

consulting  
engineers

NRB

**Supplementary  
Transportation  
Assessment  
Report**

including....

*Preliminary Travel Plan / Mobility  
Management Plan (Appendix I)*

*For*

**Citywest Cemetery.  
(RFI Stage SDCC Reg. Ref.:  
SD22A/0457)**

*At*

**Garter Lane, Saggart,  
Co. Dublin.**

**SUBMISSION ISSUE**

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## EXECUTIVE SUMMARY

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NRB Consulting Engineers Ltd were appointed to address the Traffic/Transportation issues associated with a planning application for a Cemetery at Garter Lane, Saggart, Co. Dublin (SD22A/0457) on lands previously in use as Citywest Golf Course.

This supplementary report has been prepared to address **RFI Item 7F** which states that *“the applicant/developer should submit a revised Transportation Assessment which analyses how local traffic will be affected if the Garter Lane/Fortunestown Lane junction upgrades are not implemented. Clarification should also be given on how the visitor traffic to/from the cemetery was calculated, noting discrepancies in the figures given in the Transport Assessment and the Verde Environmental Assessment. Data on daily and yearly funeral numbers should be clearly shown and justified based on similar developments”*.

The Trip Generation has been updated herein, to include for 1,095 interments per year (averaging 3 funerals a day), rates as advised by the applicant. We also used new additional traffic survey data to inform the response to the RFI and this Report.

Additional traffic surveys were undertaken over a 5-day period (Thursday 30<sup>th</sup> March to Wednesday 5<sup>th</sup> April 2023), at Kilmashogue Cemetery, an established cemetery facility in South County Dublin. This existing cemetery has over 3,000 plots, or approximately 4,500 interments (based on 1.5 interments per plot), which is nearly three times the number of interments than is anticipated at the proposed Cemetery at the end of year 1.

The average daily trips to the Kilmashogue Cemetery was recorded as 256 Total Daily Trip (128 Arrivals and 128 Departures). A daily total of 486 Total Daily Trips (243 Arrivals and 243 Departures) has been assumed for this assessment at the end of year 1, for a robust and onerous traffic assessment, justifying the proposed trip generation.

The average total hourly trips (during the 5 hours when funerals took place) was 58 total hourly trips (35 Arrivals and 23 Departures), while a total of 120 total hourly trips (60 Arrivals and 60 Departures) has been assumed in this assessment, confirming that the trip generation figures used herein are robust and onerous.

The Kilmashogue Cemetery average AM Peak (8am-9am) trip generation was 1 vehicle trip (1 Arrival and 0 Departures), and an average PM Peak (5pm-6pm) trip generation

was 3 vehicle trips (0 Arrivals and 3 Departures). An AM Peak (8am-9am) and PM Peak (5pm-6pm) trip generation of 30 Peak Hour Trips (15 Arrivals and 15 Departures) has been assumed for this assessment, for a robust and onerous traffic assessment, again confirming that the trip generation figures used herein are robust and onerous.

While the proposed development will have a worst-case 0.7% and 0.9% increase in traffic at the existing Garter Lane / Fortunestown Lane junction, the existing junction has been modelled as per the existing junction arrangements. The existing Garter Lane/Fortunestown Lane Traffic Signal Controlled Junction consists of a stand-alone traffic signal-controlled T-Junction with single lane approaches and a full all-red pedestrian crossing phase, which results in limited performance and capacity, in particular at peak times there are a large number of vehicles turning right from Garter Lane onto Fortunestown Lane which block northbound vehicles.

The junction operates within theoretical capacity limits during the year of Opening Year 2025. Without the proposed development in place, the junction operates above capacity during the AM Peak in the Design Year 2040, but operates within capacity during the PM Peak in the Design Year 2040. The proposed development has a minimal impact on the capacity of the junction.

The assessment has also taken account of a permitted and planned junction improvement, **which was conditioned as part of an adjacent permission for Strategic Housing** on lands to the east of Garter Lane (ABP-300555-18, Condition 3(i)), which includes for a new right turn lane on the junction's southern arm.

This assessment also considers this junction improvement as 'committed infrastructure' for analysis purposes, in accordance with Industry TA Assessment Guidelines, which requires such infrastructure to be considered as being already provided. This is particularly the case in circumstances where the upgrade is planning condition for a 3<sup>rd</sup> party application. Notwithstanding, the proposed junction has been modelled with the proposed new ~35m long right turn lane on the junction's southern arm.

The proposed mitigation measures results in better junction Degree of Saturation and reduced queue lengths, compared to the existing junction. The junction operates within capacity, both in the Opening Year 2025 and the Design Year 2040.

Furthermore, we address **RFI Items 1A and 7C** which states that *"the applicant has proposed a perimeter road around the site boundary. No rationale or justification for this road has been provided. The applicant is therefore requested to provide a masterplan for the remaining blue line lands, to provide some insight into the future intention of these lands and thereby the requirement to provide the road as currently designed"* and *"the applicant is requested to clarify the rational for the 6.5m wide perimeter access road and accompanying cycle lane and footpath which continues from the 2 no proposed access points to the existing access road which runs parallel to the N7"*. The proposed perimeter road around the site boundary has now been curtailed with the perimeter road connecting to the internal service road, which provides access to overflow parking, and is required for hearses and connects to the pathways across the site.

**RFI Item 7D**, requests that *"the applicant is requested to submit a Mobility Management Plan detailing the predicted number of visitors travelling to and from the site by public transport or active travel and any measures to be put in place to promote the use of sustainable transport."* A Mobility Management Plan has been undertaken, which accompanies this revised Transportation Assessment.

