Figure A-17: Number of Ordinary Goods Vehicle 2 Journeys for JTC Surveys for LT per Site

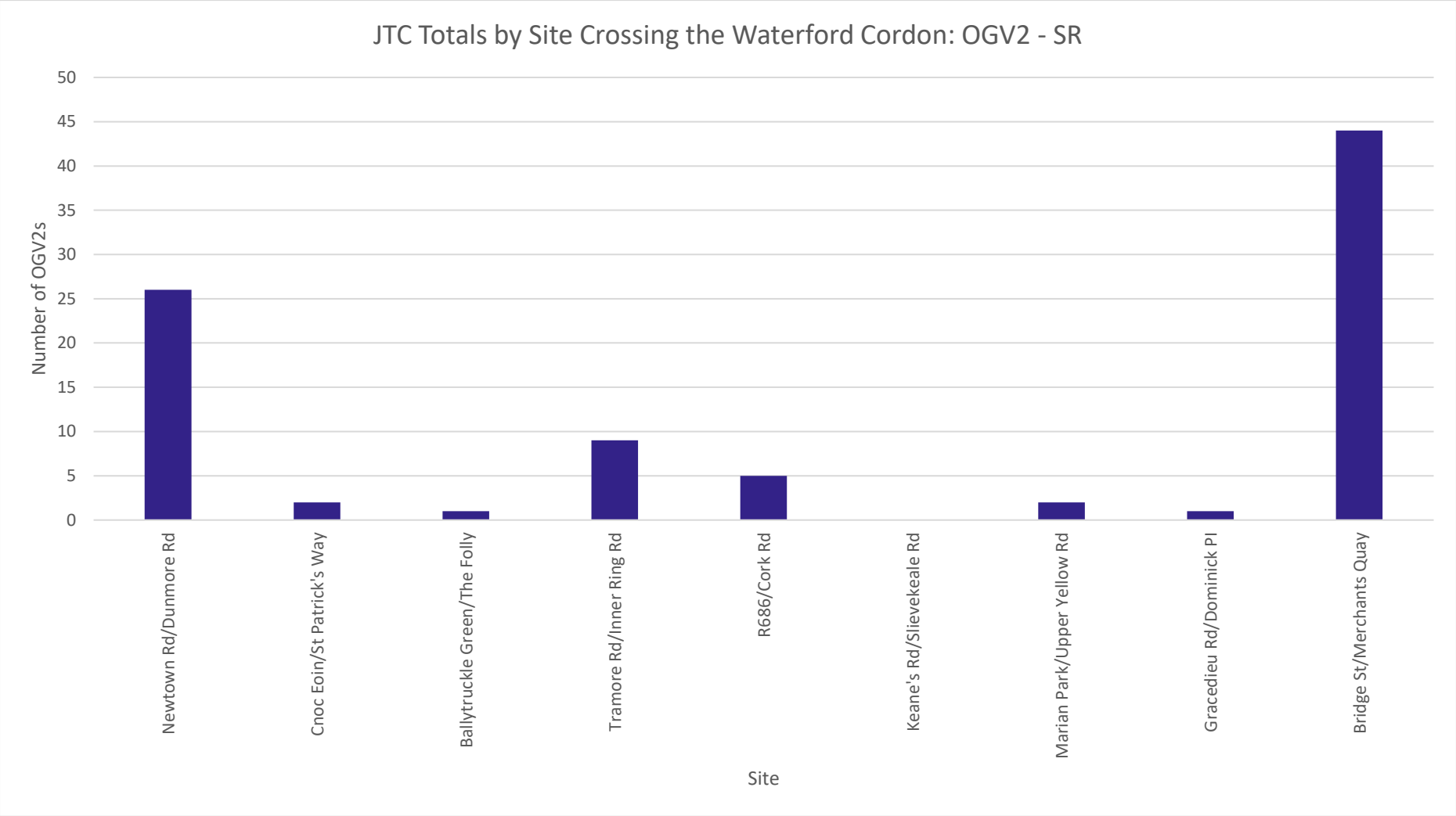


Figure A-18: Number of Ordinary Goods Vehicle 2 Journeys for JTC Surveys for SR per Site

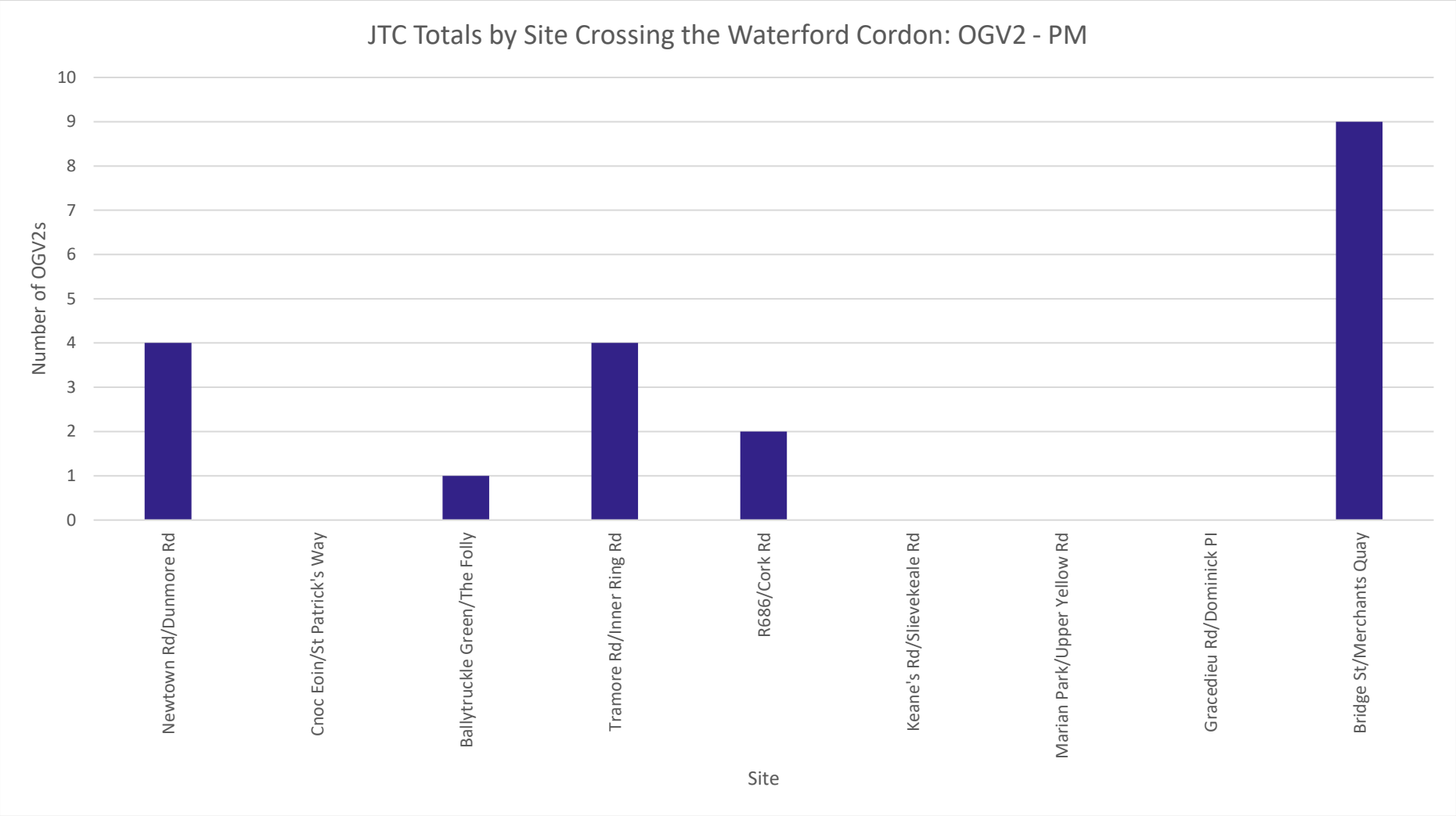


Figure A-19: Number of Ordinary Goods Vehicle 2 Journeys for JTC Surveys for PM per Site

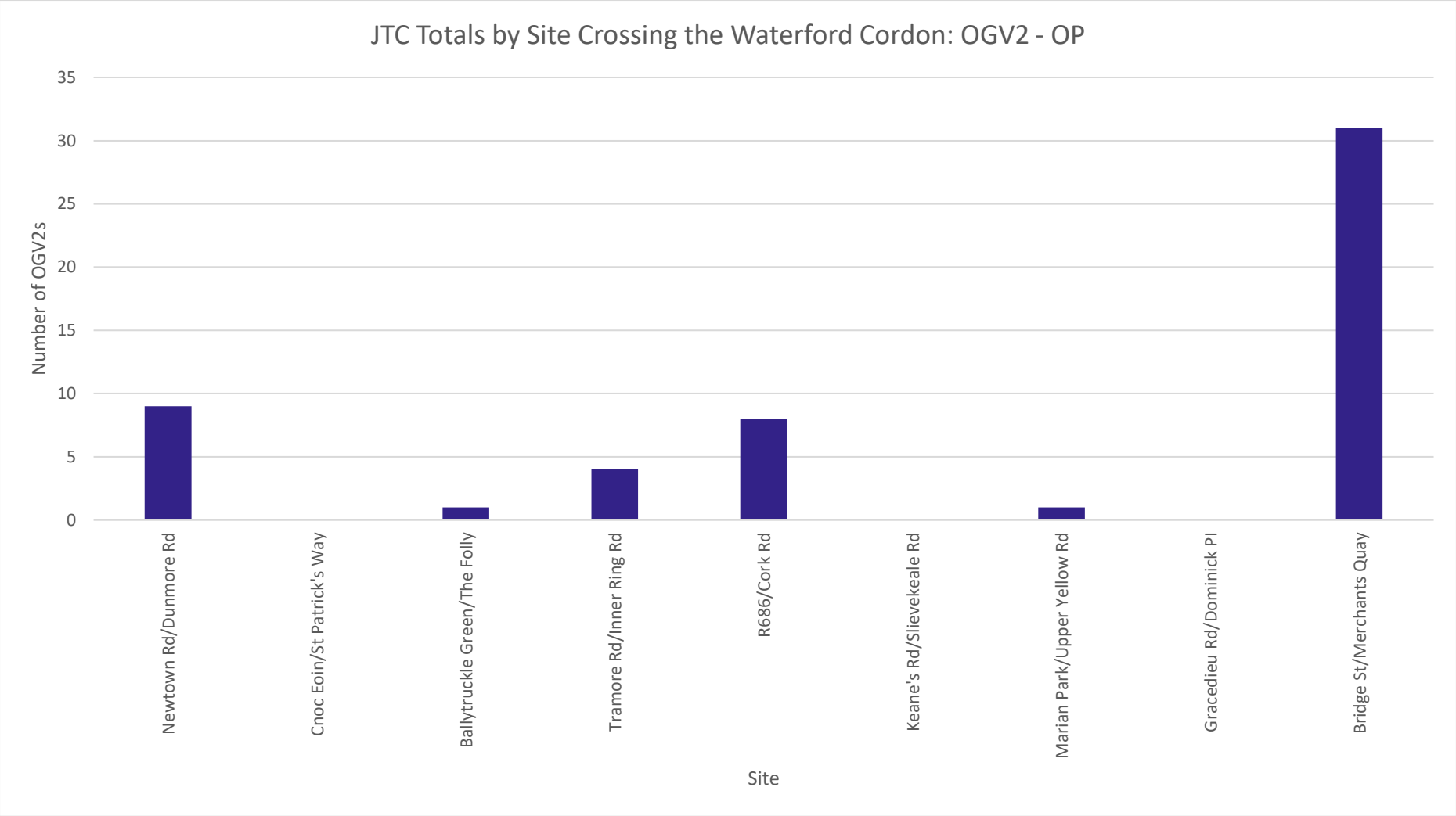


Figure A-20:Number of Ordinary Goods Vehicle 2 Journeys for JTC Surveys for OP per Site

