Proposed Residential Development
at
Hayden's Lane
Lucan
County Dublin

Traffic Report

Prepared for
Green Construction Ltd

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Traffic and Transportation Consultants

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1.0 Introduction.

1.1 TPS M Moran & Associates have been retained by Green Construction Ltd to undertake a Traffic Report relating to a proposed residential development consisting of 74 apartment units on lands off Hayden's Lane, Lucan, County Dublin.

1.2 The former National Roads Authority now, Transport Infrastructure for Ireland published the *'Traffic and Transport Assessment Guidelines'* in September 2014 which provided specific advice when a Traffic Impact Assessment should be undertaken.

1.3 These guidelines identified thresholds for land use development based on land use trip attraction or land use trip generation which impact on adjacent road links or junctions receiving the proposed development.

1.4 These guidelines also provided advice on acceptable traffic modelling programs, traffic data sources, road safety issues to be considered and pre planning discussions with the relevant Local Authority. These thresholds are set down below.

Thresholds

This section considers the thresholds at which the production of Traffic and Transport Assessments in relation to planning applications is recommended.

It is important to identify proposals that will affect National Roads, and which may have other transport implications at the earliest stages of development planning and design.

This will help to ensure that additional costs and delays to the developer are avoided and facilitate best practice evaluation by planning authorities, the NRA and other transport agencies.

Table 1.4 of the Traffic Management Guidelines (DoT/DoEHLG/DTO, 2003) gives the thresholds above which a Transport Assessment is automatically required. The thresholds concerned are reproduced below.

- *Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road.*
- *Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists, or the location is sensitive.*
- *Residential development in excess of 200 dwellings.*
- *Retail and leisure development in excess of 1,000m2.*
- *Office, education and hospital development in excess of 2,500m2*
- *Industrial development in excess of 5,000m2*
- *Distribution and warehousing in excess of 10,000m2*

1.5 While the proposed residential development is well below these thresholds which will be discussed further within this report, we consider it worthwhile to outline the likely trip generation and traffic impact of this small residential development.

2.0 Scope of the Traffic Report.

2.1 In this report we will identify the existing road and traffic conditions and assess the relative level of impact the proposed development is likely to have on the local road network. We will also identify how the traffic associated with the proposed residential development can be accommodated on the adjacent road network.

2.2 The methodology used within this TIA complies with best practise for Traffic Impact Assessments indicated within key publications, which include:

- 'Traffic and Transport Assessment Guidelines' National Roads Authority (May 2014).
- 'Guidelines for Traffic Impact Assessments' The Institution of Highways and Transportation.
- The Design Manual for Urban Roads and Streets.

2.3 In this report the existing roads and traffic conditions in the vicinity of the proposed residential apartment development site will be identified. The relative level of impact the proposed development is likely to have on the local road network will be assessed.

2.4 In this report comment will also be made on the proposed vehicular site access arrangements to serve the proposed residential development. In addition, this report, which addresses the likely traffic impact of the proposed development, will generally be structured as follows:

- Existing Site Former Land Uses.
- Assessment of the existing roads and traffic conditions on the road network in the vicinity of the proposed development site.
- Assessment of the trip rates associated with the proposed residential development.
- Assignment of the trip distribution patterns associated with the proposed development onto the adjacent road network.
- Design Manual for Urban Roads and Streets and Proposed Site Access.
- Proposed site access arrangements.
- Car Parking Provision.
- Swept Path Assessments.

2.5 Background information used within this report has been derived from technical information and layout plans prepared by Opperman Project Architects, for this development proposal.

3.0 Existing Site Former Land Uses.

3.1 The existing site formerly operated as a 2-storey industrial unit having a general gross floor area of 2691sq metres.

3.2 Vehicular access to this former industrial unit is provided from Hayden's Lane at 2 locations taking the form of wide gated simple priority junctions located towards the northern and southern boundaries of this site.

3.3 These access points provide access to the surface parking and service areas associated within the former industrial unit. Thus, it can be considered that the principle of vehicular access to serve land use development is well established from this section of Hayden's Lane.

3.4 While we do not have details on the extent of daily or peak hour's trips generated by this former industrial unit, we can provide estimated trips based on the gross floor area of this unit being reviewed within the TRICS 2020(b) database.

3.5 Table 1.0 below is derived from the TRICS 2020(b) database which indicates this unit had the potential to generate just below 50 inbound and 50 outbound traffic movements during its typical daily operation.

Survey Start/End: 00:00-24:00
Trip rate parameter range available: 1138 - 974258 (units: sqm)

State TRP Figure & Extrapolate Results | ON | Estimated TRIP rate value per 2691 SQM
Estimated TRIP rates shown in shaded column (for 2691 SQM)

TRIP RATE VALUE PER 100 SQM	ARRIVALS Total Rate: 1.807 Peak: 08:00-09:00			Total 48.553	DEPARTURES Total rate: 1.698 Peak: 17:00-18:00			Total 45.662	TOTALS Total rate: 3.505 Peak: 08:00-09:00			Total 94.215
	No. Days	Ave. GFA	Trip Rate	Estimated Trip rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip rate
00:00-01:00	1	470200	0.004	0.097	1	470200	0.002	0.046	1	470200	0.006	0.143
01:00-02:00	1	470200	0.005	0.126	1	470200	0.001	0.017	1	470200	0.006	0.143
02:00-03:00	1	470200	0.005	0.137	1	470200	0.002	0.046	1	470200	0.007	0.183
03:00-04:00	1	470200	0.006	0.149	1	470200	0.002	0.046	1	470200	0.008	0.195
04:00-05:00	1	470200	0.009	0.240	1	470200	0.002	0.063	1	470200	0.011	0.303
05:00-06:00	15	46002	0.042	1.131	15	46002	0.011	0.296	15	46002	0.053	1.427
06:00-07:00	16	43831	0.105	2.828	16	43831	0.029	0.783	16	43831	0.134	3.611
07:00-08:00	68	40576	0.171	4.596	68	40576	0.059	1.590	68	40576	0.230	6.186
08:00-09:00	68	40576	0.210	5.639	68	40576	0.090	2.420	68	40576	0.300	8.059
09:00-10:00	68	40576	0.155	4.167	68	40576	0.109	2.934	68	40576	0.264	7.101
10:00-11:00	68	40576	0.129	3.484	68	40576	0.118	3.184	68	40576	0.247	6.668
11:00-12:00	68	40576	0.125	3.358	68	40576	0.128	3.434	68	40576	0.253	6.792
12:00-13:00	68	40576	0.127	3.410	68	40576	0.144	3.871	68	40576	0.271	7.281
13:00-14:00	68	40576	0.142	3.828	68	40576	0.134	3.608	68	40576	0.276	7.436
14:00-15:00	68	40576	0.119	3.202	68	40576	0.146	3.921	68	40576	0.265	7.123
15:00-16:00	68	40576	0.109	2.928	68	40576	0.152	4.095	68	40576	0.261	7.023
16:00-17:00	68	40576	0.103	2.781	68	40576	0.183	4.922	68	40576	0.286	7.703
17:00-18:00	68	40576	0.066	1.767	68	40576	0.189	5.079	68	40576	0.255	6.846
18:00-19:00	68	40576	0.047	1.252	68	40576	0.084	2.248	68	40576	0.131	3.500