**RFI Item 7E**, requests that *"the applicant is requested to submit a revised car parking layout showing a reduction in the number of car parking spaces, taking into account visitors travelling by sustainable transport modes. i. 20% of the spaces shall be Electric Vehicle Charging spaces .ii. 5% of the spaces shall be for mobility impaired users.* The proposed car parking has been reduced by 40%, from 110 no. spaces to 66 no. spaces. 23 no. car parking spaces will be provided beside the reception, with 43 spaces provided within overflow areas. 13 no. of spaces (20%) will be Electric Vehicle Charging spaces, with 3 no. of the spaces (5%) provided for mobility impaired users.

The Report has been prepared in accordance with the TII's Traffic & Transportation Assessment Guidelines and addresses the worst-case traffic impact of the proposal utilising data supported by new traffic surveys of an existing cemetery. This TA addresses the adequacy of the existing road network to safely and appropriately accommodate the worst-case vehicular demands with the development fully constructed and operational, taking account of the existing traffic demands locally and the various permitted developments in the area.

Being located in the heart of Saggart, within a short distance of Dublin and, with an ever-increasing population locally, the site is ideally placed to provide a significant and needed

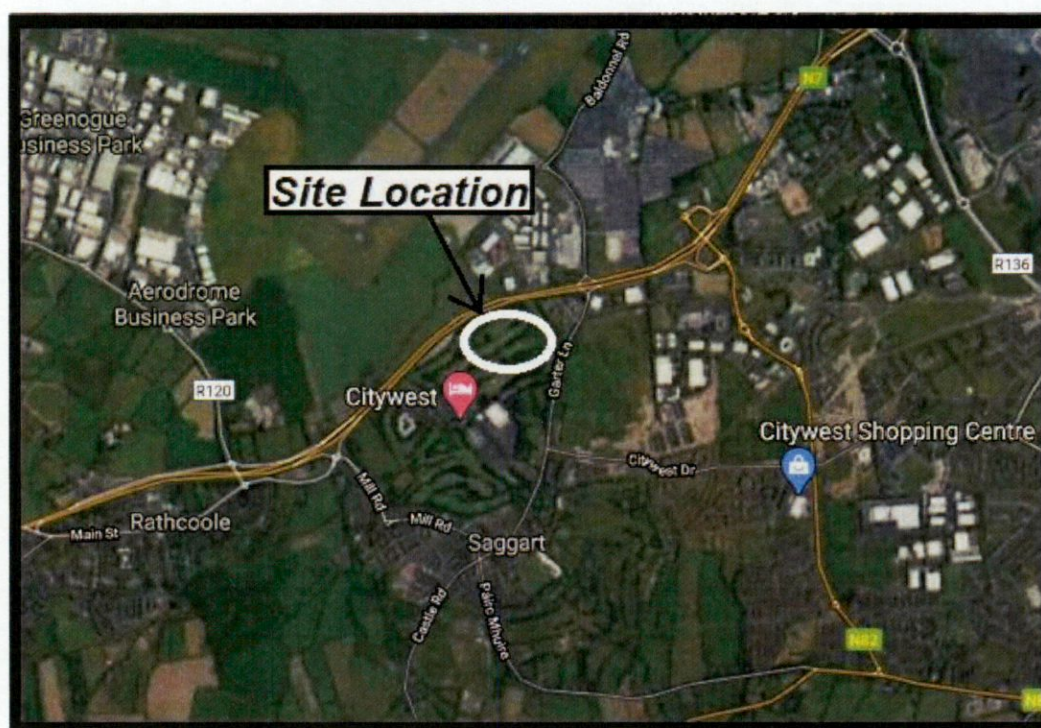
service. The proposed new vehicular access onto Garter Lane will include the provision of a dedicated right turn lane for intended right turning traffic.

The Transportation Assessment confirms that the proposed development has a negligible impact upon the operation of the adjacent road network and that the vehicular access junction to Garter Lane is more than adequate to accommodate the worst-case traffic associated with the cemetery operating. The assessment confirms that the construction and operation of the facility will have a negligible impact upon the operation of the adjacent road network and in particular the adjacent N7.

Based on our studies, we conclude that there are no adverse traffic/transportation capacity or operational safety issues associated with the construction and operation of the Cemetery that would prevent a grant of planning permission by South Dublin County Council.

## 1.0 INTRODUCTION

- 1.1 This Supplementary Transportation Assessment (TA) has been prepared by NRB Consulting Engineers Ltd and addresses the Traffic / Transportation issues arising from the proposal to construct and operate a Cemetery at Garter Lane, Saggart, Co. Dublin on lands previously in use as Citywest Golf Course.
- 1.2 The proposed development, a needed civic amenity, should be considered in the context of its location within the GDA, and being surrounded by under-construction & permitted high density residential developments (eg ABP-308982-20, ABP-305563-19 & ABP-300555-18). There are undoubtedly limited sites that can facilitate cemeteries of this nature in the GDA. A site location plan is included below as **Figure 1.1**.



**Figure 1.1 - Site Location in Saggart**

- 1.3 In describing the Receiving Environment and the Proposed Future Environment, this report addresses the following aspects of the proposed development:
- Relatively Small Scale of the development in Traffic generation terms,

- Location of the development within the GDA and the heart of Saggart, in close proximity to high quality Public Transport Links & local residents within easy walk distance,
- Predicted Trip Generation based on proposed interment rates advised by the client - 1,095 interments per year (averaging 3 funerals a day),
- Assessment of existing trip generation of the established Kilmashogue Cemetery,
- Traffic & Transportation impact,
- Capacity of the proposed vehicular accesses to accommodate the worst-case development traffic flows,
- Provision of a dedicated right turn lane on Garter Lane as ordinarily required by SDCC,
- Capacity of the Existing Road Network,
- Capacity of the Existing Garter Lane/Fortunestown Lane junction (with junction upgrades not implemented),
- Capacity of the Proposed Garter Lane/Fortunestown Lane junction (with junction upgrades implemented)
- Adequacy and safety of the existing roads and junctions locally, within the area of influence.