Motorcycle Movements by Site and Period

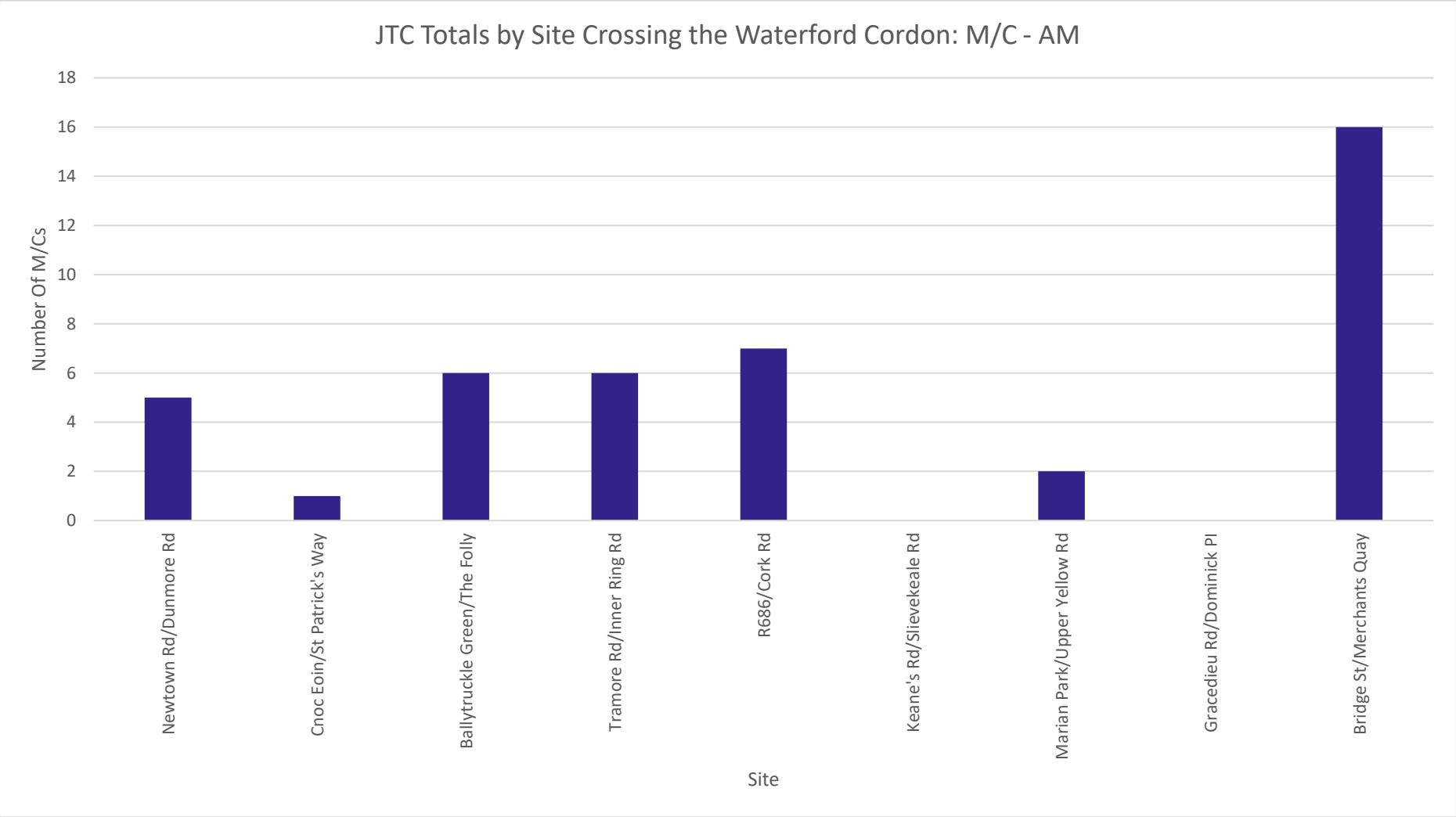


Figure A-21: Number of Motorcycle Journeys for JTC Surveys for AM per Site

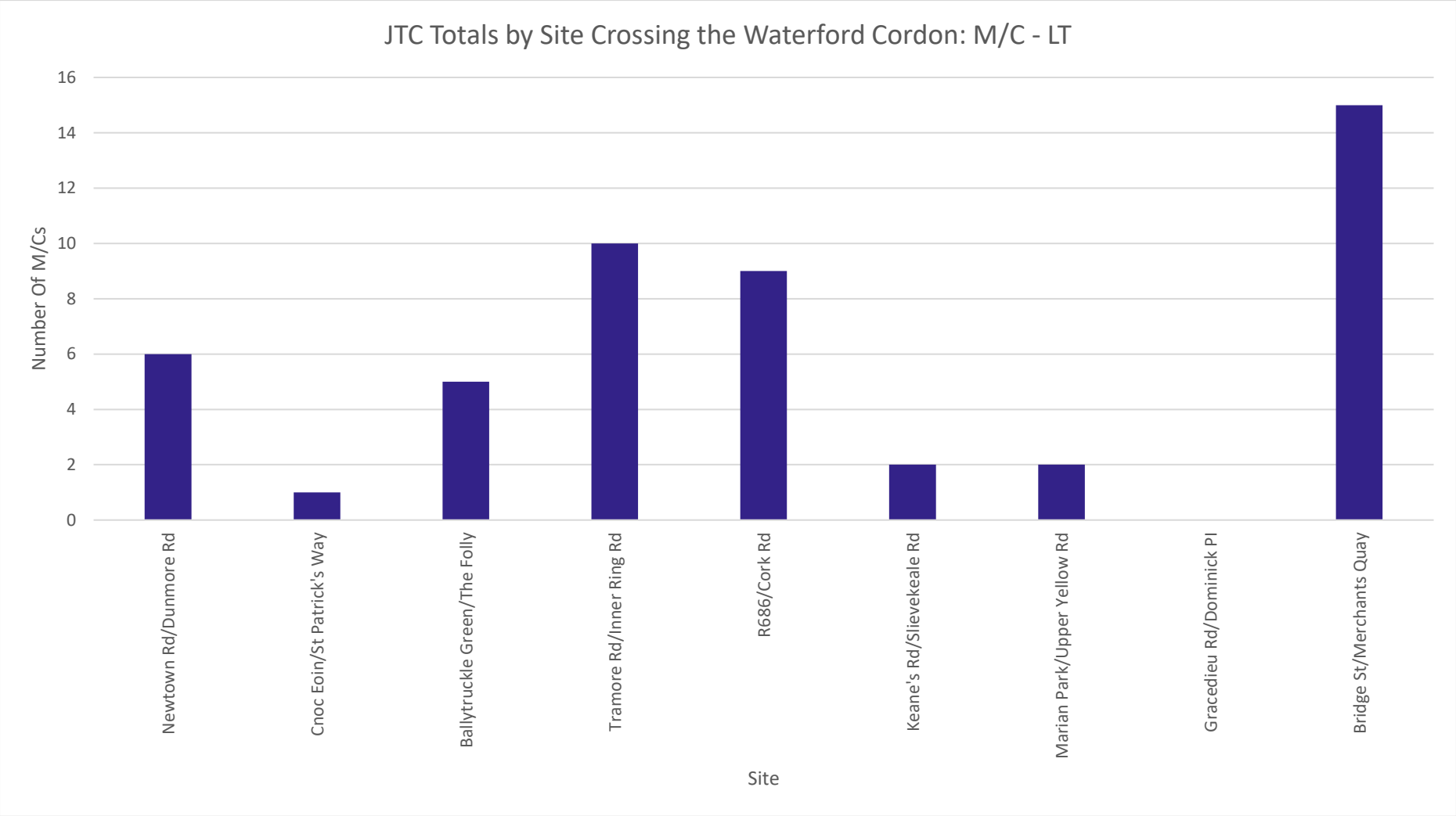


Figure A-22: Number of Motorcycle Journeys for JTC Surveys for LT per Site

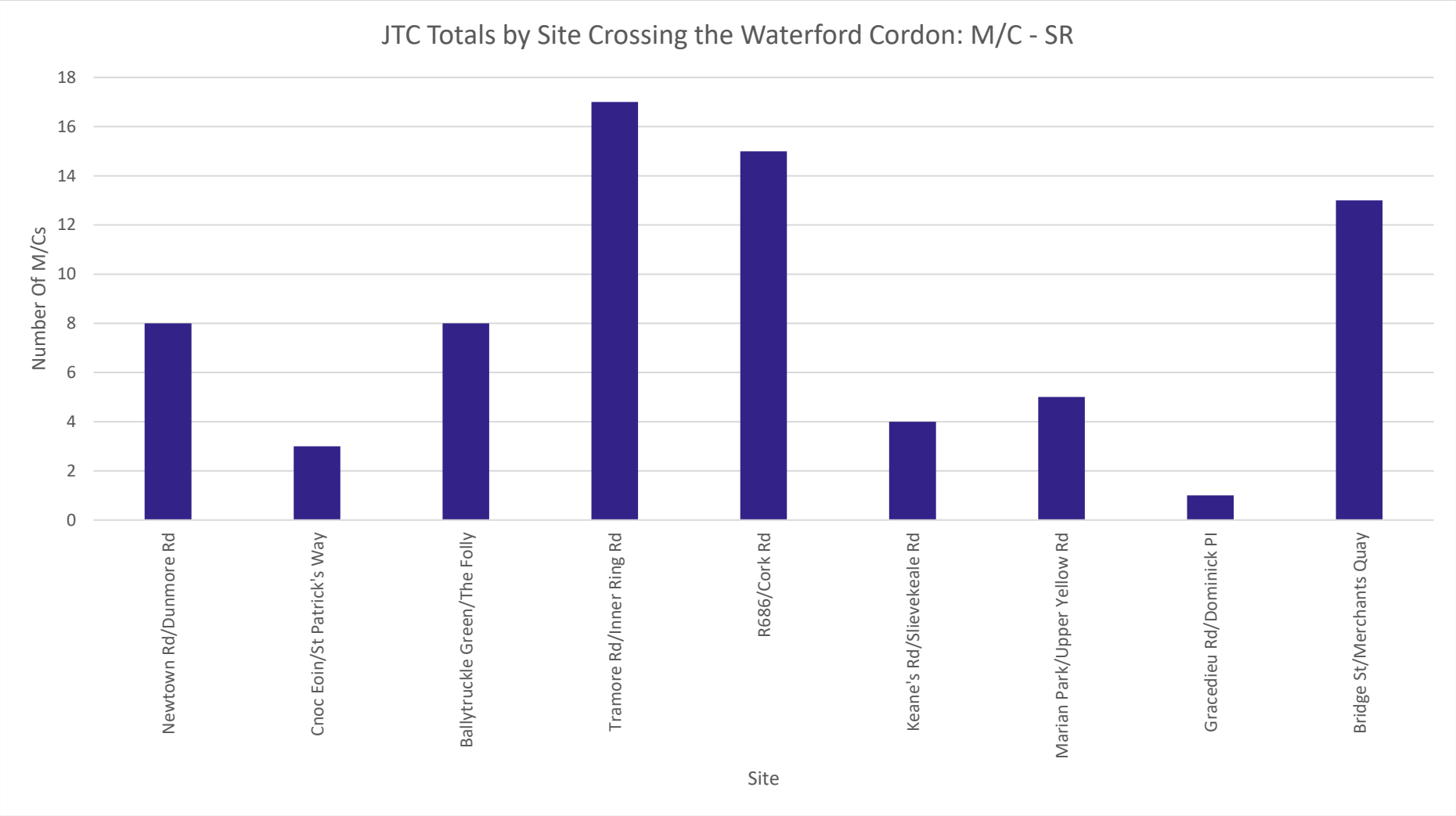


Figure A-23: Number of Motorcycle Journeys for JTC Surveys for SR per Site

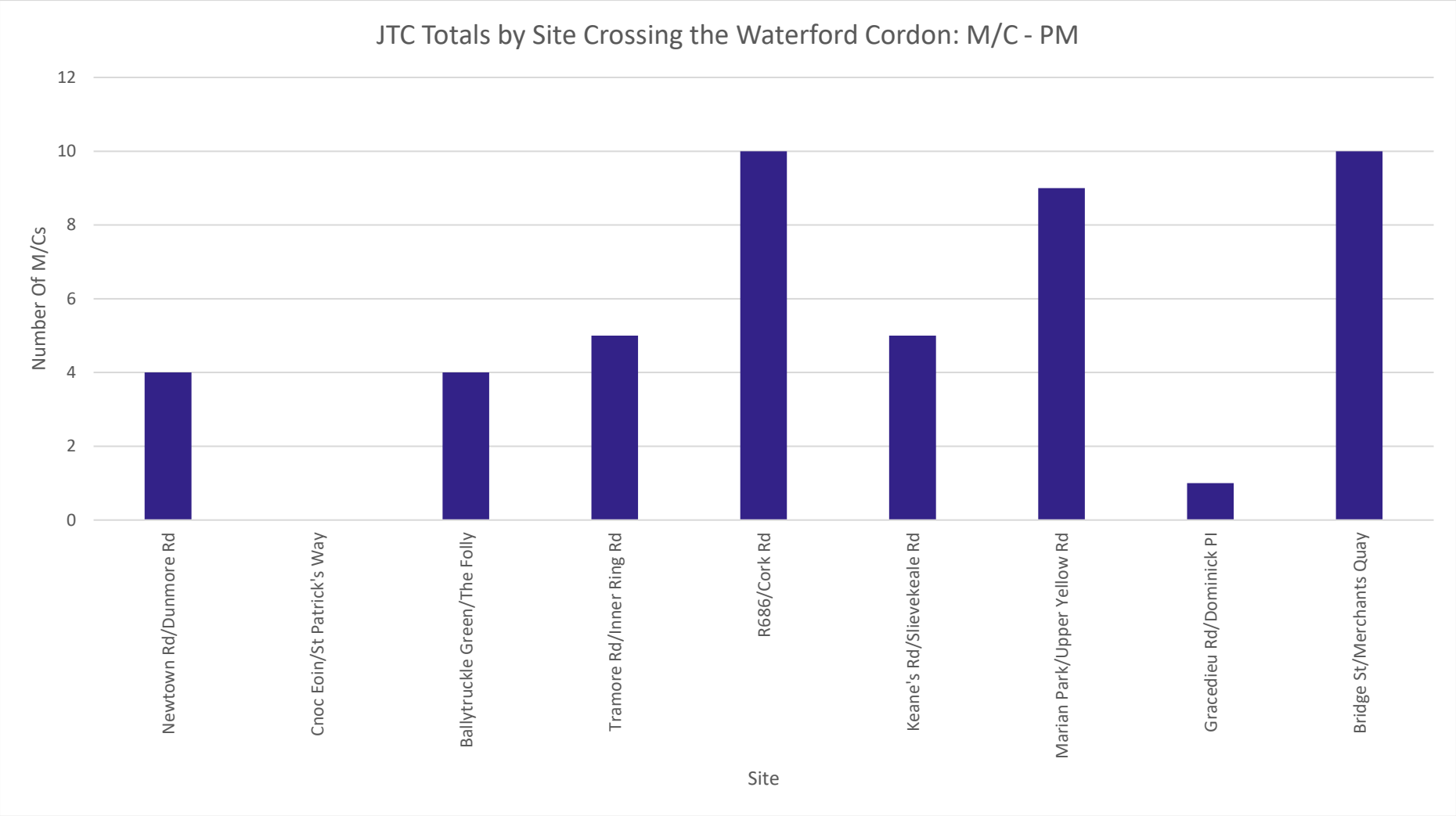


Figure A-24: Number of Motorcycle Journeys for JTC Surveys for PM per Site

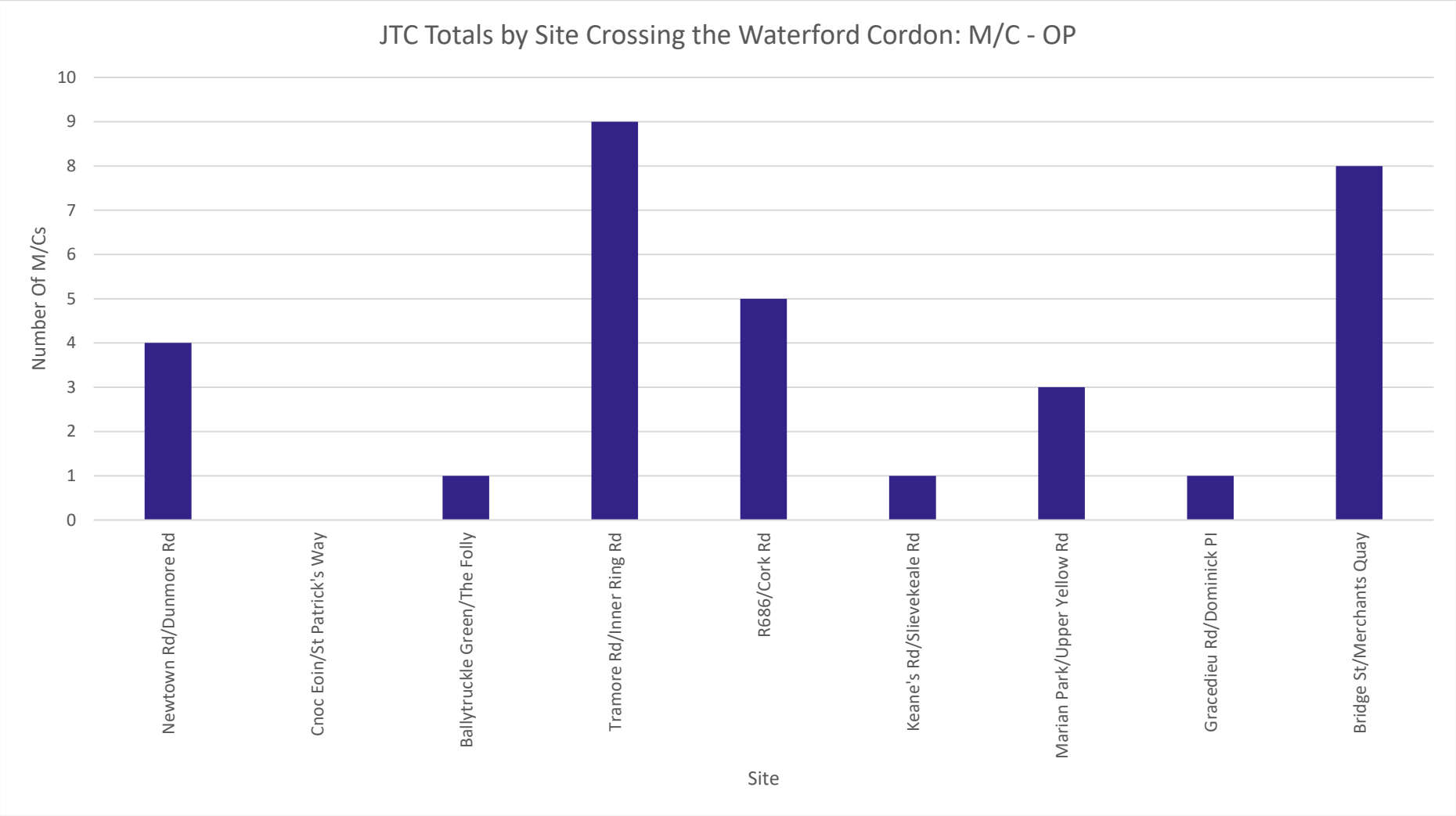


Figure A-25: Number of Motorcycle Journeys for JTC Surveys for OP per Site

Pedal Cycle Movements by Site and Period

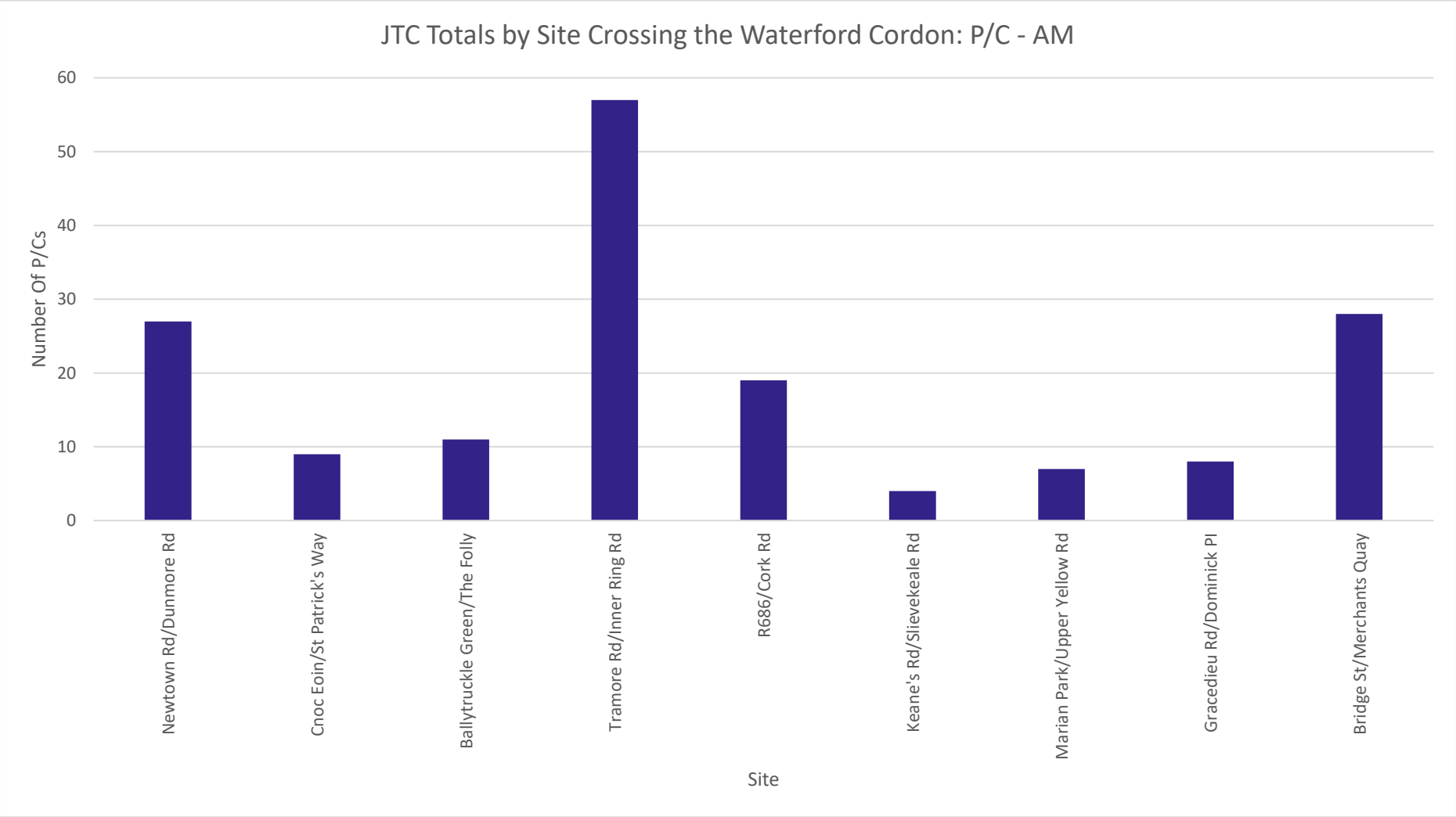