Former Industrial Unit Daily Trip Generation Table 1.0

3.6 In addition, the site has a planning permission for a nursing home comprising of 124 bedrooms (147 bed spaces) which was granted consent by South Dublin County Council under Planning Ref. SD15A/0301 in May 2017.

3.7 The permitted vehicular access to this nursing home development was via a single priority T junction off Hayden's Lane which incorporated 6.0metres junction radii within the bellmouth of this 6.05metre wide access road. Visibility sightlines of 2.4metres by 49.0metres within this access into the leading and non-leading traffic directions of Hayden's Lane.

3.8 A 1.80metre footpath was also proposed along the entire site frontage adjacent to Hayden's Lane.

3.9 The nursing home envisaged and occupancy of 132 residents with associated medical and administration staff operating 24 hours over 3 shifts.

3.10 39 car parking spaces were to be provided within the development with 12 covered bicycle parking spaces also provided within this surface car park.

3.11 From a further review of the TRICS 2020 (b) database we can project that daily trips associated with this nursing home land use just over 140 inbound and outbound traffic movements could be generated by this development.

3.12 During the typical peak hour periods this development could generate up to 15 inbound and 18 outbound traffic movements. The extent of these trips is outlined within Table 2.0 below.

TOTAL VEHICLES | Estimate TRIP rates

Survey Start/End: 07:00-21:00
Trip rate parameter range available: 16 - 99 (units:)

State TRP Figure & Extrapolate Results | ON

Estimated TRIP rate value per 132 RESIDE
Estimated TRIP rates shown in shaded column (for 132 RESIDE)

TRIP RATE VALUE PER 1 RESIDE	ARRIVALS Total Rate: 1.074 Peak: 07:00-08:00			Total 142.021	DEPARTURES Total rate: 1.088 Peak: 14:00-15:00			Total 143.404	TOTALS Total rate: 2.162 Peak: 14:00-15:00			Total 285.425
	No. Days	Ave. RESIDE	Trip Rate	Estimated Trip rate	No. Days	Ave. RESIDE	Trip Rate	Estimated Trip rate	No. Days	Ave. RESIDE	Trip Rate	Estimated Trip rate
00:00-01:00												
01:00-02:00												
02:00-03:00												
03:00-04:00												
04:00-05:00												
05:00-06:00												
06:00-07:00												
07:00-08:00	25	50	0.134	17.749	25	50	0.056	7.333	25	50	0.190	25.082
08:00-09:00	25	50	0.071	9.353	25	50	0.068	8.928	25	50	0.139	18.281
09:00-10:00	25	50	0.076	10.097	25	50	0.039	5.101	25	50	0.115	15.198
10:00-11:00	25	50	0.102	13.498	25	50	0.060	7.865	25	50	0.162	21.363
11:00-12:00	25	50	0.079	10.415	25	50	0.069	9.140	25	50	0.148	19.555
12:00-13:00	25	50	0.063	8.290	25	50	0.082	10.841	25	50	0.145	19.131
13:00-14:00	25	50	0.111	14.667	25	50	0.087	11.478	25	50	0.198	26.145
14:00-15:00	25	50	0.112	14.773	25	50	0.130	17.111	25	50	0.242	31.884
15:00-16:00	25	50	0.090	11.903	25	50	0.114	15.092	25	50	0.204	26.995
16:00-17:00	25	50	0.056	7.440	25	50	0.116	15.304	25	50	0.172	22.744
17:00-18:00	25	50	0.045	5.952	25	50	0.083	10.947	25	50	0.128	16.899
18:00-19:00	25	50	0.042	5.527	25	50	0.060	7.865	25	50	0.102	13.392
19:00-20:00	24	48	0.060	7.969	24	48	0.065	8.546	24	48	0.125	16.515
20:00-21:00	24	48	0.033	4.388	24	48	0.059	7.853	24	48	0.092	12.241

Permitted Nursing Home Daily Trip Generation — Table 2.0

3.13 As previously discussed, the principle of vehicular access is well established to serve this site from Hayden's Lane.

3.14 In addition, the principle of daily and peak existing and permitted traffic turnings movements has also been well established.

4.0 Existing Roads and Traffic Situation.

4.1 The existing site is bounded to the west by Hayden's Lane which operates as a 50kph local access road which is a cul de sac. This local access road provides access to residential and leisure land uses along its length by means of simple priority arrangements.

4.2 Hayden's Lane in the vicinity of the application site is some 5.50metres in width and contains a series of traffic calming measures along its length which take the form of paved raised speed platforms.

4.3 A continuous white line is located within the centre of this carriageway which restricts the overtaking of vehicles within this corridor and requires all vehicles to keep to the left. A pedestrian footpath is located adjacent to the northbound carriageway of Hayden's Lane with urban street lighting provided at intervals along the length of this lane.

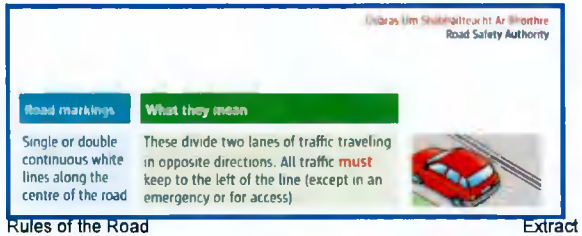
4.4 The layout of Hayden's Lane along the frontage of the existing site and in the vicinity of the existing site access and general location of the proposed site access is shown within Photograph 1.0 and Photograph 2.0 below.