1.4 Recommendations contained within this Transportation Assessment are based on the following sources of information and industry-standard practices:

- The TII Traffic & Transport Assessment Guidelines,
- Design Manual for Urban Roads and Streets,
- Recent Weekday AM and PM Peak Classified Turning Movements Traffic Survey Data commissioned and undertaken in 2022 outside the Covid 19 Pandemic,
- TII Design Guidance,
- Our experience in assessing the impact of Developments of this Nature, and
- Site Visits and Observations.

1.5 The Report has been prepared in accordance with the requirements of the TII's Traffic & Transport Assessment Guidelines. These are the professional Guidelines used to assess the impact of developments on public roads.

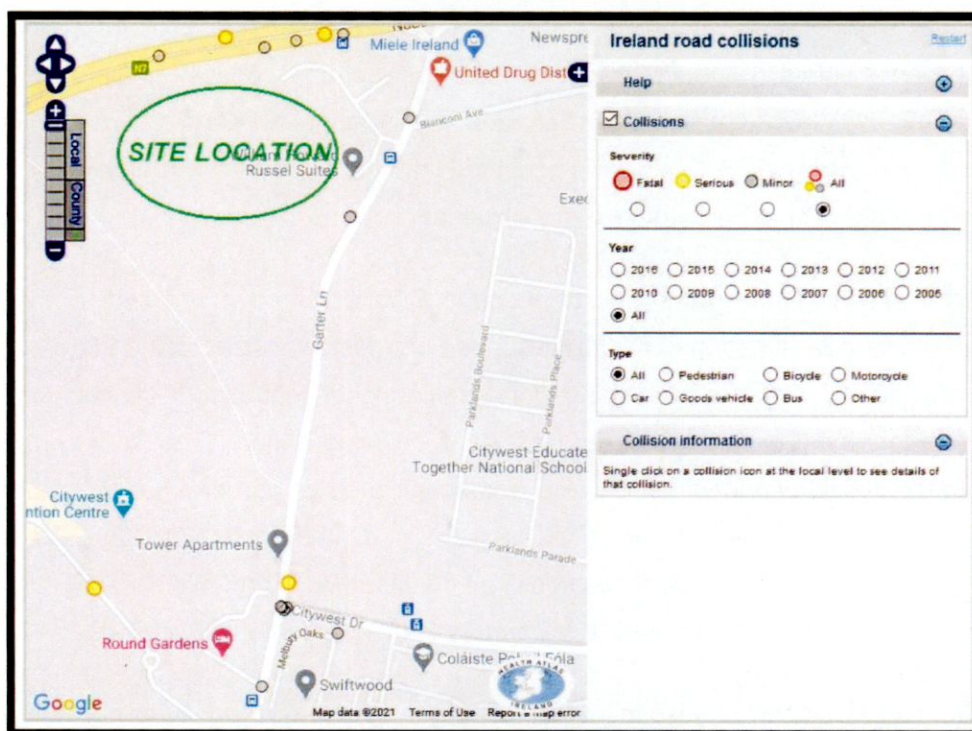
## **2.0 EXISTING CONDITIONS, DEVELOPMENT PROPOSALS & PARKING**

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- 2.1 The subject development site forms part of the previous Citywest Golf Course, being to the north-eastern corner of the lands. The site is located a short distance (within 1km) north of the Saggart LUAS Stop/Terminus on Garter Lane. The site is bound to the north by a hedgerows and roadway abutting the N7 National Road and an existing long established residential apartment development. The site is bound to the east by both private residential development and the local road, Garter Lane. It is bound to the west and south by elements of the Citywest Campus.
- 2.2 Garter Lane consists of a single carriageway road, and it links the N7 National Road with Saggart Village. It is a single carriageway 2-way road, currently subject to a 50km/h speed restriction and is relatively lightly trafficked in the context of its Link-Carrying Capacity. It runs generally in a N-S orientation past the site linking City West Hotel and Saggart Village with the N7 National Road Network. The Traffic survey confirms that Garter Lane currently carries a weekday AM Peak Hour 2-Way traffic flow of approximately 912 Passenger Car Units (PCUs) and a 2-way flow of 656 PCUs in the PM Peak Hour. In these terms, the road is considered moderately trafficked in terms of its 'link-capacity' or traffic-carrying capacity.
- 2.3 To set these flows in context, a road of this nature has a link or traffic capacity of between 1,200 & 1,500 PCUs per-direction per-hour (a capacity of between 2,400 & 3,000 2-way). So, considered in terms of its link capacity, Garter Lane is moderately trafficked. However, it is generally accepted that the capacity of a road is determined by the throughput or capacity of its terminal junctions.
- 2.4 In the case of Garter Lane, the traffic capacity of the road is affected by the limiting-performance & operation of the Garter Lane/Fortunestown Lane Traffic Signal Controlled Junction. This consists of a stand-alone traffic signal-controlled T-Junction with single lane approaches and a full all-red pedestrian crossing phase. There is a permitted and planned junction improvement, which was conditioned as part of an adjacent permission for Strategic Housing on lands to the east of Garter Lane (ABP-300555-18). This assessment considers this junction improvement as 'committed infrastructure' for analysis purposes, in accordance with Industry TA Assessment Guidelines.
- 2.5 Fortunestown Lane is also a single carriageway 2-way road, currently subject to a 50km/h speed restriction and, like Garter Lane, it too is moderately trafficked in the

context of its Link Carrying Capacity. It runs generally in a E-W orientation adjacent the LUAS Tracks and links the subject site to City West Shopping Centre to the east.