Figure A-26: Number of Pedal Cycle Journeys for JTC Surveys for AM per Site

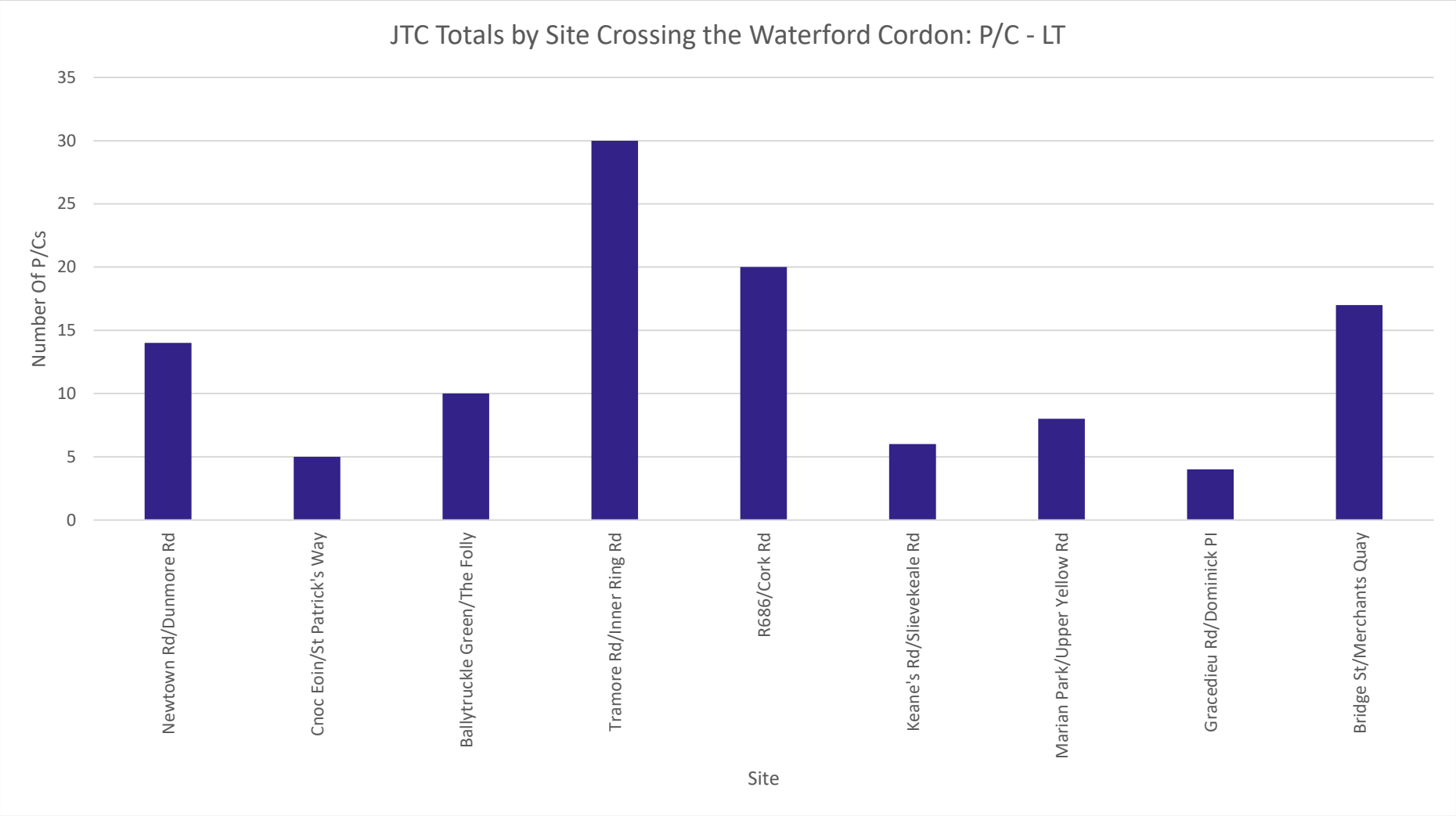


Figure A-27: Number of Pedal Cycle Journeys for JTC Surveys for LT per Site

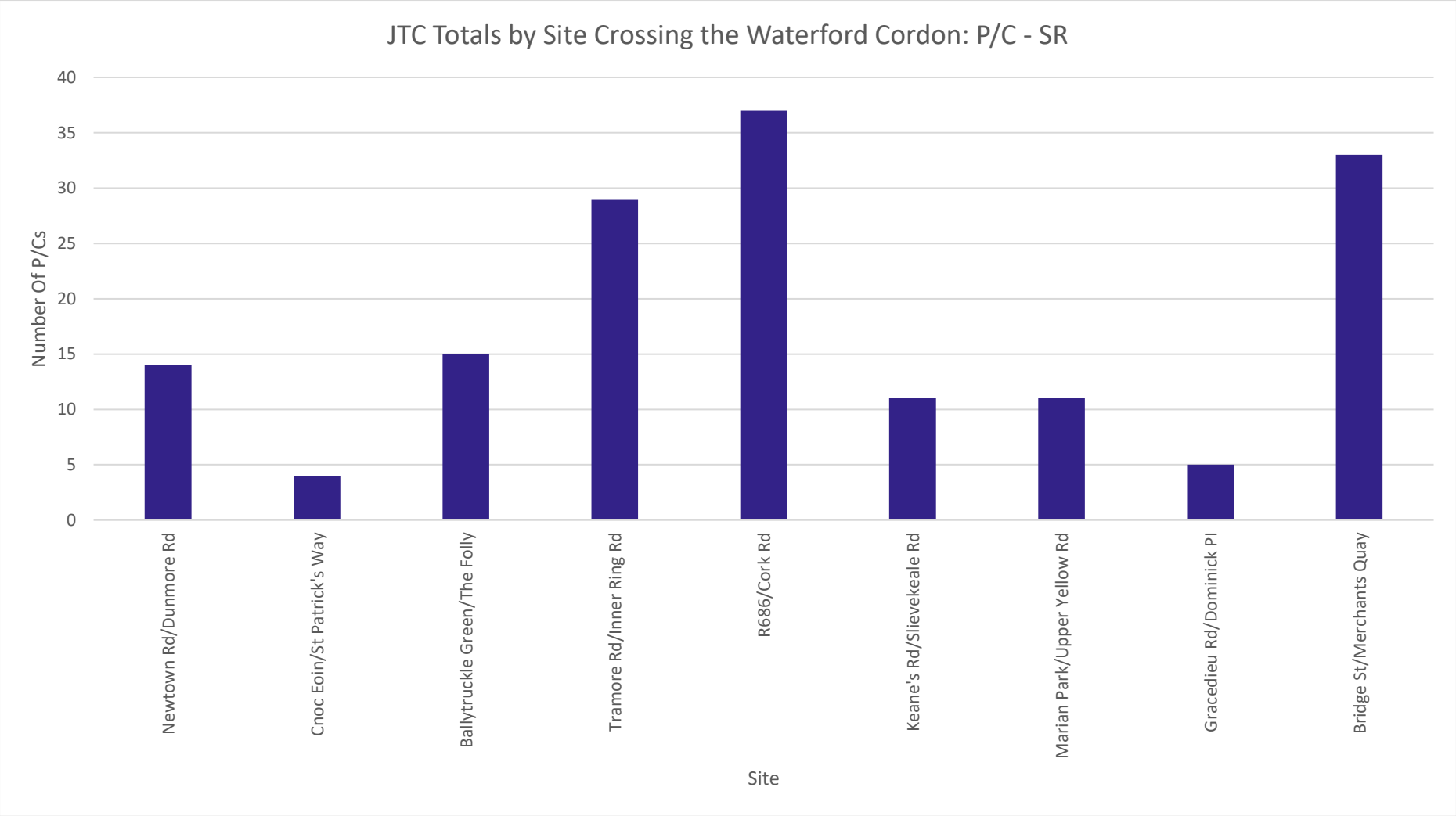


Figure A-28: Number of Pedal Cycle Journeys for JTC Surveys for SR per Site

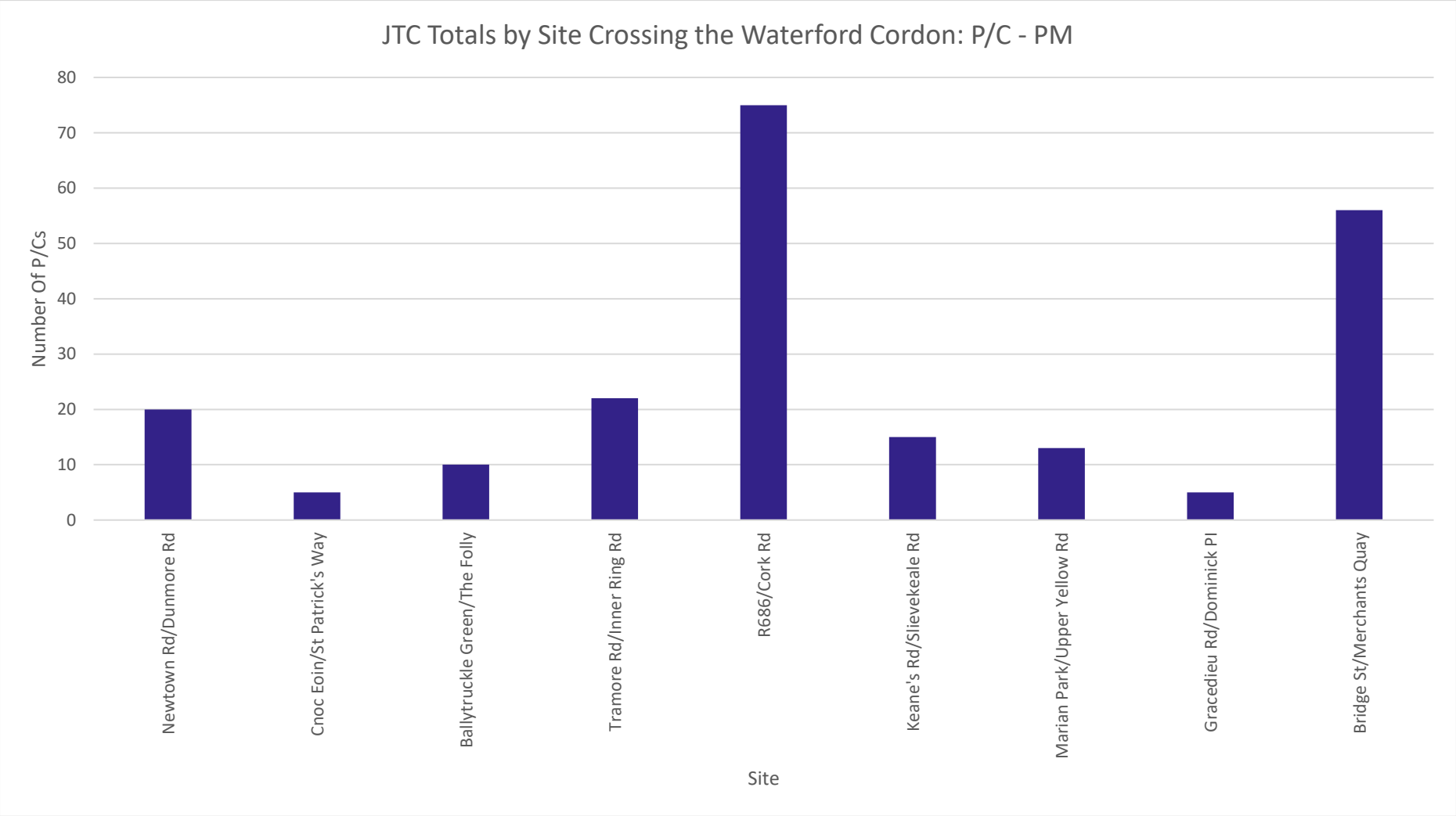


Figure A-29: Number of Pedal Cycle Journeys for JTC Surveys for PM per Site

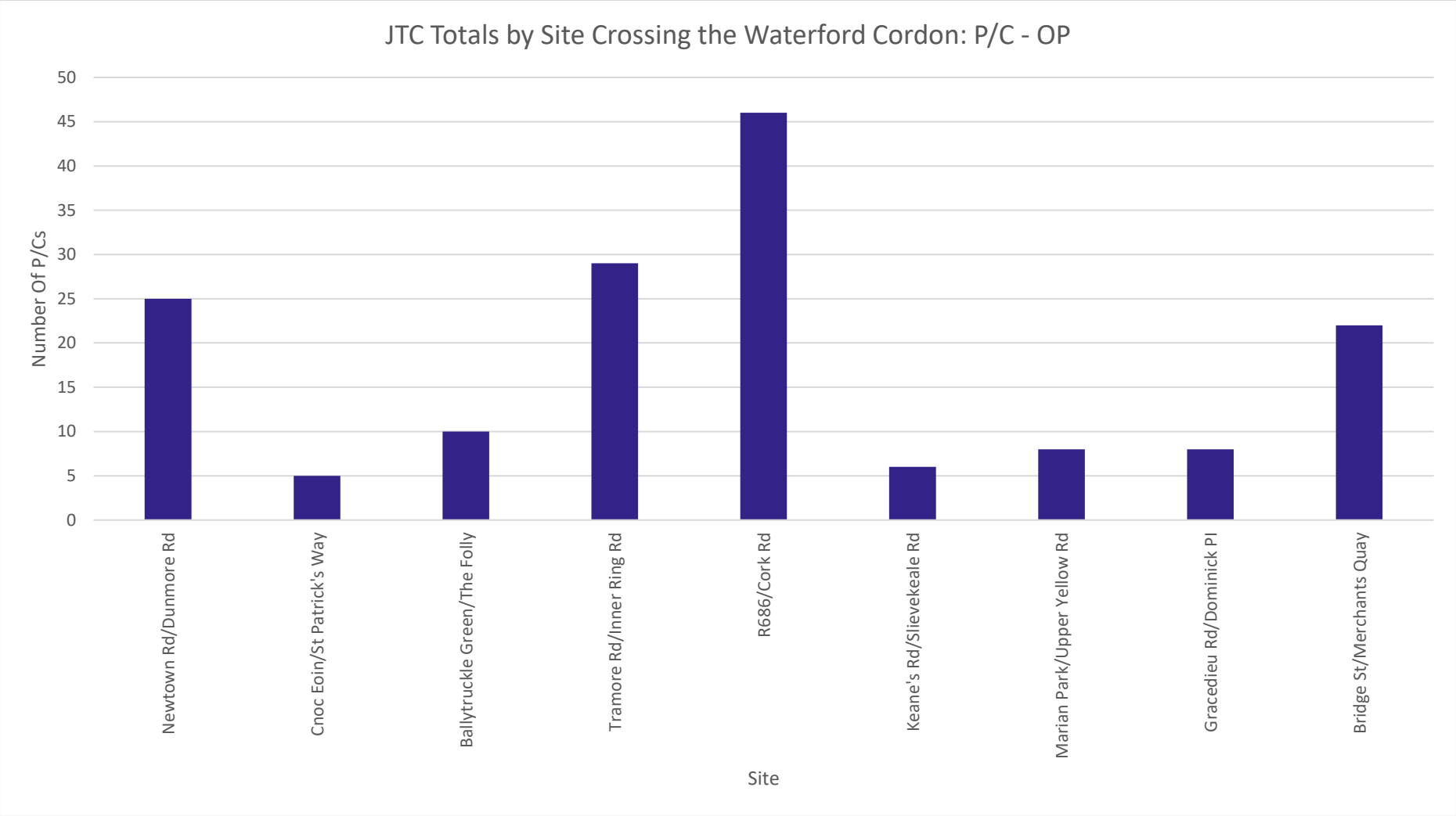


Figure A-30: Number of Pedal Cycle Journeys for JTC Surveys for OP per Site

Taxi Movements by Site and Period

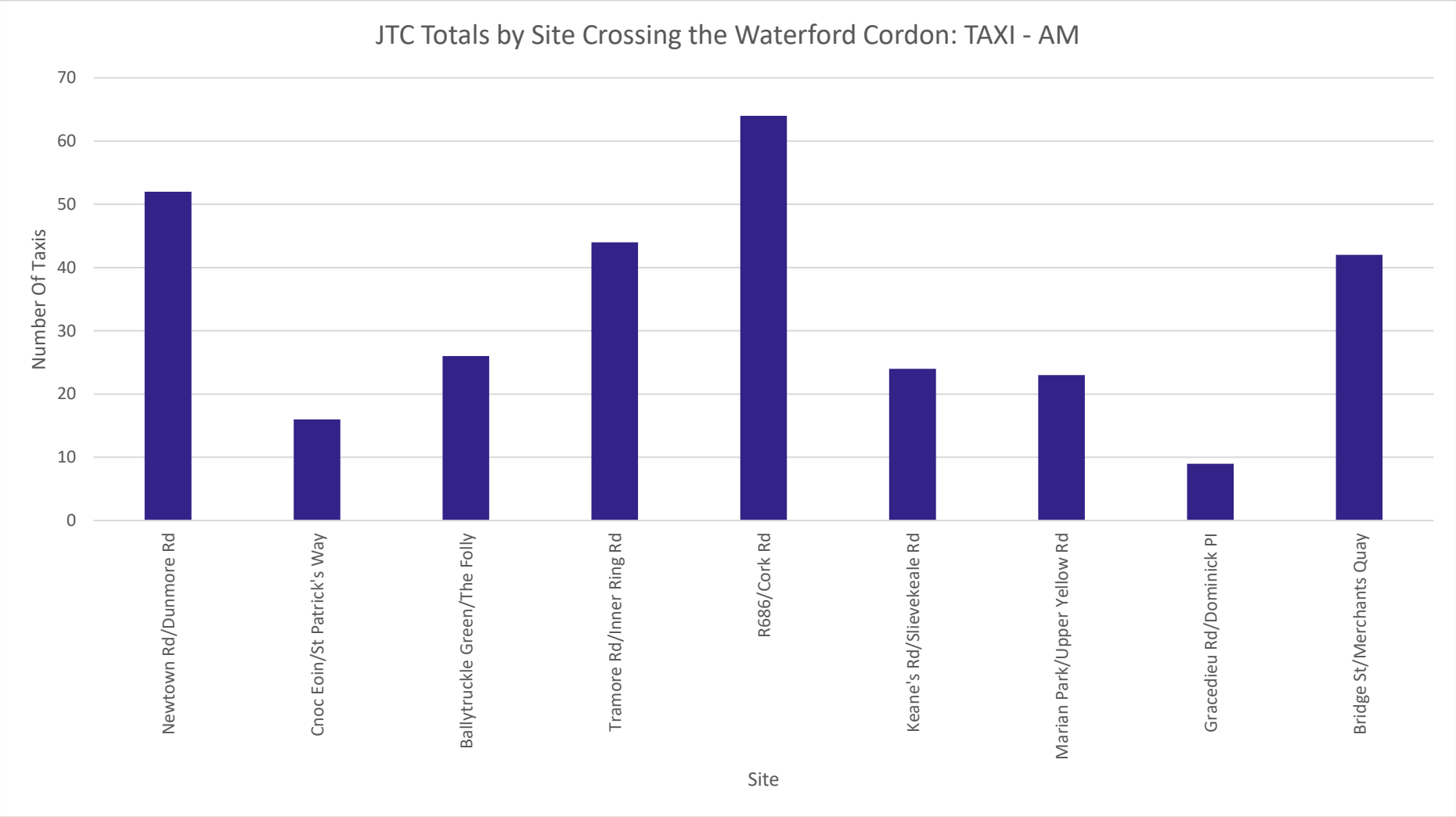


Figure A-31: Number of Taxi Journeys for JTC Surveys for AM per Site

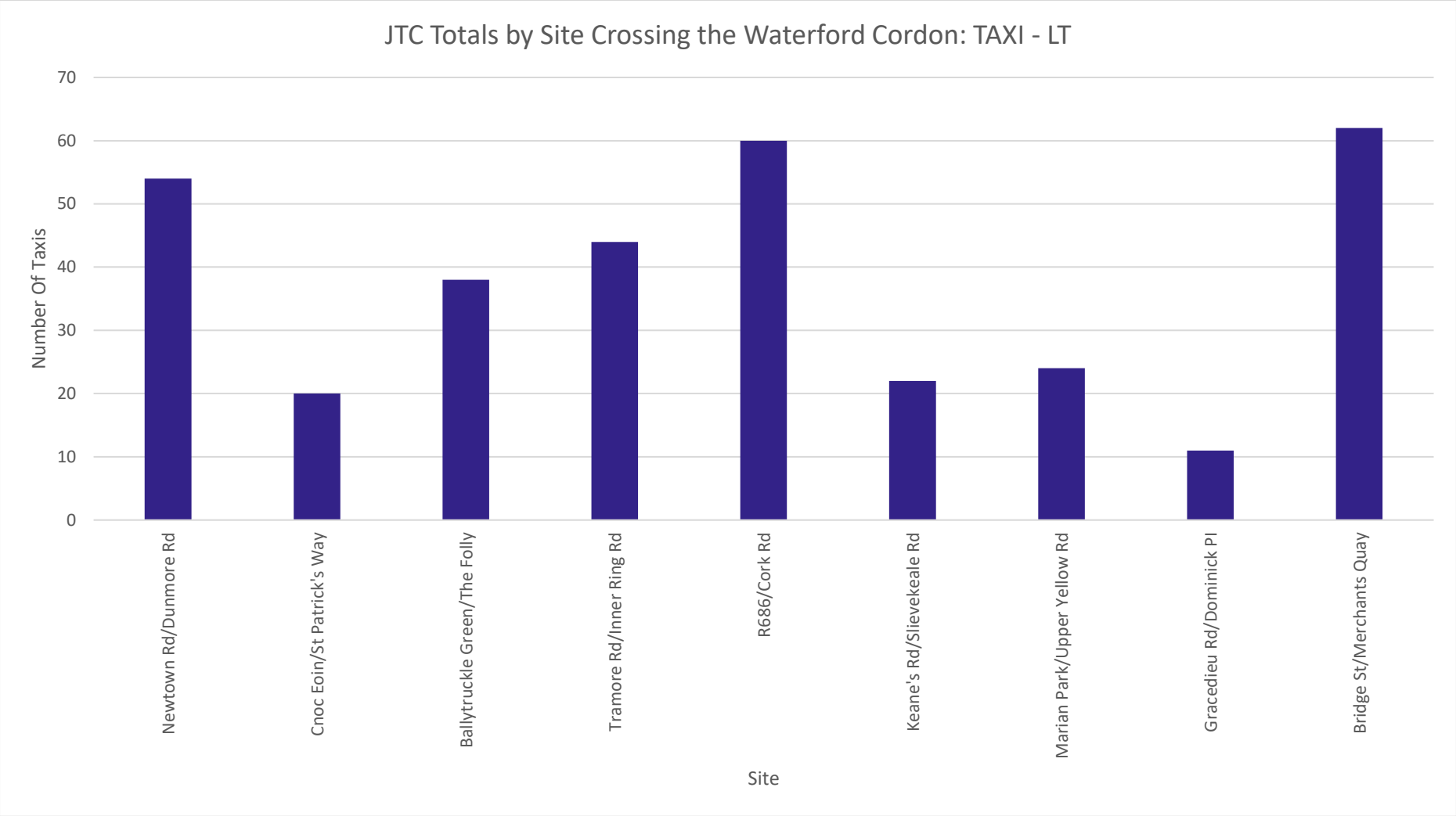