Photograph 1.0: Southbound view into Hayden's Lane from existing vehicular access to application site.

Photograph 2.0: Northbound view into Hayden's Lane from existing site access.

4.5 As previously discussed a solid centre line road marking is within the centre of the Hayden's Lane carriageway. However, this arrangement does permit the crossing of the solid white line for emergency and access purposes.

4.6 Extract 1.0 below from the Road Safety Authority Publication Rules of the Rules confirms the above.



Rules of the Road Extract 1.0

4.7 Traffic levels on Hayden's Lane are extremely low with less than 40 two-way vehicles recorded within the AM peak period between 0800hrs and 0900hrs and similar low traffic levels recorded along this route within the PM peak hour between 1700hrs and 1800hrs.

4.8 The proposed residential development site is adjacent to the Griffeen Valley Park a public recreational facility with multiply good quality pedestrian and cycle links connecting this park with adjacent residential estates and road links.

4.9 To the north of Griffeen Valley Park is Griffeen Avenue and located on Griffeen Avenue are bus stops which provide bus links between Adamstown Train Station and Dublin City Centre via Dublin Bus Route 25B.

4.10 The 25B bus service operates every 20 minutes from 0632hrs to 2317hrs on Monday to Friday and every 30 minutes from 0647hrs to 2317hrs on Saturdays and from 0917hrs to 2317hrs on Sundays.

4.11 The proposed development site is less than an 8-minute walk from Griffeen Avenue via Griffeen Valley Park and as such, can be considered as being close to a good public transport corridor.

5.0 Proposed Residential Apartment Development.

5.1 Having established the existing traffic flows in the area of the development site, we shall now consider the likely trips that could be generated by the proposed residential development of 74 apartment units.

5.2 In order to establish the likely trip generation for the above development land use the TRICS 2020(b) trip rate database (Trip Rate Information Computer System) has again been reviewed. TRICS 2020(b) is a database, which uses traffic survey information to estimate traffic generation for land use development planning purposes.

5.3 The database consists of over 7500 traffic surveys, which therefore yields empirical rather than theoretical daily, AM and PM peak hour trip rate generation figures.

5.4 The TRICS 2020(b) Database trips for the proposed land use development derived from similar industrial developments in Ireland and the UK is shown in Table 3.0 below with a copy of the TRICS 2020(b) output file attached within Appendix 1.0.

TOTAL VEHICLES

Survey Start/End: 07:00-19:00
Trip rate parameter range available: 20 - 332 (units.)

State TRP figure & Extrapolate Results: ON

Estimated TRIP rate value per 74 DWELLS
Estimated TRIP rates shown in shaded column (for 74 DWELLS)

TRIP RATE VALUE PER 1 DWELLS	ARRIVALS Total Rate: 1.149 Peak: 17:00-18:00			Total 84.969	DEPARTURES Total rate: 1.232 Peak: 08:00-09:00			Total 91.226	TOTALS Total rate: 2.381 Peak: 08:00-09:00			Total 176.195
	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip rate
00:00 01:00												
01:00-02:00												
02:00-03:00												
03:00-04:00												
04:00-05:00												
05:00-06:00												
06:00-07:00												
07:00-08:00	14	68	0.046	3.399	14	68	0.191	14.136	14	68	0.237	17.535
08:00-09:00	14	68	0.073	5.407	14	68	0.248	18.384	14	68	0.321	23.791
09:00-10:00	14	68	0.079	5.871	14	68	0.087	6.411	14	68	0.166	12.282
10:00-11:00	14	68	0.038	2.781	14	68	0.063	4.635	14	68	0.101	7.416
11:00-12:00	14	68	0.053	3.939	14	68	0.068	5.021	14	68	0.121	8.960
12:00-13:00	14	68	0.067	4.944	14	68	0.085	6.257	14	68	0.152	11.201
13:00-14:00	14	68	0.091	6.720	14	68	0.081	6.025	14	68	0.172	12.745
14:00-15:00	14	68	0.113	8.342	14	68	0.080	5.948	14	68	0.193	14.290
15:00-16:00	14	68	0.100	7.415	14	68	0.076	5.639	14	68	0.176	13.054
16:00-17:00	14	68	0.112	8.265	14	68	0.070	5.175	14	68	0.182	13.440
17:00-18:00	14	68	0.195	14.445	14	68	0.082	6.102	14	68	0.277	20.547
18:00-19:00	14	68	0.182	13.441	14	68	0.101	7.493	14	68	0.283	20.934

Projected 74 Residential Apartment Daily Trip Generation. Table 3.0

5.5 The projected daily traffic levels that would be expected to be generated by the 74 residential units on the subject site shown within Table 3.0 above which indicates that the proposed development generates negligible daily trips.

5.6 The extent of peak hour trips during these AM and PM peak traffic periods are further summarised within Table 4.0 below:

Time Period	Inbound	Outbound	Total
AM Peak Hour	6	19	25
PM Peak Hour	15	6	21

74 Residential Unit AM and PM Peak Hour Trip generation. Table 4.0.

6.0 Design Manual for Urban Roads and Streets and Proposed Site Access.

6.1 It is proposed to access the residential development site from Hayden's Lane by means of a simple priority junction which would connect to a 5.50metre internal site access estate road. Junction radii of 6.0 metres would be provided within the bellmouth of the site access where it connects with Hayden's Lane. These access arrangements are shown within Opperman Project Architects Design Brief Site Layout Plans.

6.2 Notwithstanding the traffic calming along Hayden's Lane we have assumed that Hayden's Lane operates with a permitted urban speed limit 50kph visibility sightlines of 2.4 metres x 49.0 metres are proposed within the site access into the leading and non-leading traffic directions of Hayden's Lane.

6.3 The proposed site access and internal access routes within the proposed development can be designed to accord with the standards set out within the Design Manual for Urban Roads and Streets (DMURS).

6.4 DMURS places the emphasis not on road link or junction capacity but the sharing of the available road space. DMURS was launched by the Department of Transport and the Department of Environment in March 2013 with the focus on pedestrians, cyclists, and public transport.