- 2.6 The original traffic survey confirms that, at the LUAS Stop, Fortunestown Lane carries a weekday AM Peak Hour 2-Way traffic flow of approximately 798 Passenger Car Units (PCUs) and a 2-way flow of 669 PCUs in the PM Peak Hour. In these terms, the road is also considered moderately trafficked in terms of its 'link-capacity' or traffic-carrying capacity - noting that it is also affected by the capacity of the Traffic Signal controlled junction.
- 2.7 The construction of the subject development will provide for a very significant and beneficial civic amenity, both for the GDA and for a large and growing local catchment, within easy walk distance, thereby reducing or eliminating the need to travel by car.
- 2.8 A review of the Road Safety Authority (RSA) on-line database of reported road traffic accidents confirms that there have been no significant accidents on the adjacent affected roads immediately at the site during the reported period 2005 to date (that are considered relevant, or which will be affected by the proposed development). An extract from the RSA Database is included below as **Figure 2.1**.



**Figure 2.1 - RSA Accident Extract**

### **Proposed Development**

- 2.9 A drawing showing the proposed Cemetery is included as **Appendix A**. The proposed cemetery development on the site consists of:
- 8,047 No. traditional burial plots (Three burials per plot – 24,141 total interments),
  - Columbarium walls,
  - 1 No. single storey reception building (214.7m<sup>2</sup> GFA) comprising a reception, 1 No. office, 1 No. reception store, WC, kitchenette with photovoltaic (PV) solar panels at roof level,
  - the provision of an ancillary maintenance shed, bin and battery storage structures,
  - 2 No. vehicular access point serving the proposed cemetery;
  - 66 No. car parking spaces (23 No. spaces to the east of the reception building and 43 No. within overflow car park areas to the south of the development);
  - 8 No. bicycle parking stands; and all associated hard and soft landscape and boundary treatment works including the reshaping of an existing lake and provision of a footbridge;
  - provision of SUDS measures, associated lighting, associated signage, site services (foul and surface water drainage and water supply); and
  - all other associated site excavation, infrastructural and site development works above and below ground.
- 2.10 The development includes for a new vehicular access road from Garter Lane which will include the provision of a dedicated right turn lane for intended right turning traffic.
- 2.11 To address RFI Items 1A and 7C, the proposed perimeter road around the site boundary has now been substantially altered/curtailed, with the perimeter road ending at the internal service road, which is required to provide access to overflow parking, and is required for hearses (and connects to the pathways across the site). The updated layout is shown in **Appendix A**.
- 2.12 The operational effects of the development and the levels of traffic generated are addressed within section 3 of this report.
- 2.13 We have reviewed the **Car Parking** provision in terms of the requirement in RFI item 7E to reduce the number of proposed car parking spaces. Based on the modal split for Places of Worship (as set out in the MMP), with 60% car-based trips and 40% by sustainable modes, the proposed car parking has been reduced by 40%, from 110 no. spaces to 66 no. spaces. 23 no. car parking spaces will be provided beside the

reception, with 43 spaces provided within overflow areas. 13 no. of spaces (20%) will be Electric Vehicle Charging spaces, with 3 no. of the spaces (5%) provided for mobility impaired users.

- 2.14 The Standards for **Bicycle Parking** are included in the SDCCDP Development Management Guidelines Table 12.23 and applying the standard for 'Place of Worship' requires a **minimum** of 1 space per 10 seats. Based on a typical or average funeral this would require 8-10 bicycle parking spaces, and 16 No spaces (8 no. stands) are proposed.
- 2.15 Further details of measures to encourage the use of alternative modes of transport are set out in the separate Preliminary Mobility Management Plan (or Travel Plan) as **Appendix I**. The enclosed MMP should be read in conjunction with the content of the TA Report, as an integral part.

### 3.0 TRIP GENERATION, ASSIGNMENT & DISTRIBUTION

- 3.1 The Trip Rate Information Computer System (TRICS) database is recommended for use to ascertain vehicular trip generation associated with the use of any particular site. However, having examined the database, there are no cemeteries included to allow a comparative assessment of traffic generated by developments of this nature to be accurately calculated. In this case we have therefore undertaken an assessment of the traffic generating characteristics from first principles, using a bespoke assessment.
- 3.2 A robust and onerous assessment has been undertaken of the traffic generation characteristics using the following assumptions:
- 3 no. FT maintenance staff,
  - 2 no. FT administration staff,
  - 3 no. FT staff associated with ancillary activities,
  - All staff assumed to be primary car drivers for robustness only.
- 3.3 In addition to the above, Family/friends of those interred in the cemetery will visit during the operational life of the facility. In terms of estimating visitor numbers, we have assumed a total of 1,095 no. traditional burials, during the end of the opening year. It has been further assumed that 5% of all burial graves would be visited each week. Therefore, for the year of opening visitor numbers are expected to be low, as few internments will have taken place at that time. The basis for the Traffic Generation Calculations is included as **Table 3.1** below, and included in **Appendix C**.

**Table 3.1 – Assumptions Used in Calculating Traffic Generated**

CALCULATION OF TRAFFIC GENERATION FOR CEMETERY FROM 1st PRINCIPLES	
CEMETERY STAFF TRAFFIC GENERATION	
3	Maintenance Staff (Gravedigging/Stonework/General Maintenance)
2	Administration Staff
3	Staff Associated with Ancillary Site Activities (eg Florist/Coffee)
8	Total <b>Staff</b> Working a 9-5 Standard Day (All Assumed to Drive as Car Drivers)
VISITOR TRAFFIC GENERATION DAILY (YEAR 1)	
1095	Traditional Burials Per Year (Max/Worst Case Assumed)
55	Daily Visits by Relatives Year 1 (Assuming 5% of internments visited daily)
VISITOR TRAFFIC GENERATION DAILY (YEAR 15)	
16425	Total Traditional Burials By End of Year 15
821	Daily Visits by Relatives By End Yr 15 (Assuming 5% of internments visited daily)
WORST CASE FUNERAL/CORTEGE/INTERMENT	
3	Maximum Funerals any one Day, worst case (Assumed)
60	Avg-Maximum Cars Expected to Attend
180	Daily Car Trips for Burials/Internments (Always after 11am, and before 3pm)





- 3.4 The resulting traffic generated on a daily basis by the cemetery is as set out in **Table 3.2** below. We have used a robust and onerous assumption that 12.5% of the daily relative visits occur during the commuter peak hours, when it can be seen from the Kilmashogue Cemetery traffic surveys, outlined in **Table 3.4**, that the max trip generated during the peak hours was only 1% of all total daily trips, which occurred during the PM peak (5-6pm).