Figure A-32: Number of Taxi Journeys for JTC Surveys for LT per Site

Figure A-33: Number of Taxi Journeys for JTC Surveys for SR per Site

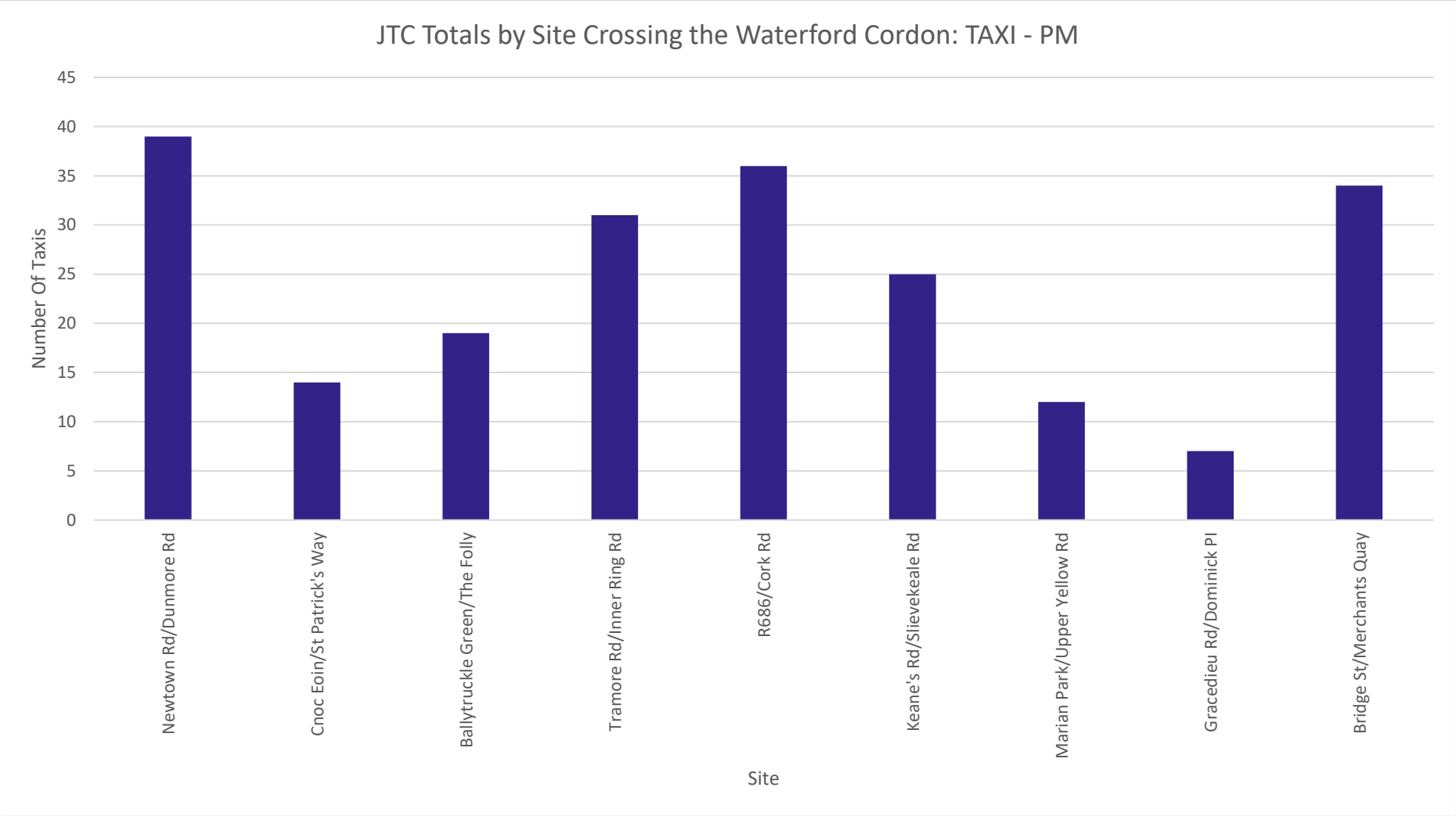


Figure A34: Number of Taxi Journeys for JTC Surveys for PM per Site

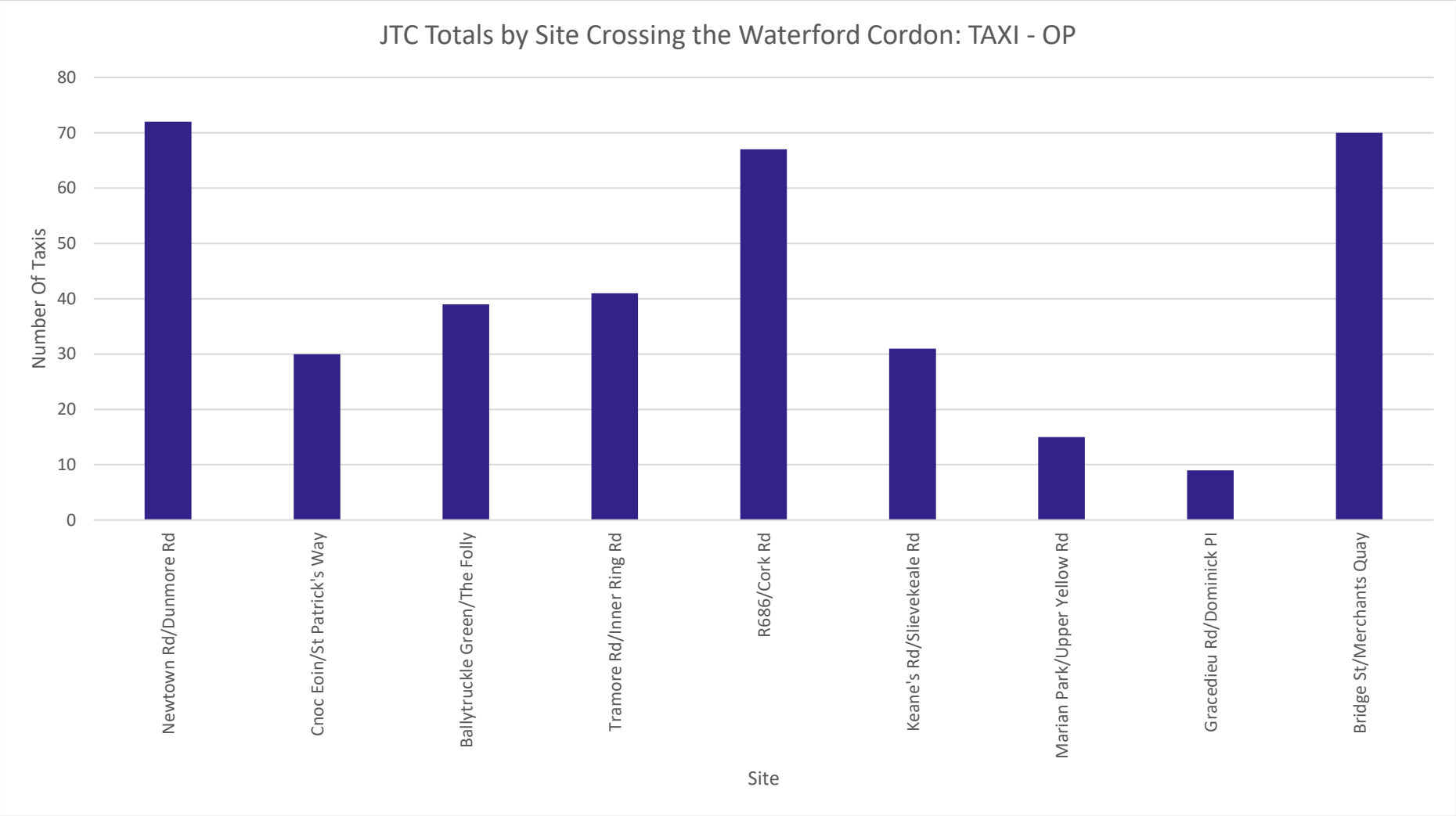


Figure A-35: Number of Taxi Journeys for JTC Surveys for OP per Site

Bus Movements by Site and Period

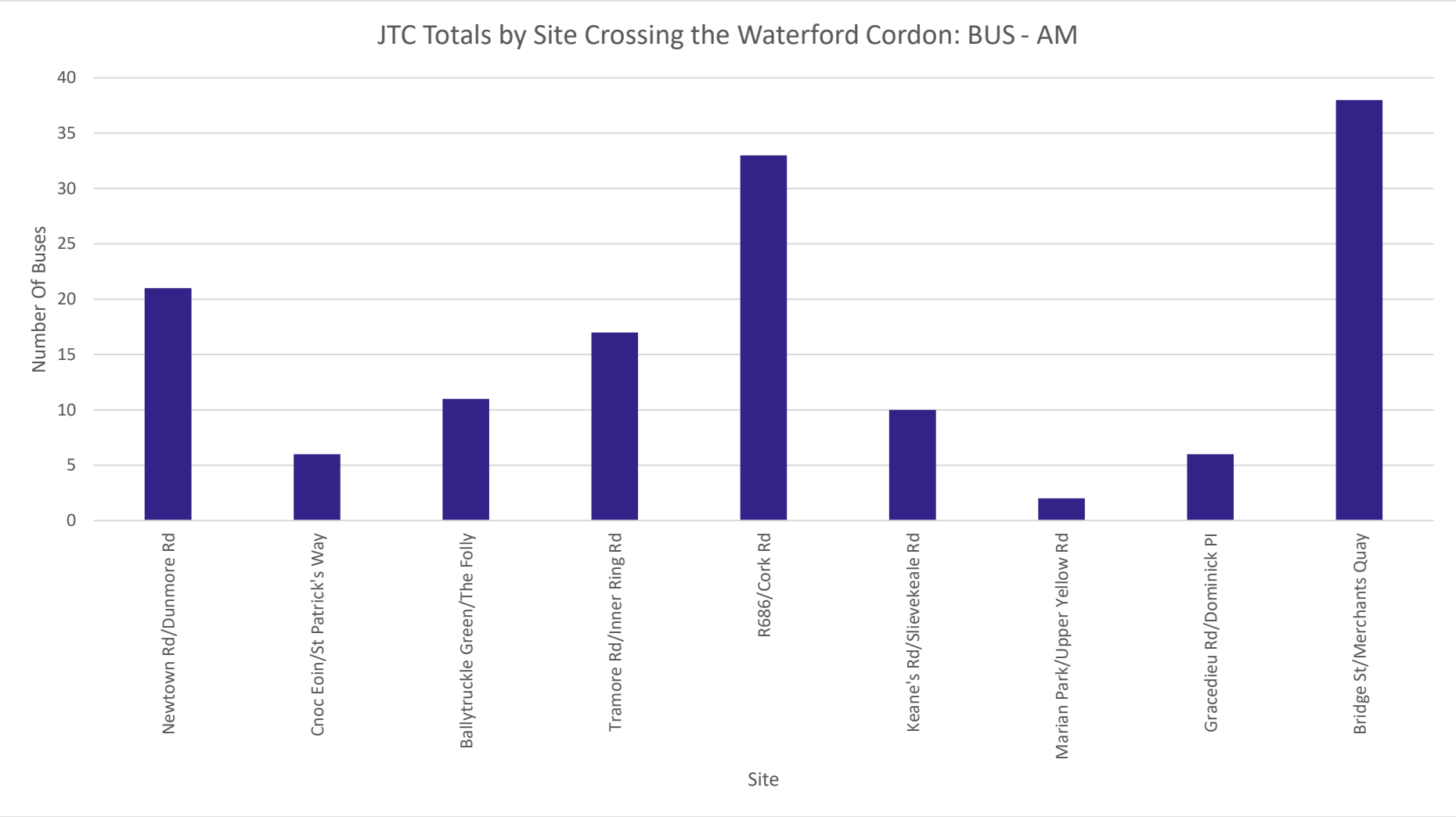


Figure A-36: Number of Bus Journeys for JTC Surveys for AM per Site

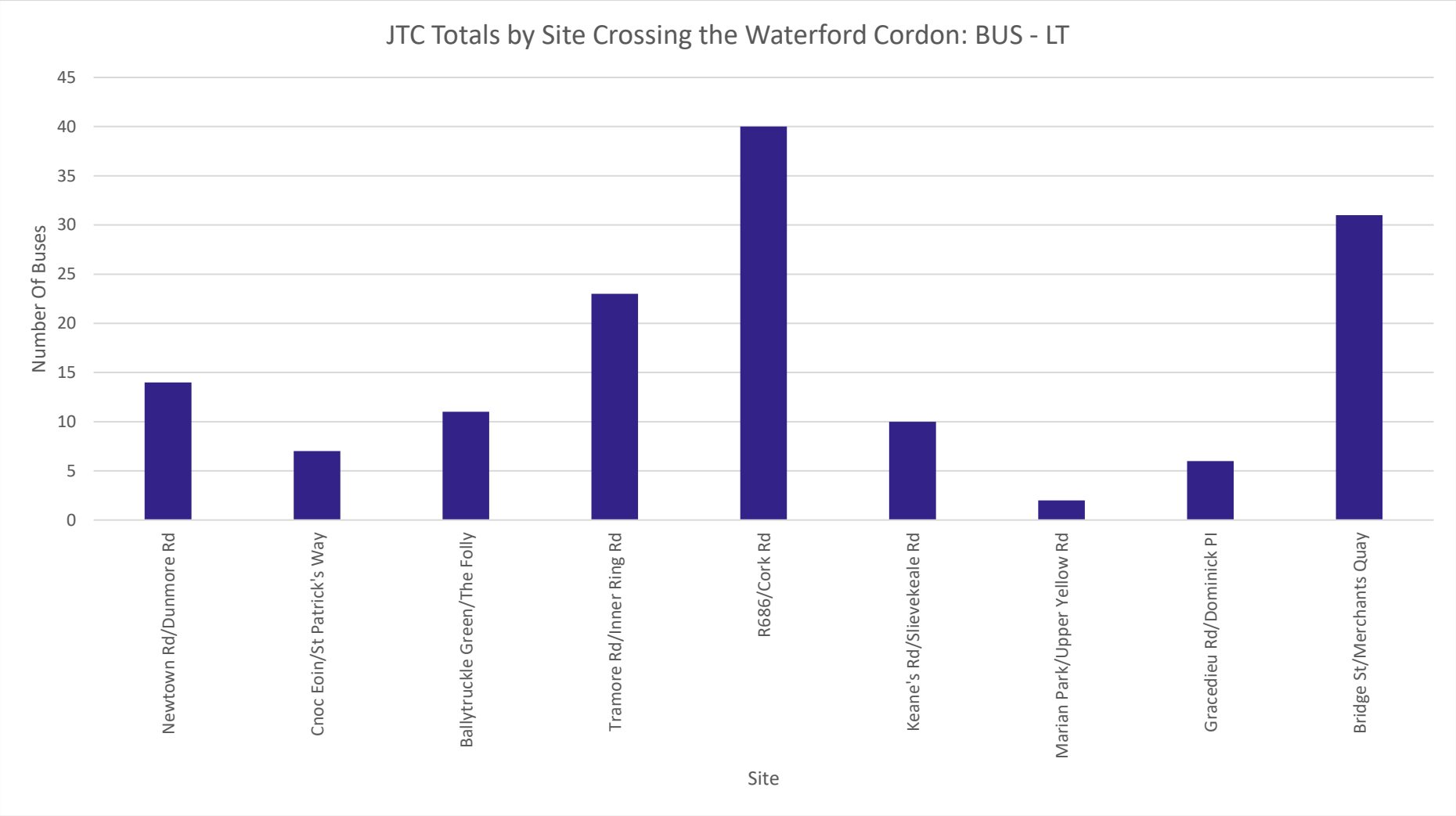


Figure A-37: Number of Bus Journeys for JTC Surveys for LT per Site

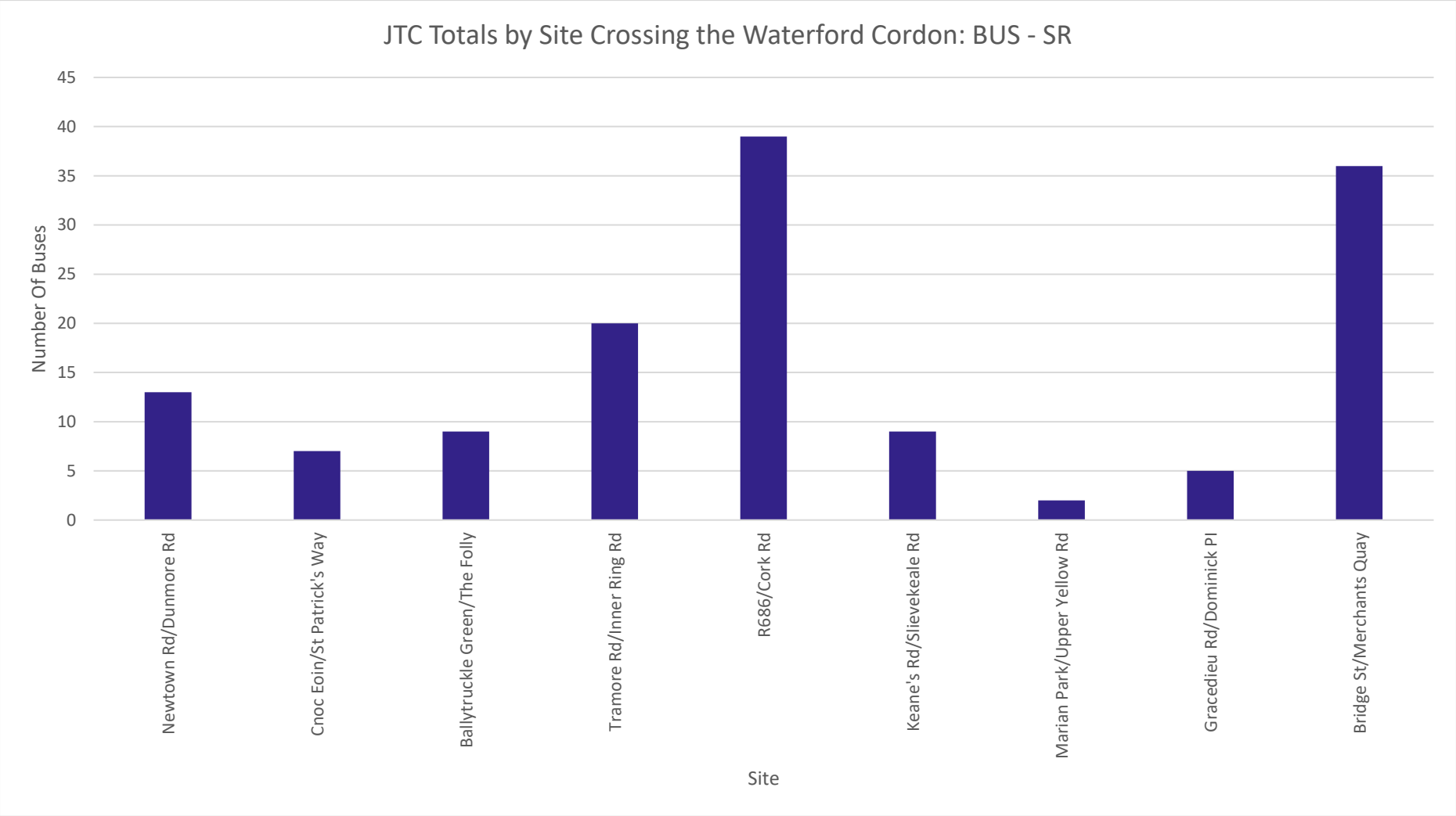


Figure A-38: Number of Bus Journeys for JTC Surveys for SR per Site