6.5 The now DMURS 2019 manual sets out design guidance and standards for constructing new and reconfiguring existing urban roads, streets and access points in Ireland, incorporating good planning and design practice.

6.6 The manual aims to end the practice of designing streets as traffic corridors, and instead focuses on the needs of pedestrians, cyclists and public transport users. DMURS seeks that designers consider first:

1. Pedestrians
2. Cyclists
3. Public Transport
4. and finally, the private motor car

6.7 Furthermore, DMURS sets out 4 principles which should be incorporated with the development of an urban form. These are:

Design Principle 1:
To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.

Design Principle 2:
The promotion of multi-functional, place- based streets that balance the needs of all users within a self-regulating environment.

Design Principle 3:
The quality of the street is measured by the quality of the pedestrian environment.

Design Principle 4:
Greater communication and co-operation between design professionals through the promotion of a plan led, multidisciplinary approach to design

6.8 In addition, street networks can be designed to maximise connectivity between destinations to promote higher levels of permeability and legibility for all users, in particular more sustainable forms of transport. This will allow people to move from place to place in a direct manner with greater route choice.

6.9 The proposed site layout places a priority on sustainable forms of travel which includes provision for dedicated pedestrian route connecting the various apartment blocks with the public routes. These routes can also be used by cyclists. Thus, maximizing the connectivity between the application site and the public realm.

6.10 This priority can be achieved by the use of various materials and finishes, promotion of shared areas and pedestrian priority within the various internal links within the application site.

6.11 The proposed site layout ensures a balance between the various users accessing the site from the public realm and provides a transition from this realm to promote a real sense of place within the site as set out within the objectives of DMURS.

7.0 Proposed Access Arrangements.

7.1 In order to assess the impact of the traffic associated with the proposed residential development may have on the adjacent Hayden's Lane we have modelled this junction using the computer-modelling program PICADY9.

7.2 PICADY9 output results consist of tables of demand flows for each time segment of the time-period analysis. These tables contain start and finish times for each arm, traffic demand data, capacity, ratio of flow to capacity findings, start queue length, end queue length, and queuing delay.

7.3 This traffic-modelling period covers the recorded busiest AM peak hour periods. A copy of the AM peak hour PICADY9 data and results are attached within Appendix 2.0 to this report with a summary of the output results shown within Table 5.0 below:

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	506	0.044	22	0.0	8.182	A
C-AB	0	1188	0.000	0	0.0	0.000	A
C-A	28			28			
A-B	11			11			
A-C	28			28			

AM Peak with Residential Development. Table 5.0

Arm A	Hayden's Lane North
Arm B	Site Access
Arm C	Hayden's Lane South

7.4 From the above summary Table 5.0 above, it is indicated that the proposed site access at its junction with the Hayden's Lane can accommodate the projected levels associated with the proposed 74 residential unit development.

7.5 This table also indicates that during this traffic period the proposed junction experiences free flow traffic conditions with no material queuing projected within this junction, operating with reserve capacity of over 90% during the critical peak traffic period.

7.6 The relative Level of Service within the proposed site access at its junction with the R415 is identified as A within the above PICADY9 assessment representing "free flow urban traffic conditions", as set out within the Highway Capacity Manual.

7.7 Urban Level of Service gauges, in a qualitative manner, the extent of congestion within a road link. Variables such as travel time and traffic speed form part of the qualitative description.

7.8 Level of Service A represents almost free flow traffic conditions falling to a Level of Service F indicating the road link is over capacity.

8.0 Car Parking Provision.

8.1 The extent of car parking provision within a proposed residential development site is discussed within Table 11.24 of the South Dublin Development Plan 2016 to 2022. Table 11.24 indicates that the number of spaces provided for any particular residential development should not exceed the maximum provision. Furthermore, the maximum provision should not be viewed as a target and a lower rate of parking may be acceptable subject to:

- The proximity of the site to public transport and the quality of the transport service it provides.
- The proximity of the development to services that fulfil occasional and day to day needs.
- The existence of a robust and achievable Workforce Management or Mobility Management Plan for the development.
- The ability of people to fulfil multiple needs in a single journey.

8.2 The proposed residential development units made up of 74 apartment units, of which 20 are one-bedroom, 48 are two-bedroom apartments and 6 are three-bedroom apartments. The extent of maximum car parking based on the proposed development being within Zone 2 of the Development Plan is shown outlined within Table 11.24 of the current South Dublin Development Plan 2016 to 2022 which suggest 0.75 spaces for 1-bedroom apartments, 1 space per 2-bedroom apartments and 1.25 spaces per 3-bedroom apartments.

8.3 Based on these maximum parking standards some 67 car parking spaces would be required to serve the development. It is proposed to provide 42 parking spaces and 160 resident and visitor bicycle parking spaces within the development site at surface level some 63% in compliance with the development plan car parking standards.

8.4 As previously discussed, the development site is less than an 8-minute walk from Griffeen Avenue which operates with good public transport connections to Adamstown Train Station and Dublin City Centre.

8.5 It is also proposed to provide a new pedestrian link from the south eastern area of the development site into Griffeen Valley Park which has been agreed with the Parks Department of South Dublin County Council. This new pedestrian link will further reduce the walk distance between the proposed development site and the public transport links on Griffeen Avenue. The extent of this new pedestrian link from the application site via Giffeen Valley Park is shown dotted in blue with Map Extract 1.0 below.

Proposed New Pedestrian Link. Map Extract 1.0

8.6 In addition, the proposed development site is also less than a 10-minute cycle ride from Adamstown Rail Station to the west which can be accessed by existing footpath and cycle infrastructure to the west of this site. The proximity of the application site is shown within Map Extract 2.0 below.

Proximity of site to Adamstown Station. Map Extract 2.0

8.7 Adamstown rail station which served by both inter city and regional rail services operating the Dublin to Cork service and the Dublin, Kildare to Portlaoise rail service. During the morning and evening peak periods this station is served by 8 train services making the site an ideal location for accessing the rail station by bicycle or walking.

8.8 Therefore, considering the proposed development site proximity to very good public transport links we consider that the provision of 42 parking spaces to be more than sufficient to serve this development proposal.

9.0 Swept Path Assessments.

9.1 The proposed residential development site can also be accessed by heavy vehicles for delivery, refuse collection or emergency purposes.