**Table 3.2 – Worst Case Traffic Generated by Kilmashogue Cemetery**

RESULTING 1ST PRINCIPLE OPENING YEAR TRAFFIC PREDICTIONS (PCUs)			
Network Hour	Arrivals (PCUs)	Departures (PCUs)	2-Way Traffic Flow
8am-8pm Daily (AADT)	243	243	486
Weekday AM Peak Hr 8-9am*	15	15	30
Weekday PM Peak Hr 5-6pm*	15	15	30
RESULTING 1ST PRINCIPLE DESIGN YEAR TRAFFIC PREDICTIONS (PCUs) AFTER 15 YEARS			
Network Hour	Arrivals (PCUs)	Departures (PCUs)	2-Way Traffic Flow
8am-8pm Daily (AADT)	1009	1009	2019
Weekday AM Peak Hr 8-9am*	111	111	221
Weekday PM Peak Hr 5-6pm*	111	111	221

\* Assumed that 12.5% of the Daily Relative Visits Occur During the Commuter Peak Hours

- 3.5 The impact locally should be considered in the context of the demonstrably low levels of traffic generated by the development **during the key weekday AM and PM commuter periods**.
- 3.6 We have reviewed the Transportation Assessment Reports undertaken for each of the adjacent permitted Strategic Housing Development Applications surrounding the subject site. We have directly extracted the predicated Traffic Effects of these separate 'committed' applications, and we have included these traffic predictions within the assessment and within the baseline Traffic Flows included as **Appendix D**. We have also included and used the same Traffic Distribution Proportions and Assessment Techniques for the SHD related traffic that were used in the assessment of the permitted adjacent SHD Applications.
- 3.7 The traffic surveys undertaken allowed us to establish the existing baseline traffic conditions. We included the traffic associated with the committed development elements locally, in addition to the traffic generated by the referenced planning applications. Details of the traffic surveys, are included as **Appendix B** and are reproduced as commuter peak hour Network Flow Diagrams as **Appendix D**.
- 3.8 In Traffic Engineering all vehicles are expressed in terms of "Passenger Car Units" (PCUs), sometimes referred to as "Car Equivalents". This is the methodology that has

been employed here, with specific industry standard conversion factors to convert HGVs, Skip Lorries, Cars/Trailers, and Bin Lorries to PCUs. The conversion factors used are in accordance with industry-standard recommendations.

- 3.9 We have assigned the new and committed traffic to the road network based on the reasonable and industry standard assumption that the trip patterns will mirror the existing weekday AM and PM peak hour traffic count data in terms of traffic turning proportions and distribution at junctions and in particular here, they reflect the observed patterns during the commuter peak hours on the local roads.
- 3.10 We have selected a year of opening of 2025 for the purposes of this assessment; however, it should be noted that minor changes of 1-2 years in the selected or actual year of opening will have no impact on the conclusions of the study. We have also undertaken assessment of the Design Year 2040 (15 years following opening), in accordance with Design Guidance, applying the Opening +15-year Traffic Generation assumptions included within **Table 3.2** above.
- 3.11 Traffic growth factors for future year assessments were calculated from data obtained in TII PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 (Travel Demand Projections 2021, Table 6.1: Central Growth Rates: Annual Growth Factors Dublin), which provides the recommended method of predicting future year traffic growth on Roads. Calculations of the relevant growth factors are included in **Table 3.3** below (based on tabulated 'central growth' in the Dublin Area).
- 3.12 It should be noted that any requirement to use different or higher growth factors will have no implications for the conclusions of the study, in light of the very low levels of annual background traffic growth.

**Table 3.3 - Traffic Growth Rates, TII Travel Demand Projections Unit 5.3**

Year	to Year	Table 6.1
Survey	2025	1.049
2025	2040	1.140

- 3.13 The resulting Traffic Flow Projections and Figures within **Appendix D** allowed the assessment of impact of the development to be undertaken.

### **Kilmashogue Cemetery Traffic Surveys**

- 3.14 In order to address RFI Item 7F, regarding data on daily trips to the cemetery, traffic surveys were commissioned at the Kilmashogue Cemetery for a 5-day traffic period, between Thursday 30<sup>th</sup> March to Wednesday 5<sup>th</sup> April 2023, each day between 7am and 7pm.
- 3.15 Kilmashogue Cemetery is an established cemetery location in South County Dublin. This existing cemetery has over 3,000 plots, or approximately 4,500 internments (based on 1.5 interments per plot), three times the number of interments than is anticipated at the proposed Cemetery at the end of year 1.
- 3.16 The total hourly and daily trip generation, arrivals, departments and total, for the 5-day period are shown in **Table 3.4** below. The average daily trips to the Kilmashogue Cemetery were recorded as 256 Total Daily Trip (128 Arrivals and 128 Departures). As per Table 3.2, a daily total of 486 Total Daily Trips (243 Arrivals and 243 Departures) has been assumed in the traffic analysis for this report at the end of year 1, representing a robust and onerous traffic assessment, confirming the thorough approach to trip generation.
- 3.17 Five funerals took place over the 5-day period. These took place at the following times:
- Friday at 12pm
  - Friday at 1pm
  - Friday at 2.45pm
  - Monday at 11.30am
  - Tuesday at 11.30am
- 3.18 The three funerals which took place on Friday 31<sup>st</sup> March, explaining why it has the highest number of trips during the 12pm to 3pm time period. The average total hourly trips during the 5 hours when funerals took place was 58 total hourly trips (35 Arrivals and 23 Departures), while a total of 120 total hourly trips (60 Arrivals and 60 Departures) has been assumed in the traffic analysis for this report, as set out in **Table 3.1**, thus justifying the proposed trip generation.
- 3.19 The average hourly trips are shown in the last three columns. It shows that the maximum trip generation occurs between 1pm-2pm, outside the peak network periods. The total max generation during this time period was 42 vehicles total hourly trips (21 Arrivals and 21 Departures).
- 3.20 However, during the network peaks, the AM and PM peak, the average trip generation was a lot lower than during the 1pm-2pm time period. The Kilmashogue Cemetery