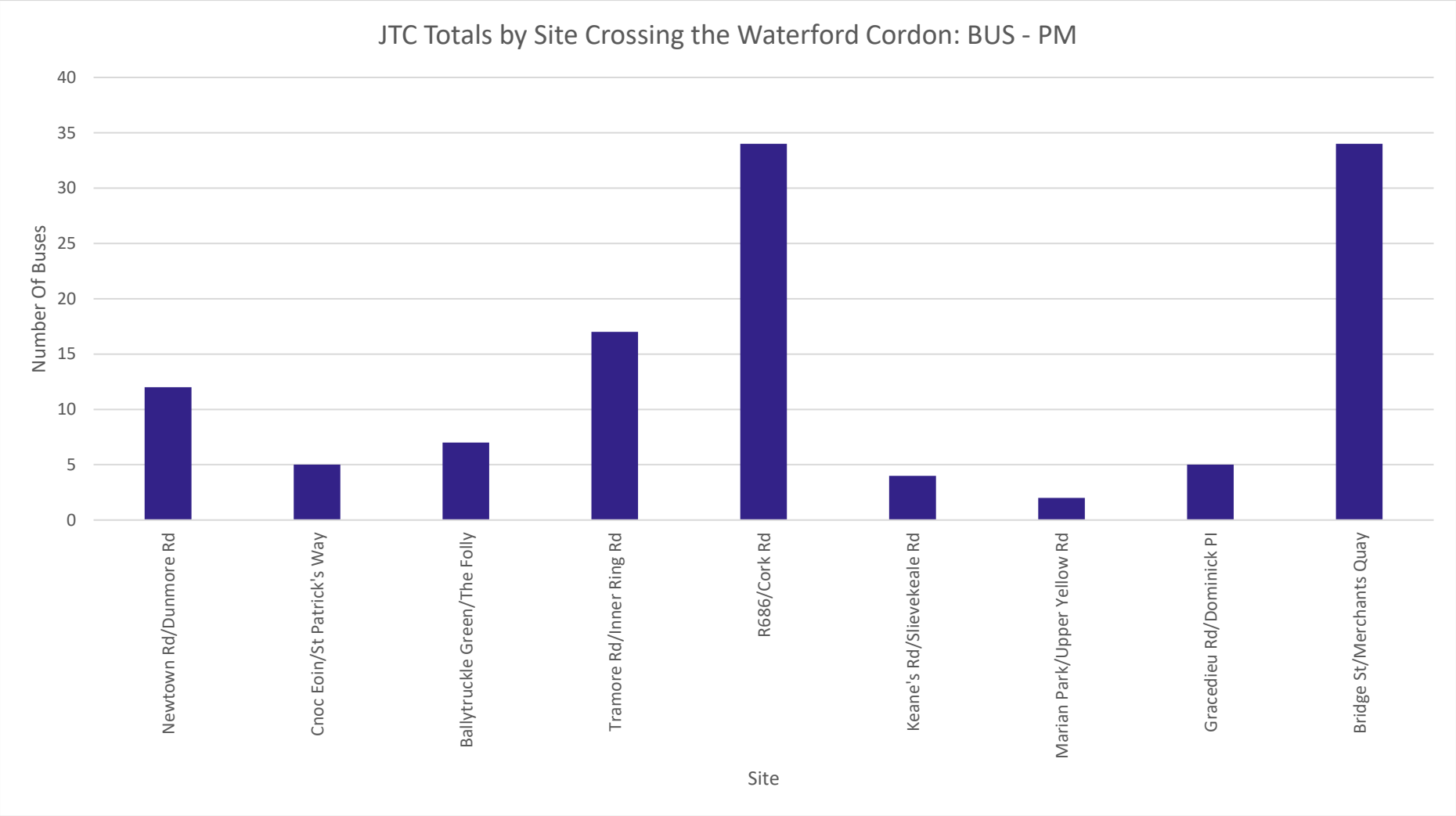


Figure A-39: Number of Bus Journeys for JTC Surveys for PM per Site

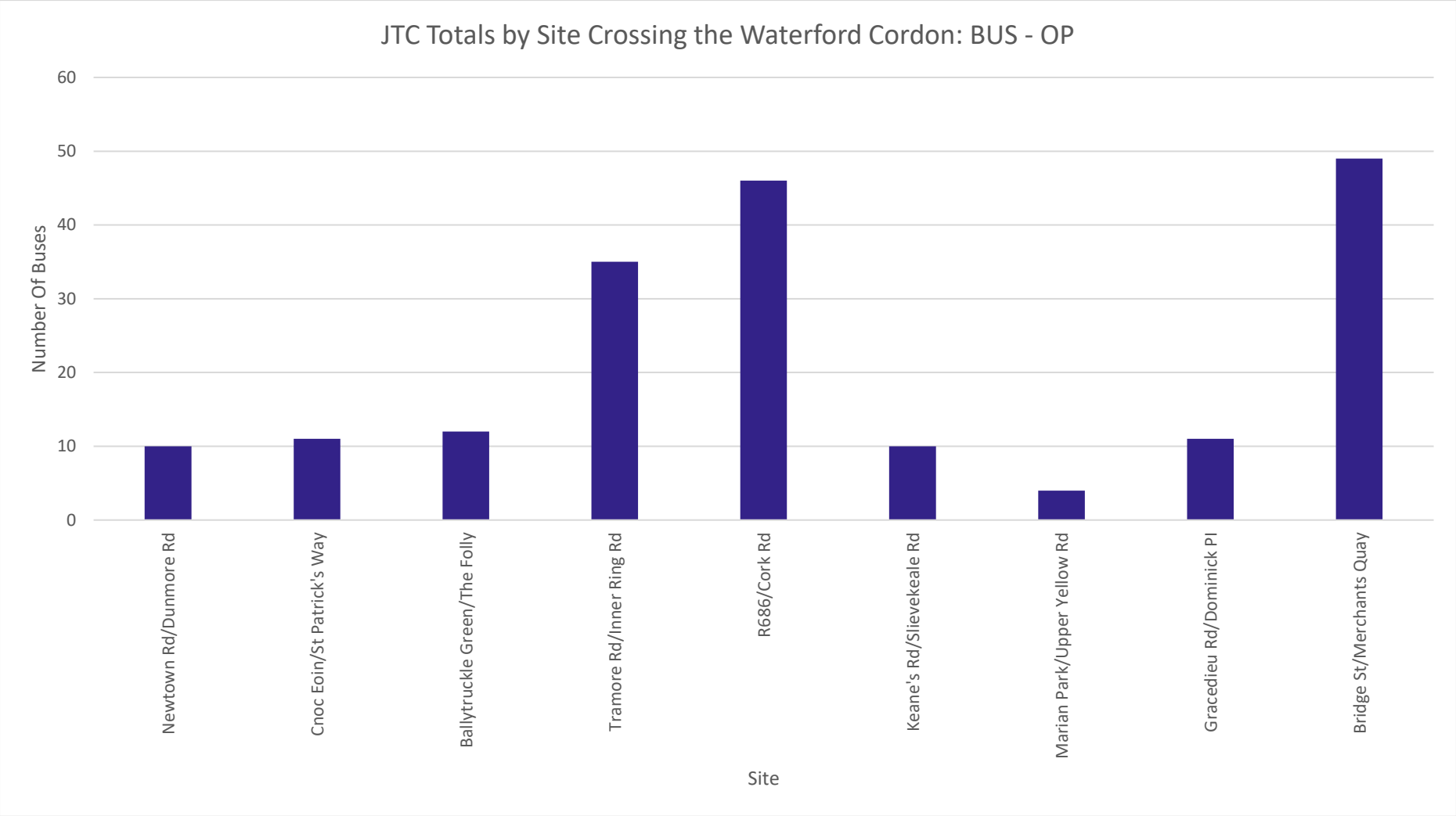


Figure A-40: Number of Bus Journeys for JTC Surveys for OP per Site

Pedestrian Movements by Site and Period

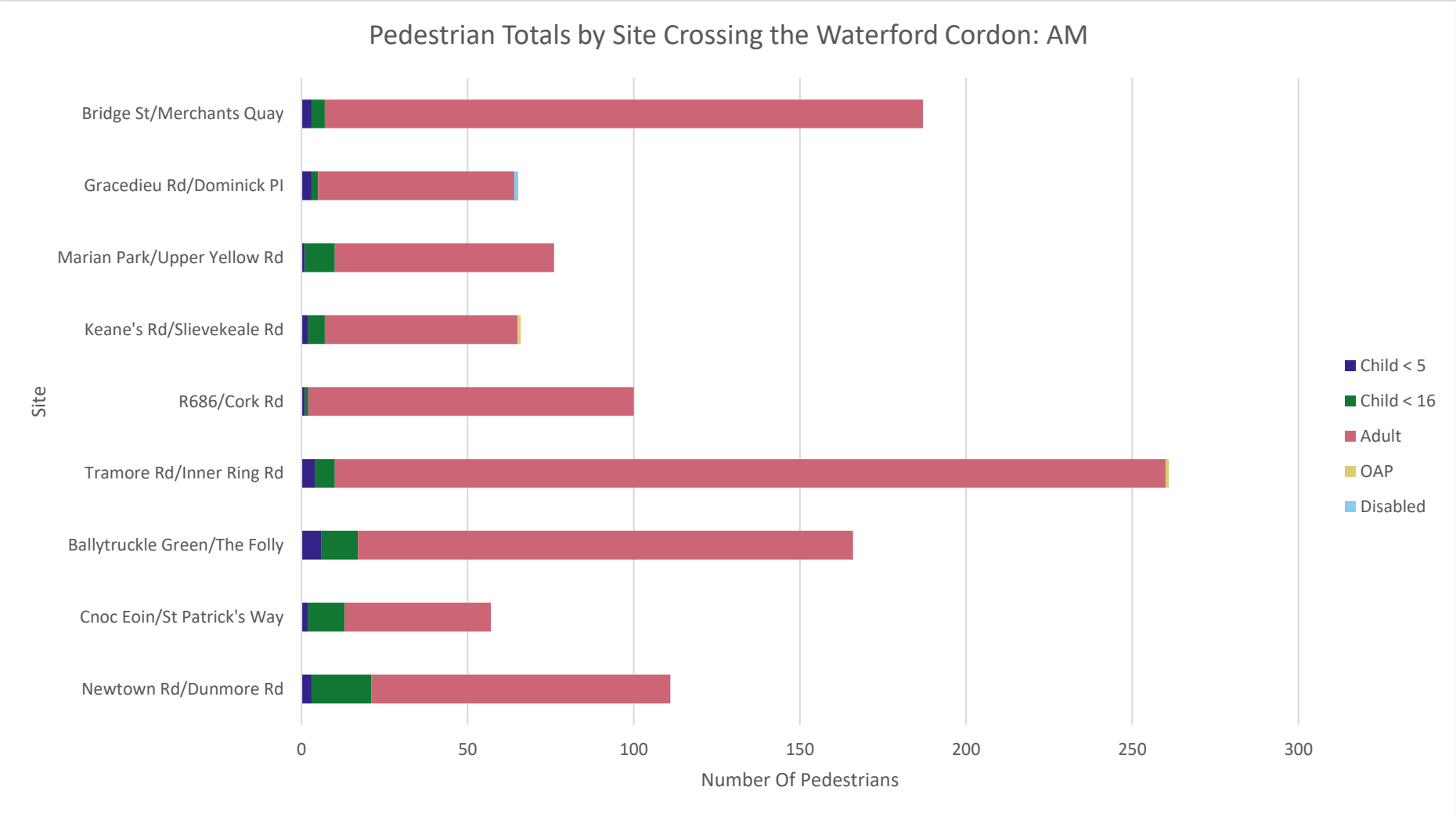


Figure A-41: Number of Pedestrian Journeys for Ped Surveys for AM per Site

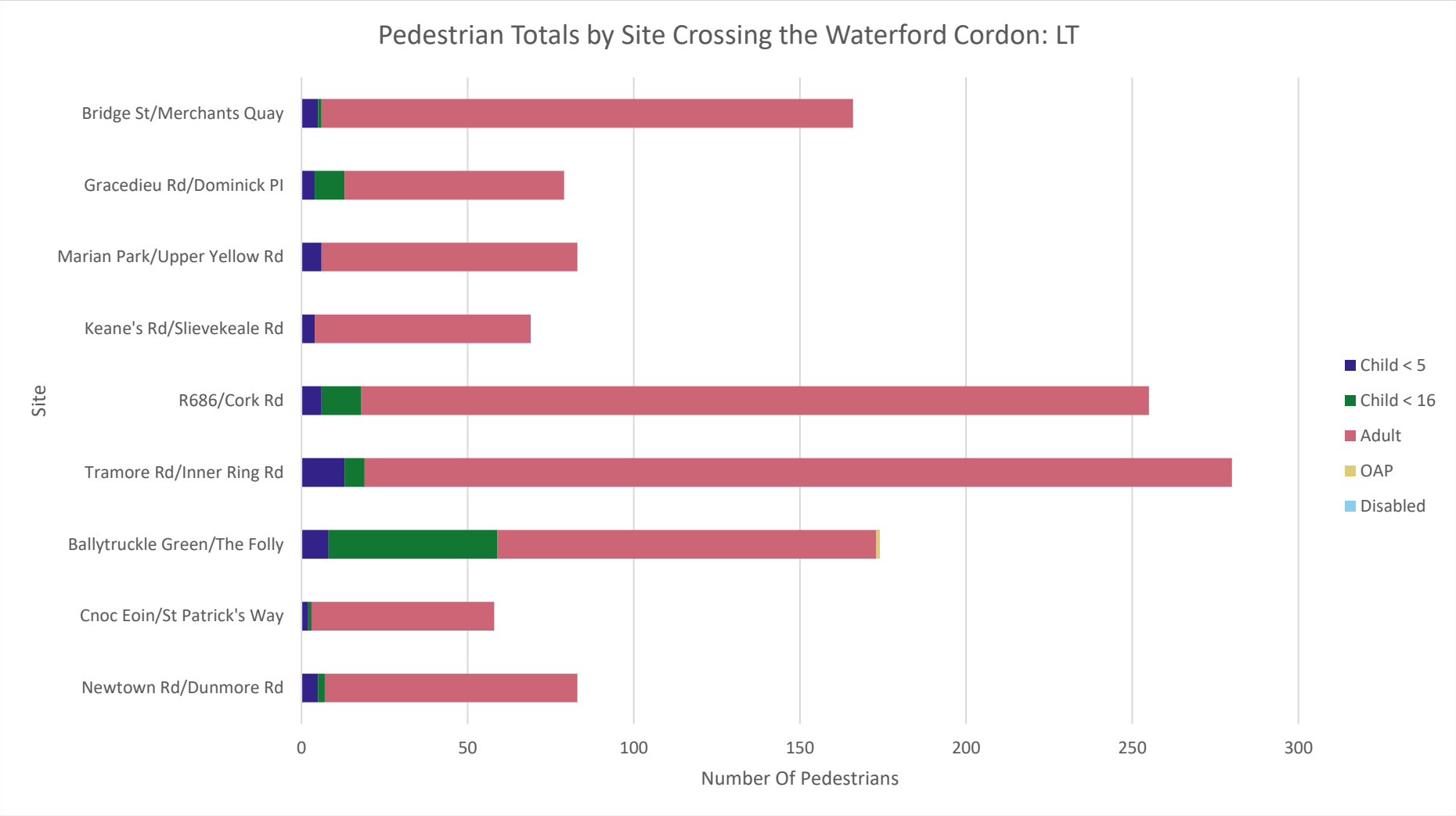


Figure A-42: Number of Pedestrian Journeys for Ped Surveys for LT per Site

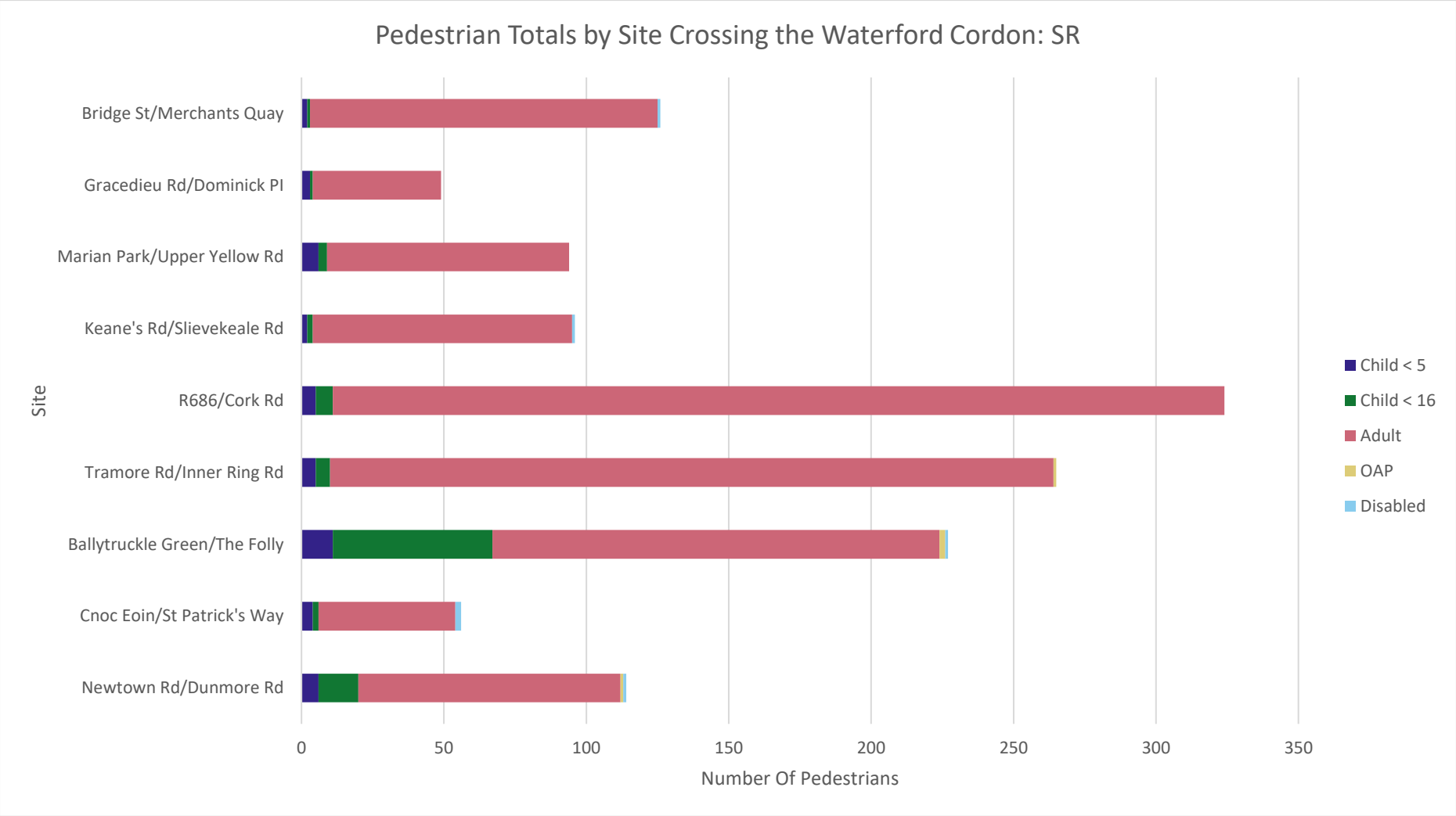


Figure A-43: Number of Pedestrian Journeys for Ped Surveys for SR per Site

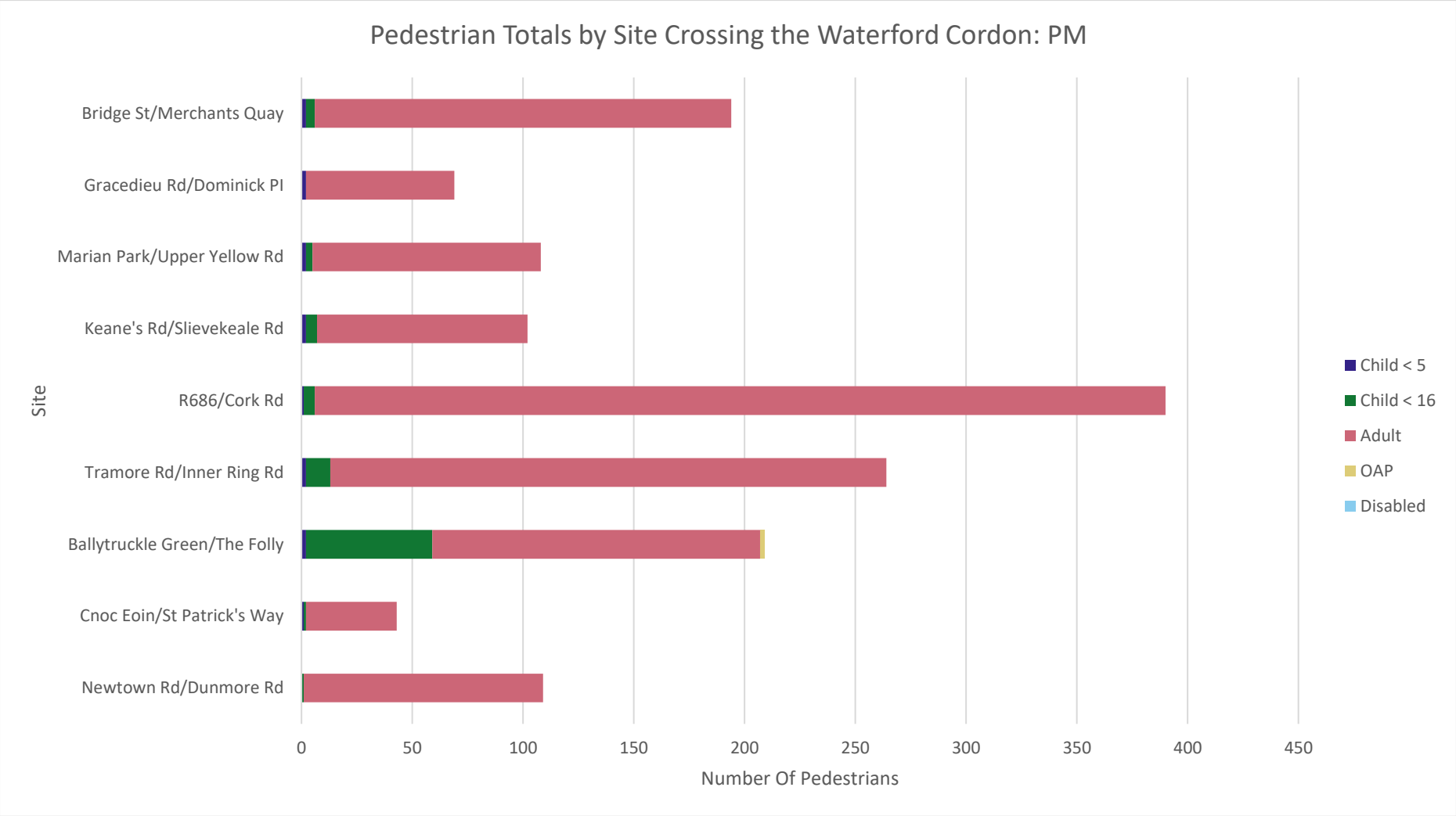


Figure A-44: Number of Pedestrian Journeys for Ped Surveys for PM per Site