9.2 A swept path assessment for heavy vehicles including a refuse cart type vehicle is shown within the attached Drawing Number 121-A27-SP05 which is attached within Appendix 3.0. This swept path assessment indicates the inbound and reversing turning manoeuvre within the internal site access routes, confirming that a heavy vehicle can undertake these manoeuvres within the internal site access road area.

9.3 In addition, Drawing Number 121-A27-SP06 also attached within Appendix 3.0 indicates the inbound and outbound turning manoeuvre of a fire tender vehicle attending the proposed residential development site.

10.0 Conclusions.

10.1 In this report we have identified the existing traffic conditions and assessed the level of impact the proposed warehouse is likely to have on the adjacent road network. We have also identified how the proposed development can be accommodated within this existing road network.

10.2 We have carried out capacity assessments within the critical road links and road junction, which indicate that under the forecast traffic conditions there will be sufficient practical reserve capacity at this location to accommodate the development proposal.

10.3 From the above, we conclude that the existing road and junction links to access the proposed development site can operate satisfactorily in accommodating the levels and types of traffic likely to be generated by the residential apartment development.

Appendices.

TRICS 2020(b) Development Output File. Appendix 1.0

Calculation Reference: AUDIT-764101-211214-1245

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : C - FLATS PRIVATELY OWNED
TOTAL VEHICLES

Selected regions and areas:

12	**CONNAUGHT**		
	GA	GALWAY	1 days
13	**MUNSTER**		
	WA	WATERFORD	1 days
14	**LEINSTER**		
	LU	LOUTH	3 days
15	**GREATER DUBLIN**		
	DL	DUBLIN	7 days
16	**ULSTER (REPUBLIC OF IRELAND)**		
	MG	MONAGHAN	1 days
17	**ULSTER (NORTHERN IRELAND)**		
	AN	ANTRIM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: No of Dwellings
Actual Range: 20 to 332 (units:)
Range Selected by User: 18 to 372 (units:)

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/13 to 23/10/20

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	6 days
Wednesday	1 days
Thursday	2 days
Friday	3 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	14 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	4
Suburban Area (PPS6 Out of Centre)	7
Edge of Town	1
Neighbourhood Centre (PPS6 Local Centre)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C3	14 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:
All Surveys Included

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	3 days
15,001 to 20,000	2 days
20,001 to 25,000	1 days
25,001 to 50,000	7 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
25,001 to 50,000	3 days
50,001 to 75,000	2 days
125,001 to 250,000	1 days
250,001 to 500,000	1 days
500,001 or More	6 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	4 days
1.1 to 1.5	10 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	14 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	14 days

This data displays the number of selected surveys with PTAL Ratings.

Covid-19 Restrictions	Yes	At least one survey within the selected data set was undertaken at a time of Covid-19 restrictions

TRIP RATE for Land Use 03 - RESIDENTIAL/C - FLATS PRIVATELY OWNED
TOTAL VEHICLES
Calculation factor: 1 DWELLS
Estimated TRIP rate value per 74 DWELLS shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate	No. Days	Ave. DWELLS	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00												
06:00 - 07:00												
07:00 - 08:00	14	68	0.046	3.399	14	68	0.191	14.136	14	68	0.237	17.535
08:00 - 09:00	14	68	0.073	5.407	**14**	**68**	**0.248**	**18.384**	**14**	**68**	**0.321**	**23.791**
09:00 - 10:00	14	68	0.079	5.871	14	68	0.087	6.411	14	68	0.166	12.282
10:00 - 11:00	14	68	0.038	2.781	14	68	0.063	4.635	14	68	0.101	7.416
11:00 - 12:00	14	68	0.053	3.939	14	68	0.068	5.021	14	68	0.121	8.960
12:00 - 13:00	14	68	0.067	4.944	14	68	0.085	6.257	14	68	0.152	11.201
13:00 - 14:00	14	68	0.091	6.720	14	68	0.081	6.025	14	68	0.172	12.745
14:00 - 15:00	14	68	0.113	8.342	14	68	0.080	5.948	14	68	0.193	14.290
15:00 - 16:00	14	68	0.100	7.415	14	68	0.076	5.639	14	68	0.176	13.054
16:00 - 17:00	14	68	0.112	8.265	14	68	0.070	5.175	14	68	0.182	13.440
17:00 - 18:00	**14**	**68**	**0.195**	**14.445**	14	68	0.082	6.102	14	68	0.277	20.547
18:00 - 19:00	14	68	0.182	13.441	14	68	0.101	7.493	14	68	0.283	20.934
19:00 - 20:00												
20:00 - 21:00												
21:00 - 22:00												
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			1.149	84.969			1.232	91.226			2.381	176.195

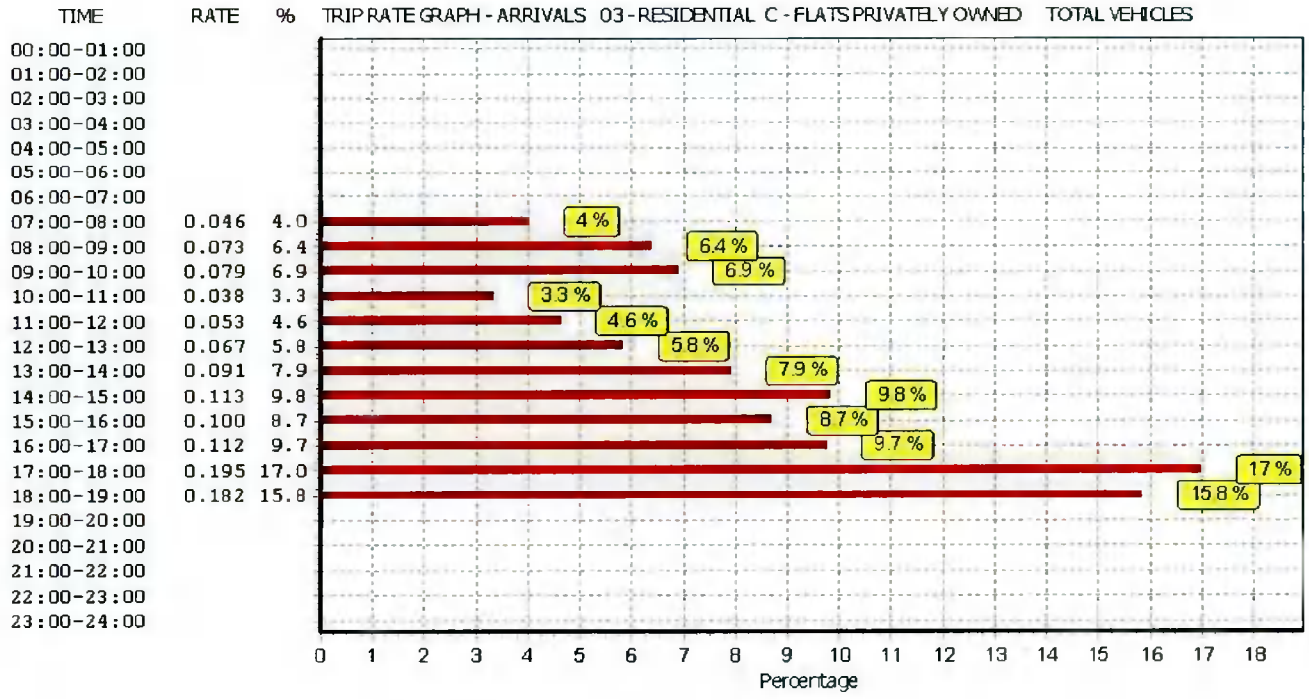
This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