average AM Peak (8am-9am) trip generation was 1 vehicle trip (1 Arrival and 0 Departures), and an average PM Peak (5pm-6pm) trip generation was 3 vehicle trips (0 Arrivals and 3 Departures).

- 3.21 An AM Peak (8am-9am) and PM Peak (5pm-6pm) trip generation of 30 Peak Hour Trips (15 Arrivals and 15 Departures) has been assumed for this assessment, as set out in **Table 3.2**, for a robust and onerous traffic assessment, justifying the proposed trip generation.

**Table 3.4 - Kilmashogue Cemetery Hourly Trip Generation**

	Thursday 30th March			Friday 31st March			Monday 3rd April			Tuesday 4th April			Wednesday 5th April			Average		
	Entry	Exit	Total	Entry	Exit	Total	Entry	Exit	Total	Entry	Exit	Total	Entry	Exit	Total	Entry	Exit	Total
7am-8am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8am-9am	1	0	1	2	0	2	1	0	1	2	0	2	0	0	0	1	0	1
9am-10am	0	0	0	3	3	6	4	3	7	3	0	3	2	0	2	2	1	4
10am-11am	9	8	17	17	12	29	18	18	36	15	12	27	8	8	16	13	12	25
11am-12noon	16	9	25	17	15	32	28	13	41	37	18	55	15	13	28	23	14	36
12noon-1pm	12	15	27	27	28	55	10	21	31	18	37	55	14	16	30	16	23	40
1pm-2pm	5	7	12	44	46	90	17	15	32	22	25	47	17	12	29	21	21	42
2pm-3pm	22	19	41	37	10	47	22	21	43	20	17	37	18	20	38	24	17	41
3pm-4pm	17	16	33	11	40	51	20	24	44	21	23	44	16	16	32	17	24	41
4pm-5pm	9	15	24	18	19	37	6	6	12	12	17	29	9	12	21	11	14	25
5pm-6pm	0	2	2	0	3	3	0	5	5	0	1	1	0	2	2	0	3	3
6pm-7pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	91	91	182	176	176	352	126	126	252	150	150	300	99	99	198	128	128	256
Network Peak Hour																		
Funeral																		

- 3.22 The raw traffic survey data for the Kilmashogue Cemetery is provided in **Appendix H**.

## 4.0 **TRAFFIC IMPACT - TRAFFIC CAPACITY RESULTS**

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- 4.1 The Institution of Highways and Transportation (IHT) Guidelines for Traffic Impact Assessment and the TII Traffic and Transport Assessment Guidelines sets out a mechanism for assessment of developments of this nature and determining whether further assessment is indeed required. This industry standard process requires a **Threshold Assessment** of the impact on the local roads to be provided in order to determine whether further, more detailed modelling and assessment of particular critical junctions is necessary.
- 4.2 The professional guidance referenced above sets out specific increases in traffic volume associated with new development, which, if breeched, requires further detailed analysis to be undertaken. The recommendation is that, if the expected increase is **5% or greater**, then further analysis is warranted in circumstances where junctions are at capacity or are within but are nearing capacity. It should be noted that in cases where the observed traffic flow on any road is low, the effect of the development can have a disproportionate impact - with low levels of existing traffic the net effect of increased traffic is exacerbated). In the case of the subject development site, we have added the effect of traffic associated with adjacent permitted development, with Traffic Data and Distribution extracted from the Transportation Assessment Reports prepared for the individual applications. It should also be noted that we have applied a realistic and robust assessment of the levels of traffic associated with the proposed Cemetery as explained above and as included in **Appendix D**.
- 4.3 With the current and predicted traffic characteristics in the area, and with the ever-increasing residential density within walking distance, it is anticipated that the addition of the development traffic, to long established roads will in-reality not result in any significant level of increase in traffic capacity issues arising on the local roads.
- 4.4 It should also be noted that with the creation of the local roads and streets in the area, as residential sites become developed, this will have the effect of further reducing traffic impact by dispersing and diluting the effect of any additional development related traffic volumes. In addition, under Assessment Guidance, any requirement to consider the effect of even more committed or planned development would have the effect of further increasing base/background traffic conditions and would in fact have the knock-on effect of reducing the net impact of the subject cemetery development traffic.

- 4.5 We have undertaken the detailed assessment of the impact of the proposed development (Reference **Appendix D** Page 7 herewith), and this confirms the Threshold Impact of locally affected junctions as set out below as **Table 4.1**.