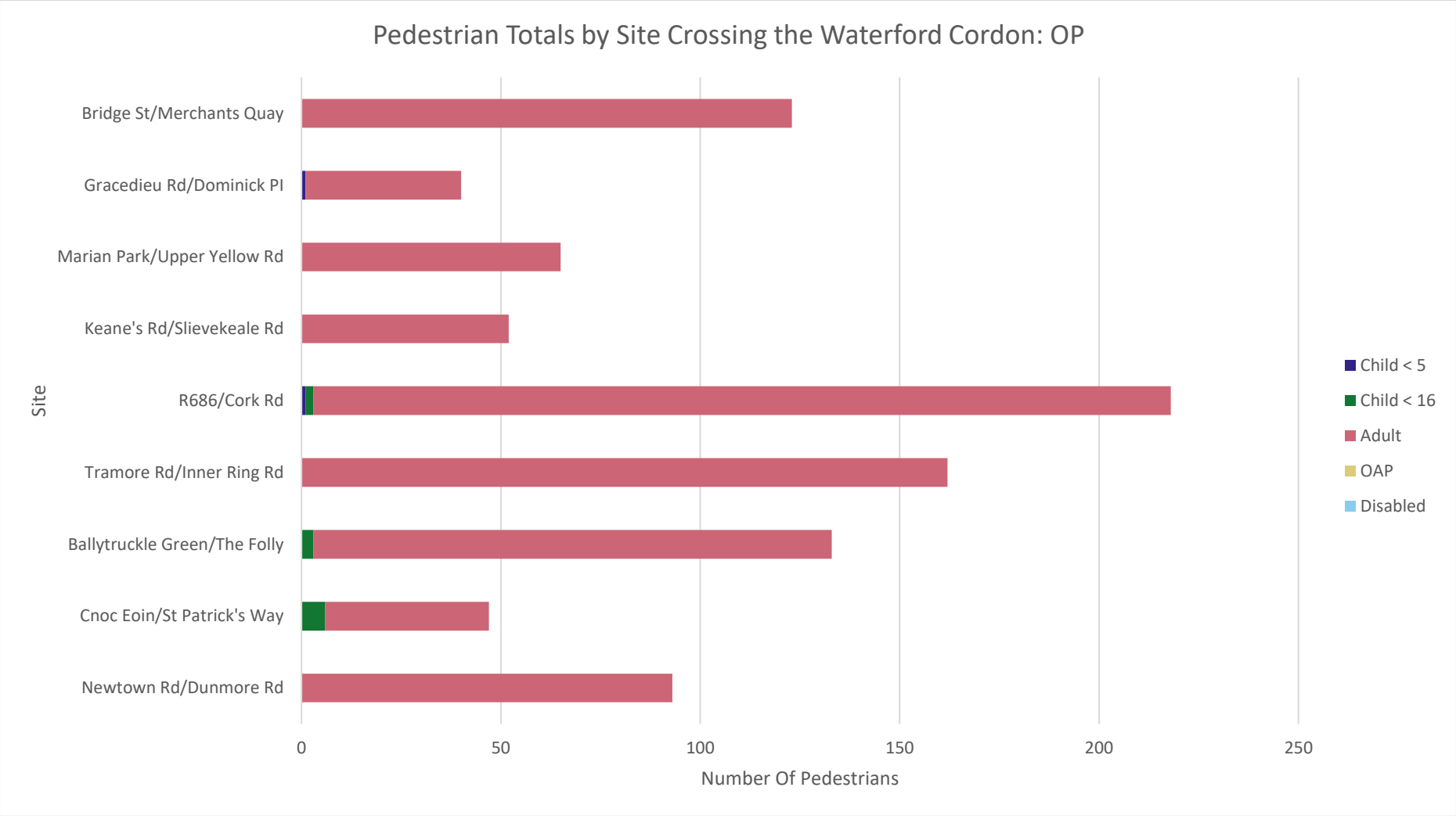


Figure A-45: Number of Pedestrian Journeys for Ped Surveys for OP per Site

Total People Movements by Time Period

Table A-1:AM Period Total Traffic Movements

Mode	Trips	% Trips
P/C	170	1%
Pedestrian	1,089	4%
Car	21,701	85%
Taxi	450	2%
Bus	2,183	9%
Rail	53	0%

Table A-2:LT Period Total Traffic Movements

Mode	Trips	% Trips
P/C	114	1%
Pedestrian	1,247	4%
Car	19,391	85%
Taxi	502	2%
Bus	2,156	9%
Rail	113	0%

Table A-3:SR Period Total Traffic Movements

Mode	Trips	% Trips
P/C	159	1%
Pedestrian	1,351	4%
Car	21,996	85%
Taxi	502	2%
Bus	2,431	9%
Rail	71	0%

Table A-4:PM Period Total Traffic Movements

Mode	Trips	% Trips
P/C	221	1%
Pedestrian	1,488	4%
Car	21,873	85%
Taxi	324	2%
Bus	1,715	9%
Rail	107	0%