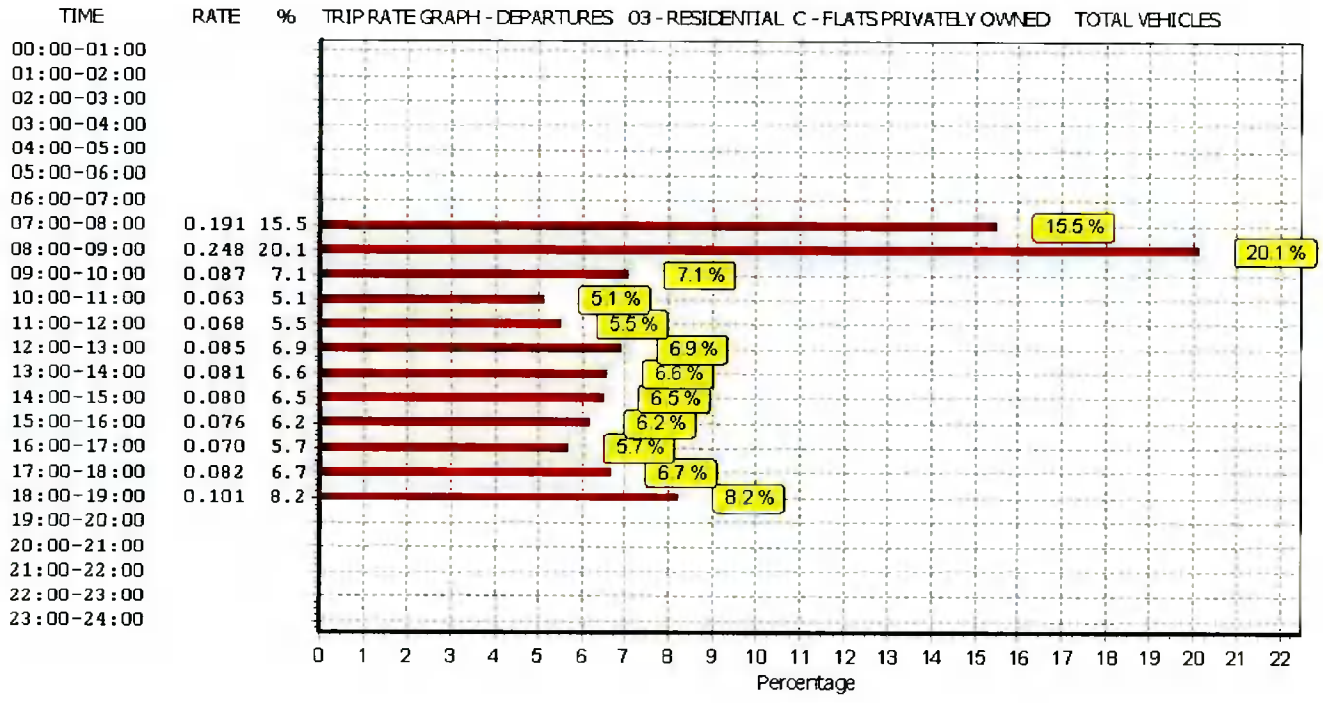
Parameter summary

Trip rate parameter range selected:	20 - 332 (units:)
Survey date date range:	01/01/13 - 23/10/20
Number of weekdays (Monday-Friday):	14
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

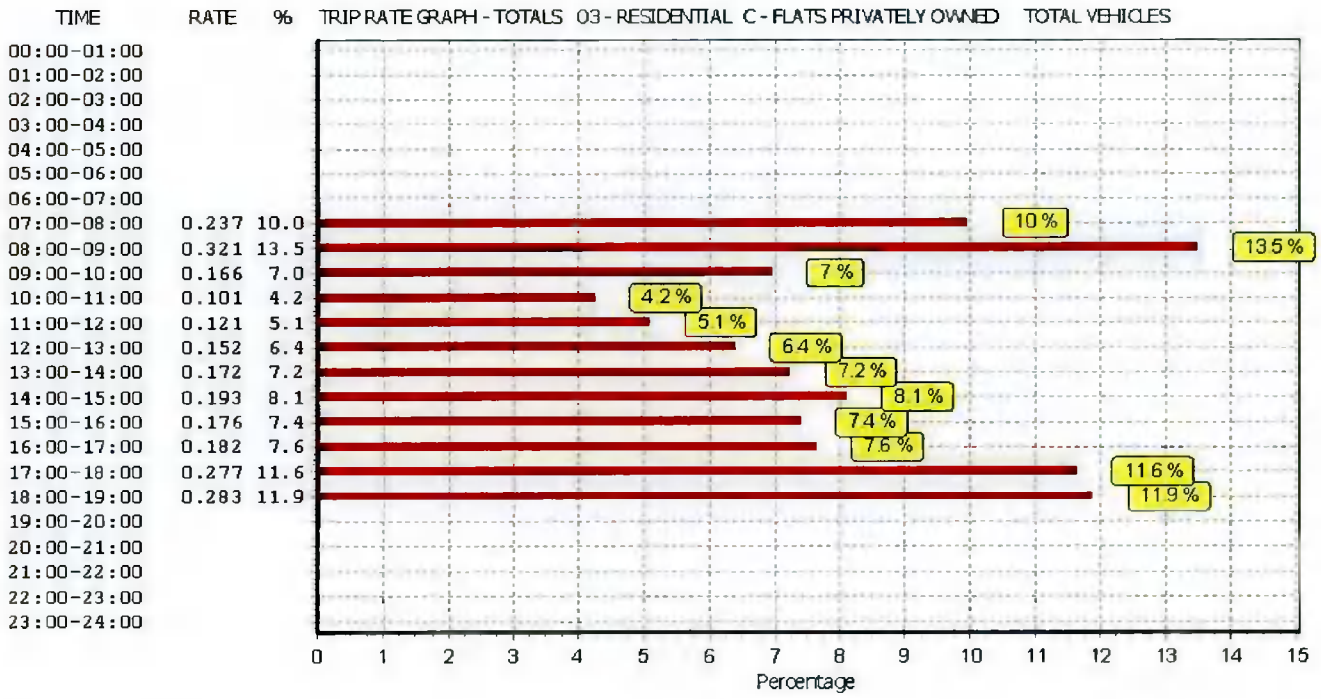
This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.