**Table 4.1 - Opening Year Threshold Assessment of Junction Impact - TII Guidelines**

Relevant Junction	AM Pk (%)	PM Pk (%)	Comment
N7 National Road Junction	0.1%	0.1%	Sub 5% Threshold - No Assessment Req'd
Bianconi Ave/Garter Lane	1.4%	1.7%	Sub 5% Threshold - No Assessment Req'd
Fortunestown Lane/Garter Ave	0.9%	1.4%	Sub 5% Threshold - No Assessment Req'd but included as requested in the SDCC RFI
Garter Lane/City West Access	0.7%	0.9%	Sub 5% Threshold - No Assessment Req'd
Development Vehicular Access	NA	NA	Junction Assessed for Completeness

- 4.6 In terms of the National Road N7, it is clear that the scale of the subject application is sub-threshold in Traffic Impact Terms, with commuter peak hour increases of 0.1% (i.e., not even near 1%) meaning that the increases in traffic are negligible and unnoticeable. In 24 Hr AADT terms, the effect on the N7 is 0.14%. To set these increases in context, the accepted day-to-day variation in traffic volumes (due to variables such as day of week or weather conditions) is accepted as being 10%. In this regard, less than single digit percentage increases or changes will go entirely unnoticed on the N7.

#### **Proposed Site Access to Garter Lane**

- 4.7 Notwithstanding the clear low levels of traffic, we have undertaken a detailed assessment of the capacity of the proposed Garter Lane Priority Junction serving as access to the proposed cemetery using TII-approved software modelling techniques and this is included below.
- 4.8 We have used the TII-approved computer simulation model PiCADY (Priority Intersection Capacity & Delay) to assess the capacity queues and delay at the site access junction in order to confirm that adequate capacity exists in order to accommodate the proposed development traffic in addition to existing and committed or permitted flows. The results of the modelling are summarised and discussed below.
- 4.9 The results of the capacity modelling are summarised as **Table 4.2**, with the entire models included herein as **Appendix E**.

**Table 4.2 - PiCADY Summary Results New Site Access onto Garter Lane**

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2025 Opening Year AM Peak	<1	0.04
2025 Opening Year PM Peak	<1	0.03
2040 Design Year AM Peak	<1	0.32
2040 Design Year PM Peak	<1	0.27

- 4.10 The capacity output results above are way below the recommended RFC of 0.85 (85% Capacity) and therefore no problems are anticipated at the Proposed Junction in terms of Capacity or excessive vehicle Queues. This provides significant assurance in terms of capacity in light of the onerous and realistic generation rates applied.
- 4.11 The above analysis confirms that there is more than adequate capacity in the existing and proposed junctions to accommodate the worst-case traffic projections without any concerns arising in terms of traffic congestion or indeed Traffic Safety, with a negligible effect associated with the proposed cemetery traffic.

#### **Garter Lane / Fortunestown Lane Junction**

- 4.12 The existing Garter Lane/Fortunestown Lane Traffic Signal Controlled Junction consists of a stand-alone traffic signal-controlled T Junction with single lane approaches and a full all-red pedestrian crossing phase, which results in limited performance and capacity, in particular there is a large number of vehicles turning right from Garter Lane onto Fortunestown Lane which block northbound vehicles.
- 4.13 There is a permitted and planned junction improvement, which was conditioned for construction as part of an adjacent permission for Strategic Housing on lands to the east of Garter Lane (ABP-300555-18), which includes for a new right turn lane on the junction's southern arm. This assessment considers this junction improvement as 'committed infrastructure' for analysis purposes, in accordance with Industry TA Assessment Guidelines. This is provided at the specific request of SDCC within the RFI.
- 4.14 We have used the TII-approved software package **LINSIG** (Linked Signal Design) software package to assess the capacity of the existing and proposed junction. LINSIG produces results based on a Degrees of Saturation (DoS) and Mean Max Queues (PCU-Hr). A DoS greater than 100% indicates that a junction is operating at or above maximum capacity, with 90% considered to be the optimum DoS value for signal junction operation.

### Existing Garter Lane / Fortunestown Lane

- 4.15 The existing junction has been modelled with the current junction arrangements, with single lane approaches and a full all-red pedestrian crossing phase. The results of the capacity modelling are summarised in **Tables 4.3 & 4.4**, with the entire models included herein as **Appendix F**.

**Table 4.3: LiNSiG Results, Existing Junction Without Development, Weekday AM & PM Peak Hours - 2025 & 2040**

Modelled Scenario	Max Junction DoS (%)	Mean Max Queues (PCU)
Opening Year 2025 AM Peak Hr	88.5%	18.1
Opening Year 2025 PM Peak Hr	64.2%	12.9
Design Year 2040 AM Peak Hr	107.6%	44.0
Design Year 2040 PM Peak Hr	79.8%	17.1

**Table 4.4: LiNSiG Results, Existing Junction With Development, Weekday AM & PM Peak Hours - 2025 & 2040**

Modelled Scenario	Max Junction DoS (%)	Mean Max Queues (PCU)
Opening Year 2025 AM Peak Hr	88.8%	18.3
Opening Year 2025 PM Peak Hr	64.7%	13.1
Design Year 2040 AM Peak Hr	110.2%	66.0
Design Year 2040 PM Peak Hr	84.1%	18.4

- 4.16 As is shown in the LinSig results, comparing Tables 4.3 and 4.4, the proposed development has a minimal impact on the capacity of the junction. The junction operates within theoretical capacity limits during the year of opening, but with long queues in the AM peak. Without the development in place the junction operates above capacity during the AM Peak in the design year 2040. **However, as per the Mitigation Measures as set out in Section 11.6.3 of the EIAR (ABP-300555-18), it is proposed to upgrade this junction by 2024, with the proposed layout by others shown in Appendix J.**

### Proposed Garter Lane / Fortunestown Lane

- 4.17 The proposed junction has been modelled with the proposed mitigation measures in place, which includes for a new ~35m right turn lane on the junction's southern arm. The results of the capacity modelling are summarised in **Tables 4.5 & 4.6**, with the entire models included herein as **Appendix G**.