Appendix B - Additional Bus Stop Survey Data

Bus Stop Flow Data

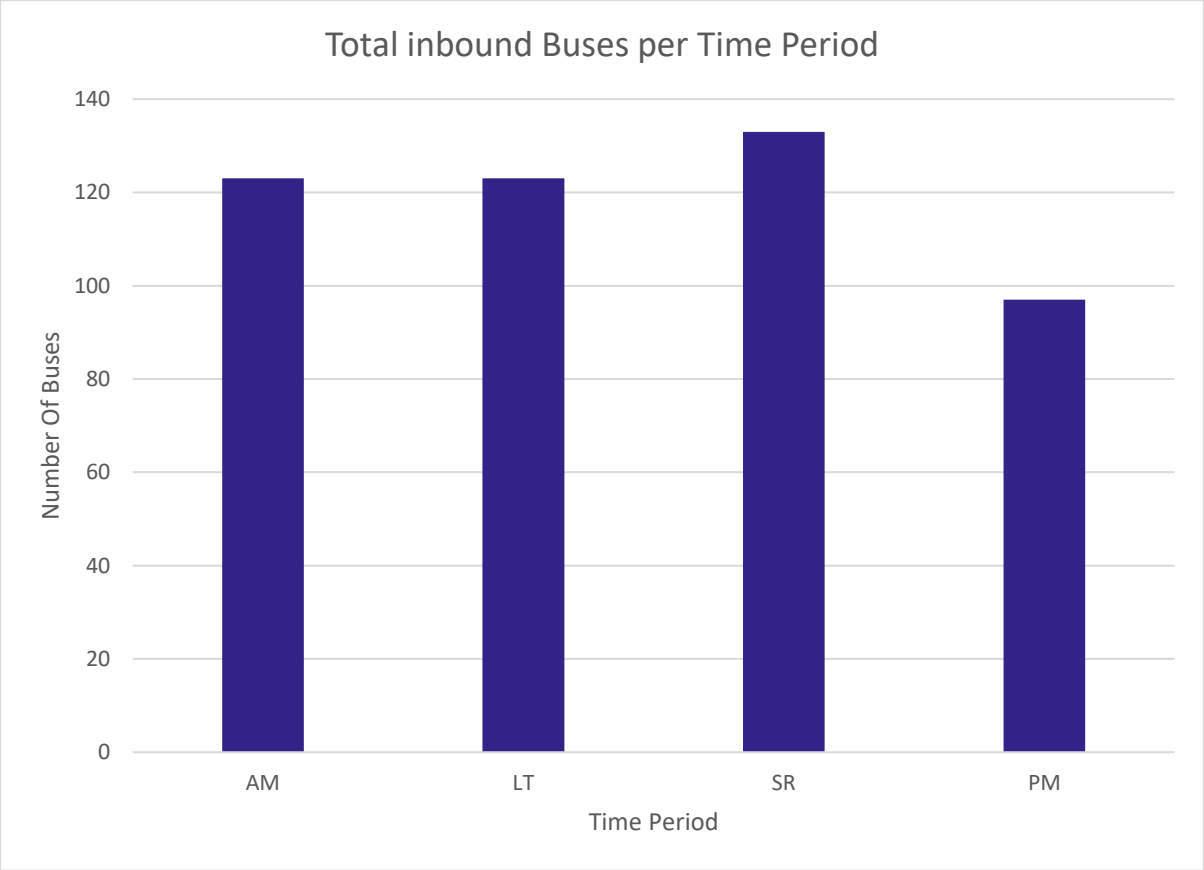


Figure B-1:Total Buses per Time Period - Waterford

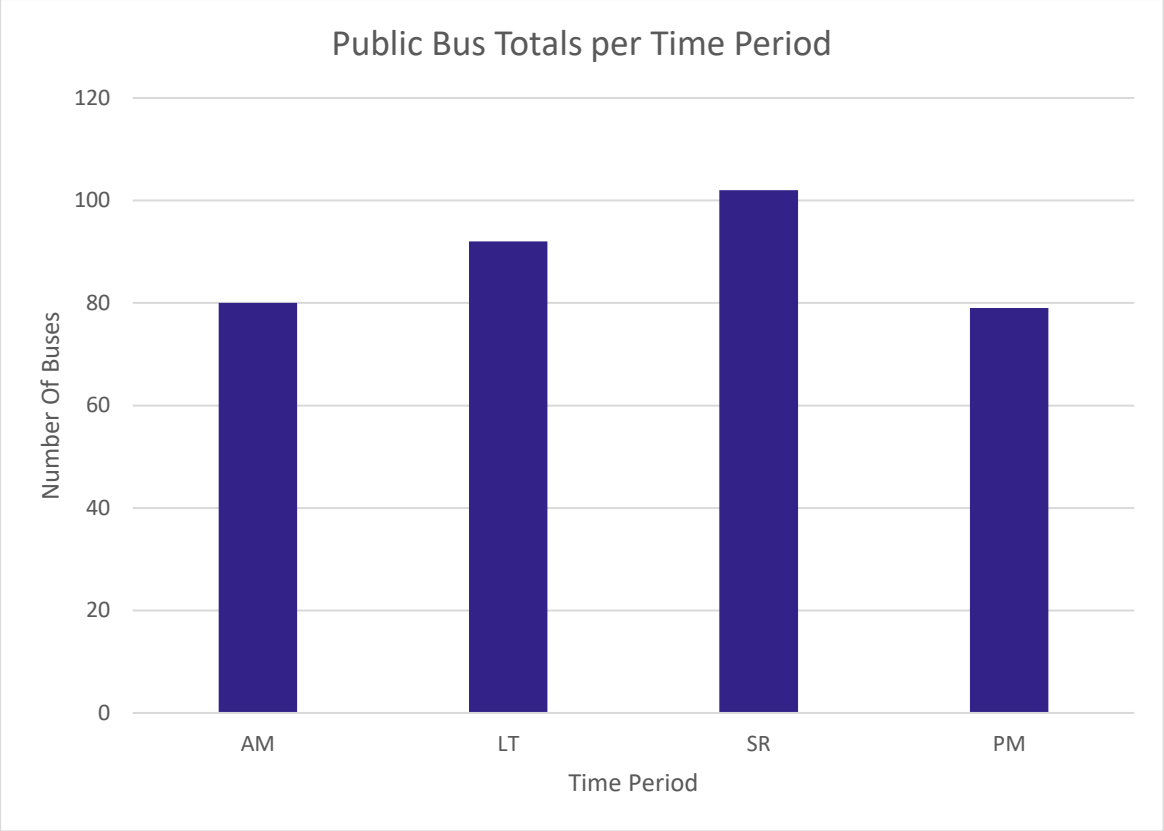


Figure B-2: Public Buses Total per Time Period - Waterford

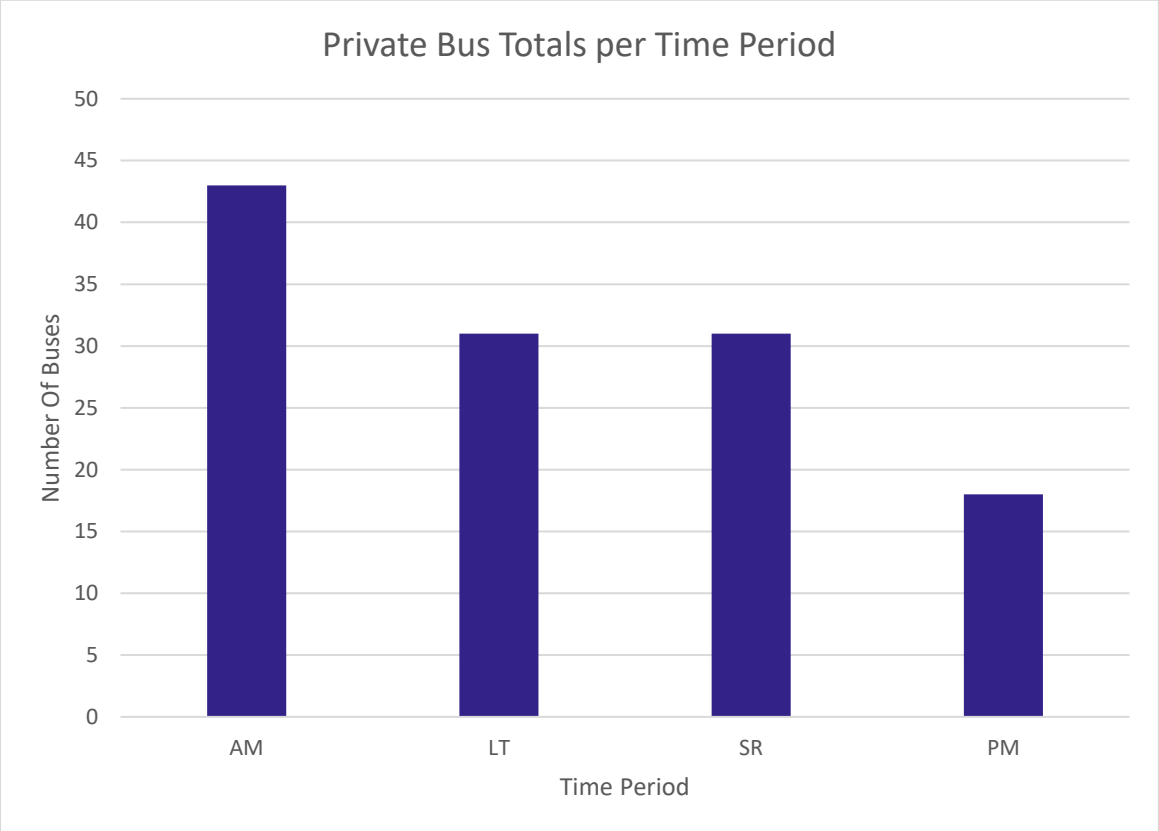


Figure B-3: Private Buses Total per Time Period - Waterford

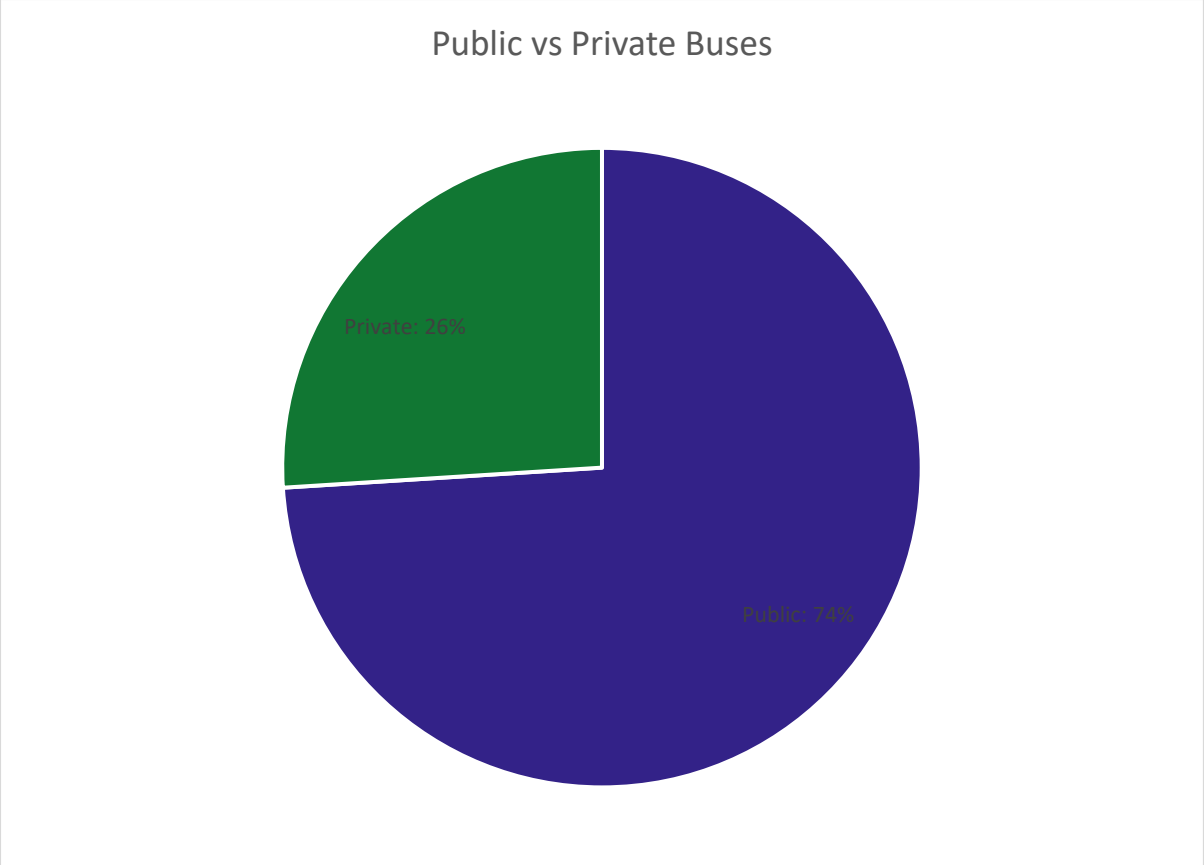


Figure B-4: Private Buses vs Public Buses - Waterford

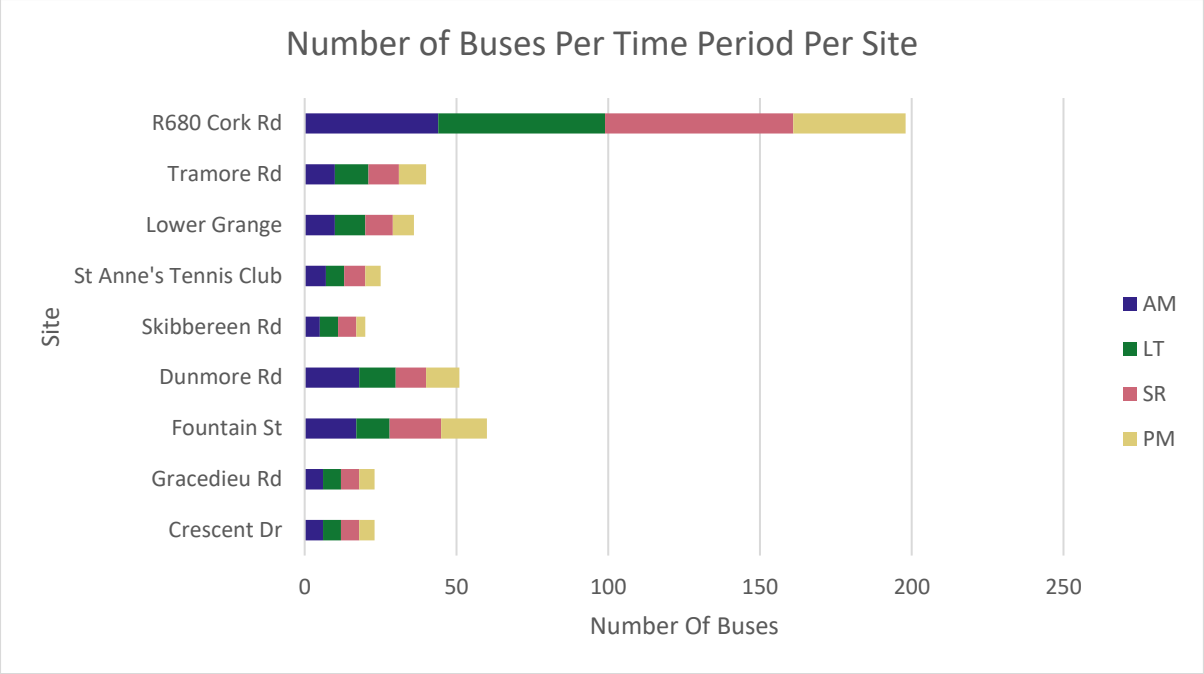


Figure B-5: Number of Buses per Time Period Per Site - Waterford

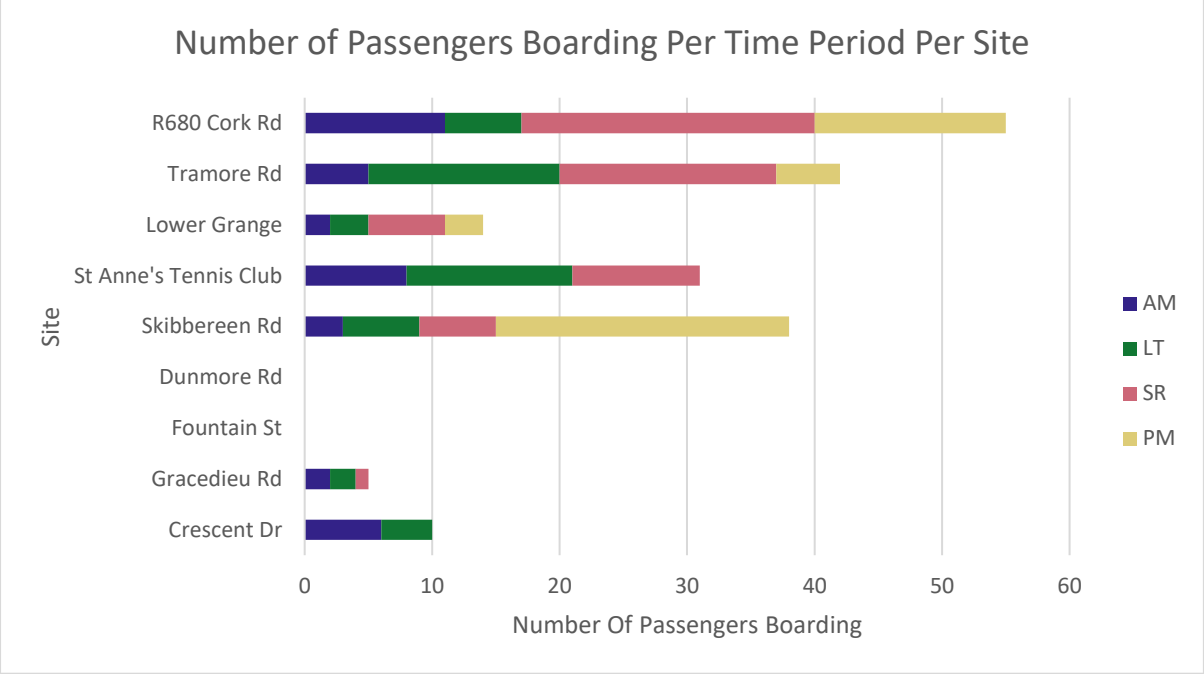


Figure B-6: Number of Passengers Boarding per Time Period Per Site - Waterford

Bus Occupancy Methodology

The bus passenger trip numbers used throughout this report were calculated from the bus occupancy surveys using the methodology outlined below.

First, the average capacity for each bus type was calculated. These are standard industry bus capacity values and are shown in the table below.

Table B-1: Average capacity per bus type

Average capacity of Typical Bus Types				
Double Decker	**Single Decker**	**Single Coach**	**Double Coach**	**Mini Bus**
94	37	55	79	16

Then, working back from the average capacity per bus type, a value was calculated which corresponds with each occupancy percentage that was recorded in the bus occupancy surveys. This was calculated by taking the maximum passenger numbers per bus type, dividing the value by 100 and multiplying by the occupancy value.

Table B-2: Occupancy Per Bus Type

Occupancy %	Double Decker Passenger Number	Single Decker Passenger Number	Single Coach Passenger Number	Double Coach Passenger Number	Mini Bus Passenger Number
0	0	0	0	0	0
5	5	2	3	4	1
10	9	4	6	8	2
15	14	6	8	12	2
20	19	7	11	16	3
25	24	9	14	20	4
30	28	11	17	24	5
35	33	13	19	28	6
40	38	15	22	32	6
45	42	17	25	36	7
50	47	19	28	40	8
55	52	20	30	43	9
60	56	22	33	47	10
65	61	24	36	51	10

70	66	26	39	55	11
75	71	28	41	59	12
80	75	30	44	63	13
85	80	31	47	67	14
90	85	33	50	71	14
95	89	35	52	75	15
100	94	37	55	79	16

Then, using the above table, the average number of passengers per bus type and occupancy range was calculated. The below table defines the ranges and the average passenger number for each range. The passenger numbers from the above table for each range are added together and the average calculated.

Table B-3: Average passengers per range

Average number of passengers per range					
Range	**Double Decker**	**Single Decker**	**Single Coach**	**Double Coach**	**Mini Bus**
0-24%	9	4	6	8	2
25-50%	33	13	19	28	6
51-74%	38	15	22	32	6
75-99%	61	24	36	51	10
100%	94	37	55	79	16

The same process was then carried out to calculate the lower and upper passenger bounds of each bus type. These upper and lower bounds, along with the average passenger numbers can be seen in the below tables.

Table B-4: Lower bound of passengers by range

Lower Bound of passengers per range					
Lower	**Double Decker**	**Single Decker**	**Single Coach**	**Double Coach**	**Mini Bus**
0-24%	0	0	0	0	0
25-50%	5	2	3	4	1
51-74%	28	11	17	24	5
75-99%	52	20	30	43	9
100%	75	30	44	63	13

Table B-5: Upper bound of passengers by range

Upper Bound of passengers per range					
Upper	**Double Decker**	**Single Decker**	**Single Coach**	**Double Coach**	**Mini Bus**
0-24%	19	7	11	16	3
25-49%	42	17	25	36	7
50-74%	66	26	39	55	11
75-99%	89	35	52	75	15
100%	94	37	55	79	16

Bus Passenger Trips

The following graphs indicate how many passengers crossed the cordon on a bus during each time period at each site. The data in this section was taken from the Bus Occupancy surveys, where average bus occupancy values have been used to calculate the average number of passengers on board each bus.