This graph is a visual representation of the trip rate calculation results screen. The same time periods and trip rates are displayed, but in addition there is an additional column showing the percentage of the total trip rate by individual time period, allowing peak periods to be easily identified through observation. Note that the type of count and the selected direction is shown at the top of the graph.

Appendices.

AM PICADY9 Output File. Appendix 2.0

Junctions 9
PICADY 9 - Priority Intersection Module
Version: 9.5.1.7462 © Copyright TRL Limited, 2019
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk

Filename: 74 RESIDENTIAL UNIT DEVELOPMENT HAYDEN'S LANE, LUCAN, CO.DUBLIN.
Report generation date: 05/12/2021 16:24:06

Summary of junction performance

	AM			
	Queue (PCU)	Delay (s)	RFC	LOS
Stream B-AC	0.0	8.18	0.04	A
Stream C-AB	0.0	0.00	0.00	A

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

File summary

File Description

Title	HAYDEN'S LANE
Location	LUCAN
Site number	01
Date	05/05/2021
Version	PICADY9
Status	TIA
Identifier	NIALL
Client	GREEN CONSTRUCTION LTD
Job number	121-A27
Enumerator	NIALL
Description	ISSUE

Units

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

Analysis Options

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

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	AM	AM	ONE HOUR	07:45	09:15	15

AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		2.05	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	HAYDEN'S LAND NORTH		Major
B	SITE ACCESS		Minor
C	HAYDEN'S LANE SOUTH		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.00	No	No	50.0	Yes	1.00

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

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.00	49	49

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	518	0.094	0.238	0.150	0.340
B-C	655	0.100	0.254	-	-
C-B	603	0.234	0.234	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.
Streams may be combined, in which case capacity will be adjusted.
Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Default vehicle mix	Vehicle mix source	PCU Factor for a HV (PCU)
Yes	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A	HAYDEN'S LANE NORTH	Yes	35	100.000
B	SITE ACCESS	Yes	20	100.000
C	HAYDEN'S LANE SOUTH	Yes	25	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	10	25
	B	20	0	0
	C	25	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	10	10	10
	B	10	10	10
	C	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.04	8.18	0.0	A
C-AB	0.00	0.00	0.0	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	15	510	0.030	15	0.0	8.003	A
C-AB	0	1194	0.000	0	0.0	0.000	A
C-A	19			19			
A-B	8			8			
A-C	19			19			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	18	508	0.035	18	0.0	8.079	A
C-AB	0	1191	0.000	0	0.0	0.000	A
C-A	22			22			
A-B	9			9			
A-C	22			22			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	506	0.044	22	0.0	8.182	A
C-AB	0	1188	0.000	0	0.0	0.000	A
C-A	28			28			
A-B	11			11			
A-C	28			28			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	506	0.044	22	0.0	8.182	A
C-AB	0	1188	0.000	0	0.0	0.000	A
C-A	28			28			
A-B	11			11			
A-C	28			28			

08:45 - 09:00

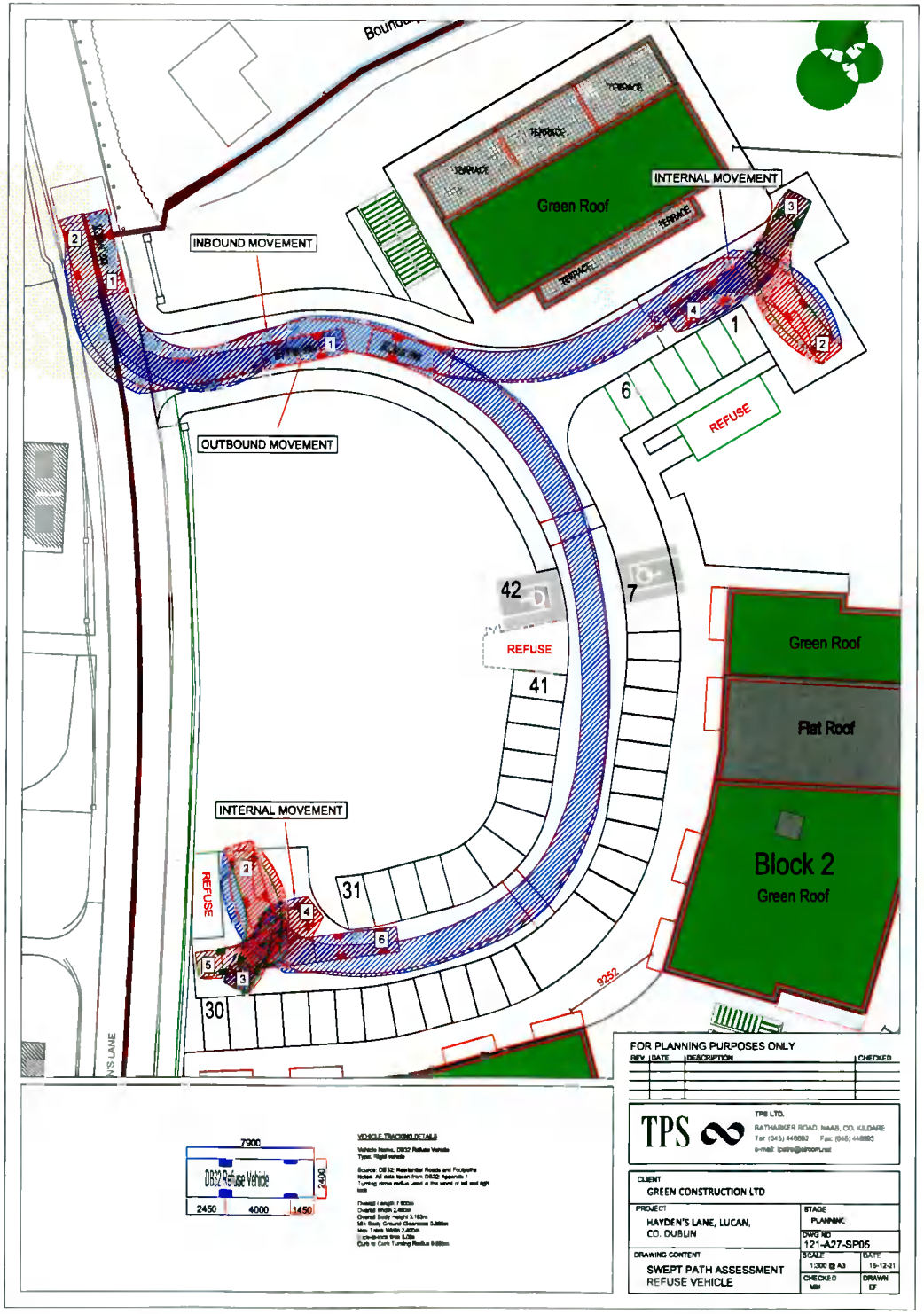
Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	18	508	0.035	18	0.0	8.082	A
C-AB	0	1191	0.000	0	0.0	0.000	A
C-A	22			22			
A-B	9			9			
A-C	22			22			