**Table 4.5: LiNSiG Results, Proposed Junction Without Development, Weekday AM & PM Peak Hours - 2025 & 2040**

Modelled Scenario	Max Junction DoS (%)	Mean Max Queues (PCU)
Opening Year 2025 AM Peak Hr	66.8%	11.8
Opening Year 2025 PM Peak Hr	58.1%	12.1
Design Year 2040 AM Peak Hr	82.1%	18.7
Design Year 2040 PM Peak Hr	75.6%	16.3

**Table 4.6: LiNSiG Results, Proposed Junction With Development, Weekday AM & PM Peak Hours - 2025 & 2040**

Modelled Scenario	Max Junction DoS (%)	Mean Max Queues (PCU)
Opening Year 2025 AM Peak Hr	66.9%	11.9
Opening Year 2025 PM Peak Hr	59.9%	12.5
Design Year 2040 AM Peak Hr	83.4%	19.3
Design Year 2040 PM Peak Hr	79.5%	17.3

- 4.18 As can be seen in Tables 4.5 and 4.6, the proposed mitigation measures results in better junction Degree of Saturation and reduced queue lengths, compared to the existing junction. The improved junction operates within capacity, with a maximum DoS of 83.4% in the Design Year 2040 AM Peak Hour.

## 5.0 CONCLUSIONS

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- 5.1 This revised supplementary Transportation Assessment Report assesses the traffic & transportation impact of the proposal to construct and operate a Cemetery at Garter Lane, Saggart, Co. Dublin on lands previously in use as Citywest Golf Course, and to address RFI Items 1A, 7C, 7D, and 7F.
  
- 5.2 RFI 1A & 7C - The proposed perimeter road around the site boundary has now been amended/curtailed with the perimeter road now connecting as far as the internal service road only, to the point which provides access to overflow parking, and is required for hearses (and also connects to the pathways across the site).
  
- 5.3 RFI 7D - A Mobility Management Plan has been undertaken, which accompanies this revised Transportation Assessment and is included as **Appendix I**.
  
- 5.4 RFI 7E - The proposed car parking has been reduced by 40%, from 110 no. spaces to 66 no. spaces. 23 no. car parking spaces will be provided beside the reception, with 43 spaces provided within overflow areas. 13 no. of spaces (20%) will be Electric Vehicle Charging spaces, with 3 no. of the spaces (5%) provided for mobility impaired users.
  
- 5.5 RFI 7F - The Trip Generation has been updated, to include for 1,095 interments per year (averaging 3 funerals a day), rates as advised by the applicant. This has also been supplemented by additional comparative traffic surveys at Kilmashogue Cemetery.
  
- 5.6 RFI 7F - These additional traffic surveys were undertaken over a 5-day period (Thursday 30th March to Wednesday 5th April 2023), at Kilmashogue Cemetery, an established cemetery location in South County Dublin. The Trip Generation rates from this established cemetery show that the trip rates used in this assessment are onerous and robust.
  
- 5.7 RFI 7F - While the proposed development will have a worst-case 0.7% and 0.9% increase in traffic at the existing Garter Lane / Fortunestown Lane junction, the existing junction has been modelled as specifically requested by SDCC. The junction operates within theoretical capacity limits during the year of Opening Year 2025. Without the proposed development in place, the junction operates above capacity during the AM Peak in the Design Year 2040 but operates within capacity during the PM Peak in the Design Year 2040.

- 5.8 RFI 7F - We understand that there is a permitted and planned junction improvement, which was conditioned as part of an adjacent permission for Strategic Housing on lands to the east of Garter Lane (ABP-300555-18, Condition 3(i)), which includes for a new right turn lane on the junction's southern arm. The proposed mitigation measures results in better junction Degree of Saturation and reduced queue lengths, compared to the existing junction. The junction operates within capacity, both in the Opening Year 2025 and the Design Year 2040.
- 5.9 The Report has been prepared in accordance with the TII's Traffic & Transportation Assessment Guidelines and addresses the worst-case traffic impact of the proposal. This TA addresses the adequacy of the existing road network to safely and appropriately accommodate the worst-case vehicular demands with the development fully constructed and operational, taking account of the existing traffic demands locally and the various permitted developments in the area.
- 5.10 Comprehensive classified turning movement surveys of the existing affected roads and junctions were carried out during the weekday AM and PM Peak Hours in 2022 during normal school term, outside the Covid 19 Pandemic, and these surveys informed the study. The analysis includes the effects of the existing traffic and permitted development traffic on the local roads and assesses the impact during the traditional peak commuter periods with the Cemetery operational.
- 5.11 The Transportation Assessment confirms that the proposed development has a negligible impact upon the operation of the adjacent road network and that the vehicular access junction to Garter Lane is more than adequate to accommodate the worst-case traffic associated with the cemetery operating. The assessment confirms that the construction and operation of the facility will have a negligible impact upon the operation of the adjacent road network and in particular the adjacent N7.
- 5.12 Car and Bicycle Parking is being provided generally in compliance with the requirements of the SDCC Development Plan.
- 5.13 Based on our studies, we conclude that there are no adverse traffic/transportation capacity or operational safety issues associated with the construction and operation of the Cemetery that would prevent a grant of planning permission by South Dublin County Council.

## APPENDICES - CONTENT

A	Development Layout and Access Arrangement
B	Raw Traffic Survey Data (2022 Validation Output)
C	Cemetery Traffic Generation Calculations (1 <sup>st</sup> Principles)
D	Traffic Flow Projections, Calculations & Network Flow Diagrams
E	PiCADY Output Data (Site Access Priority Junction)
F	LinSig Output Data (Existing Garter Lane / Fortunestown Lane Junction)
G	LinSig Output Data (Proposed Garter Lane / Fortunestown Lane Junction)
H	Raw Traffic Survey Data for the Kilmashogue Cemetery
I	Mobility Management Plan
J	Proposed Junction Improvement – Garter Lane and Fortunestown Lane

**APPENDIX A**

**Development Layout/Access Arrangement**