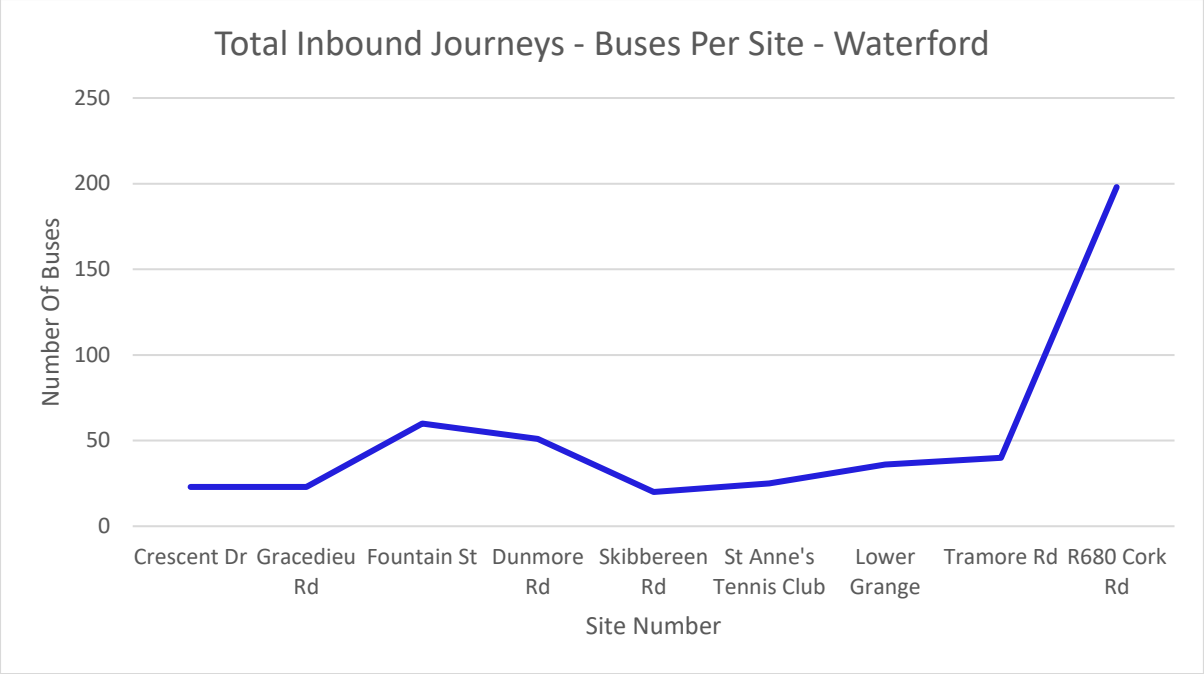


Figure B-7: Total Inbound Journeys – Buses Per Site - Waterford

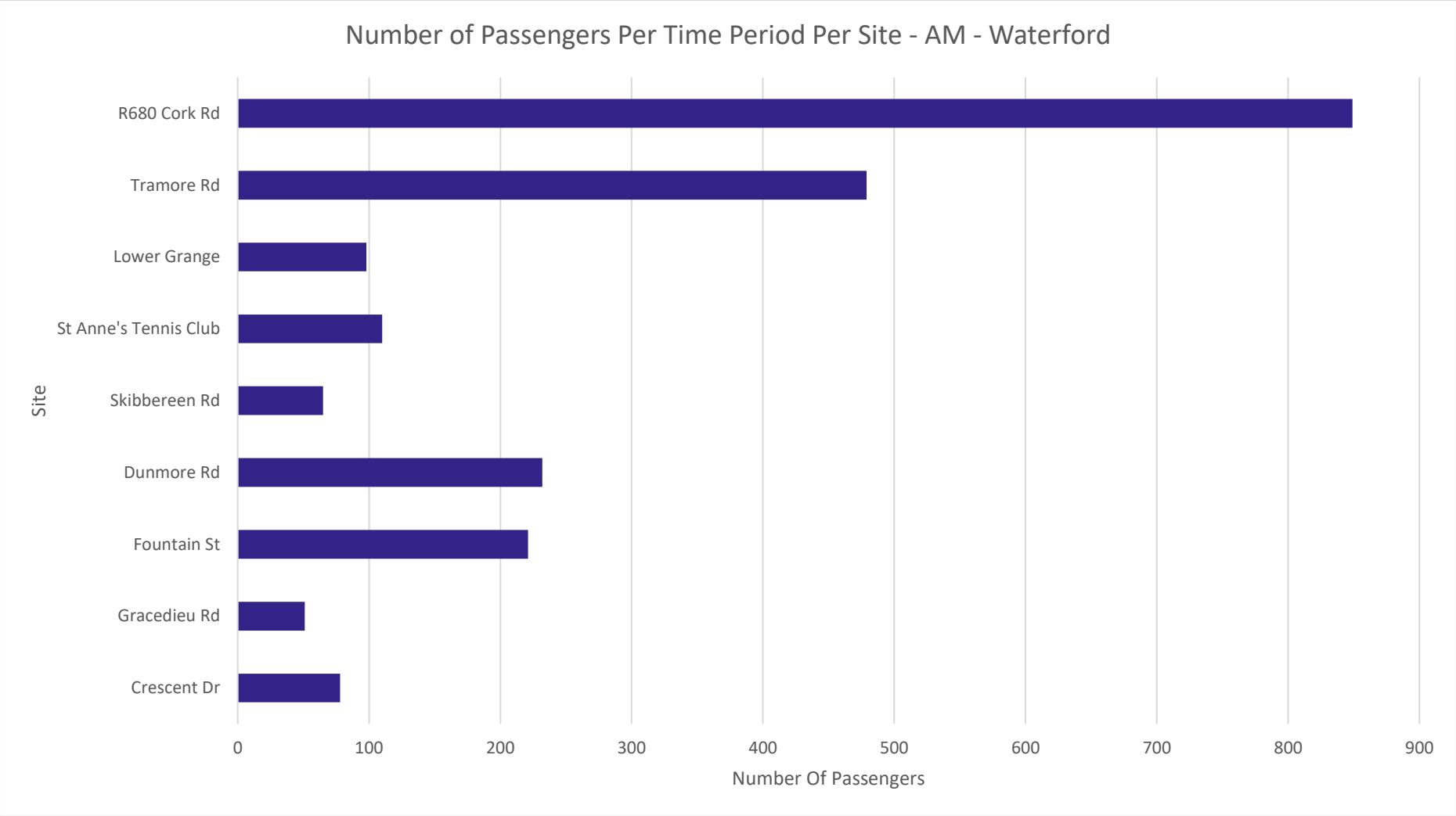


Figure B-8: Bus Passengers - AM - Waterford

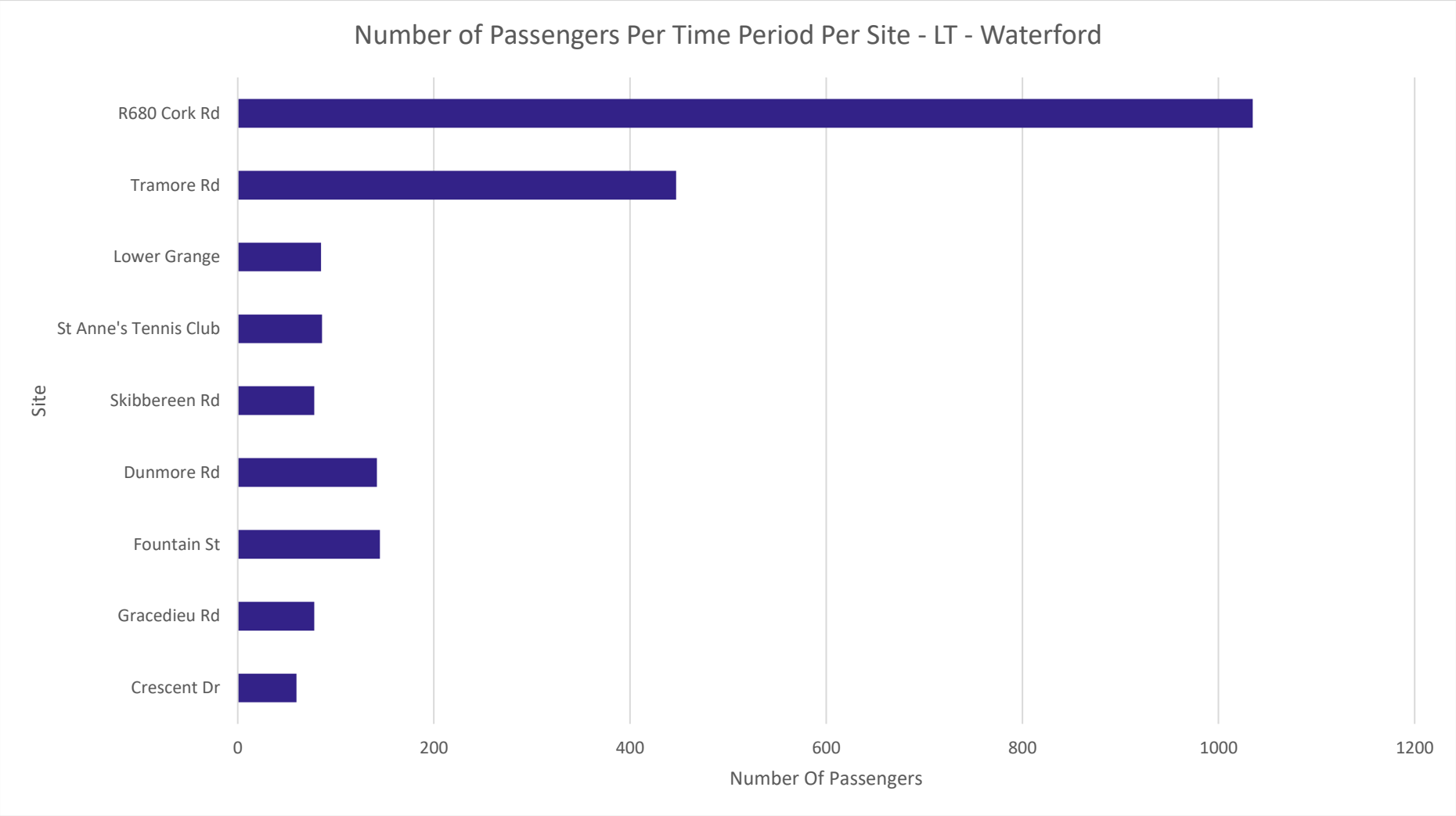


Figure B-9: Bus Passengers - LT - Waterford

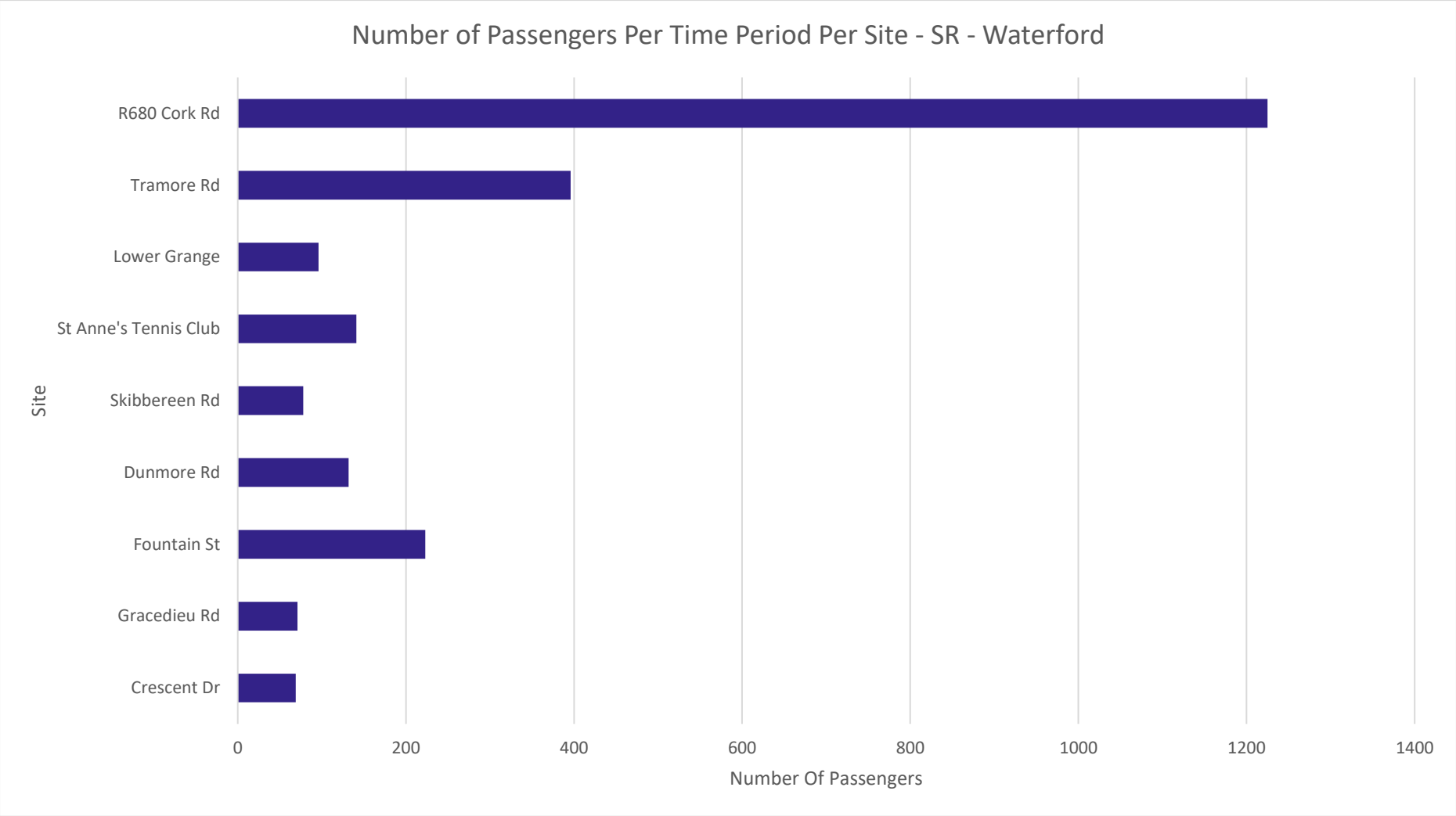


Figure B 10:Bus Passengers - SR - Waterford

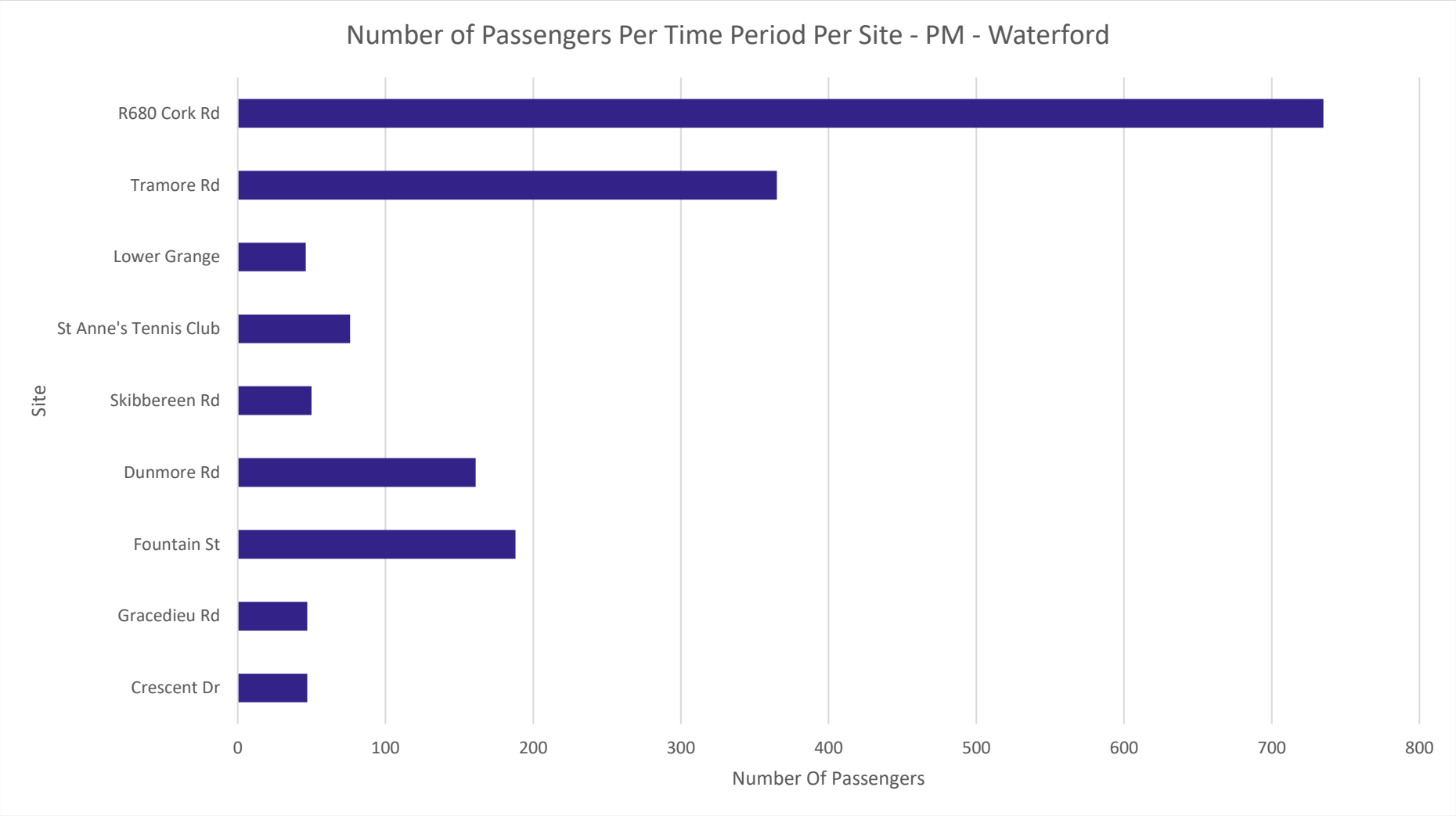


Figure B-11: Bus Passengers - PM - Waterford

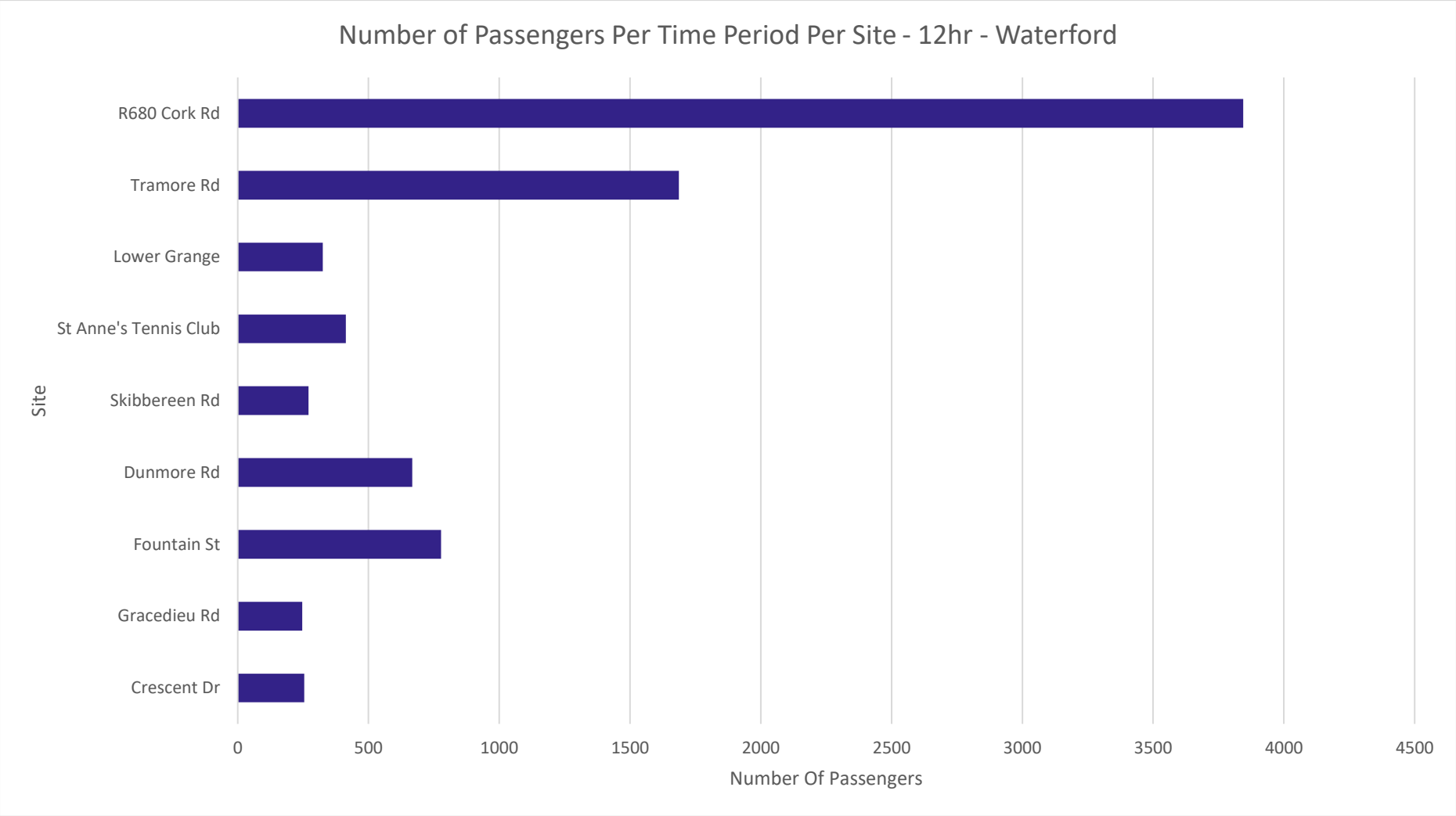


Figure B-12: Bus Passengers - 12hr - Waterford

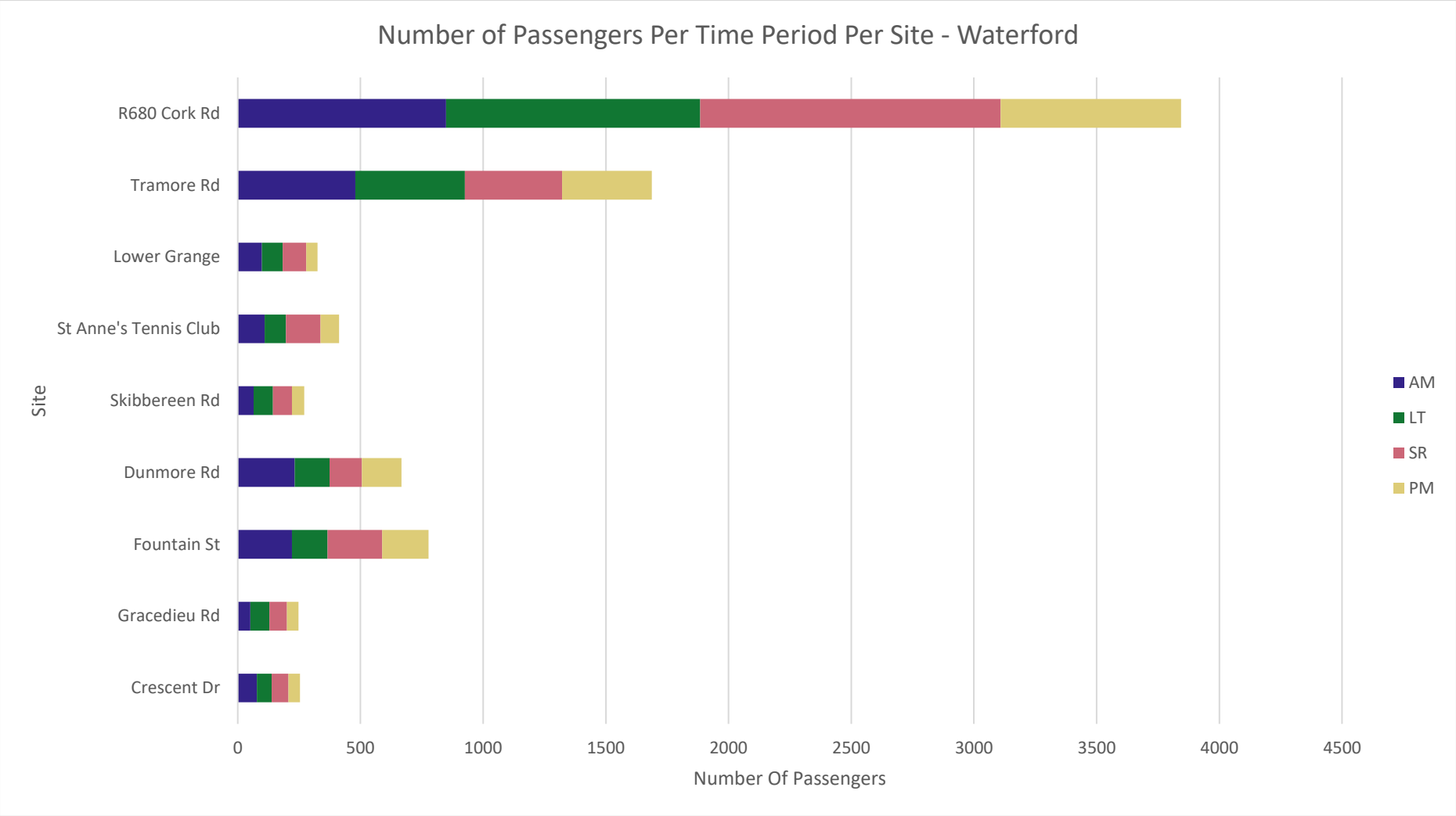


Figure B-13: Total Passenger Trips Per Site Per Time Period - Waterford

Appendix C - Heavy Rail Data

The heavy rail passenger numbers are taken from the Annual Rail Census, carried out by Iarnród Éireann. The Passenger numbers from these services were taken where the train crossed the Waterford City Cordon, or the first station that the train stopped at, after crossing the Cordon. In this case the station used was Waterford Plunkett Train Station.

The total number of people alighting at Waterford Plunkett Station, grouped by time period and origin station, are summarised below.

Table C-1: Rail Passengers per Time Period

All Rail Trips Inbound Across Cordon	Trips
AM	53
LT	113
SR	71
PM	107
12hr	344

Table C-2: Rail Passengers by Origin

Origin	AM	LT	SR	PM	12hr
Heuston	53	86	71	107	317
Limerick Junction	0	27	0	0	27