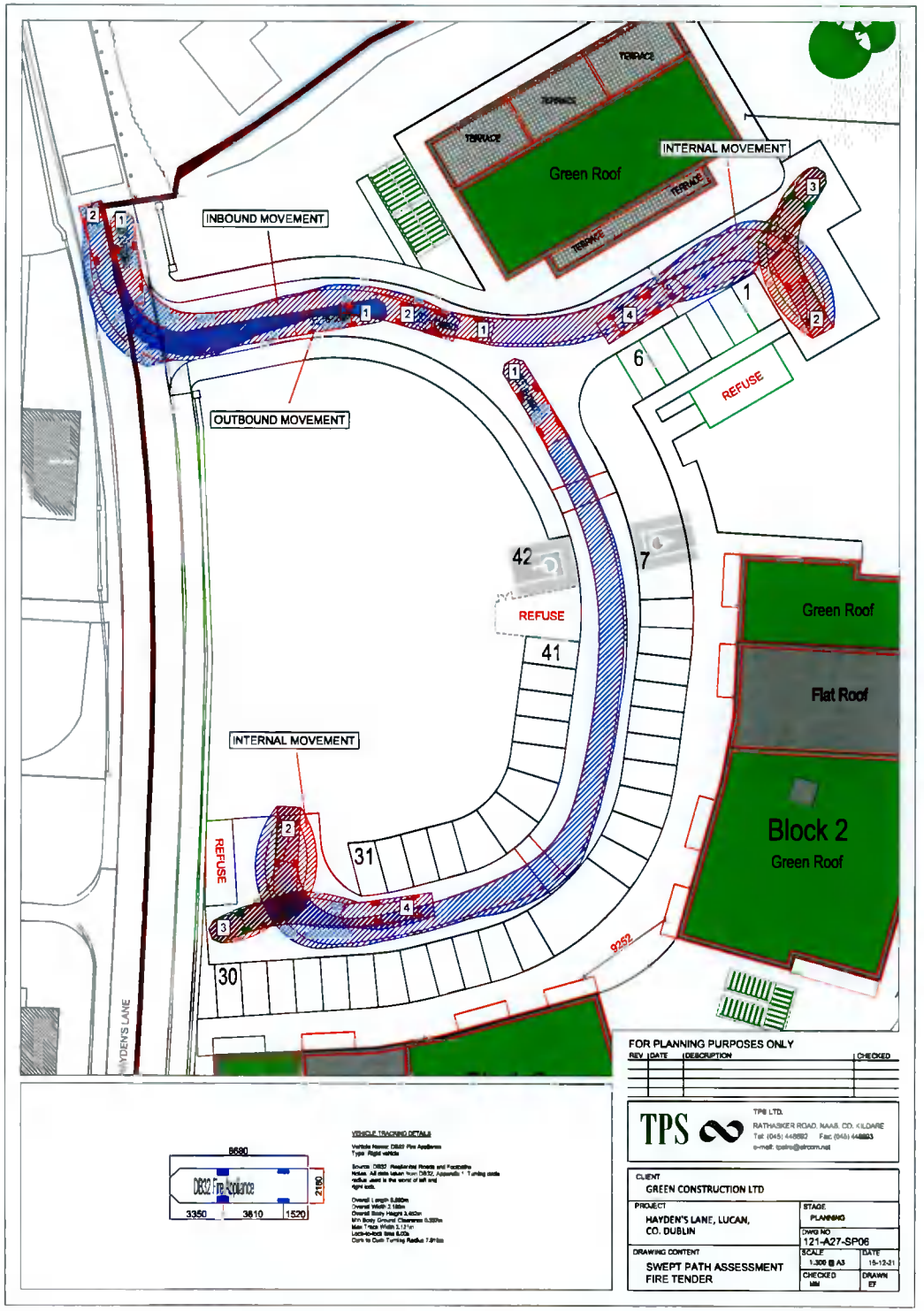
09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	15	510	0.030	15	0.0	8.008	A
C-AB	0	1194	0.000	0	0.0	0.000	A
C-A	19			19			
A-B	8			8			
A-C	19			19			

Appendices.

Swept Path Assessments. Appendix 3.0


INBOUND MOVEMENT
OUTBOUND MOVEMENT
INTERNAL MOVEMENT
INTERNAL MOVEMENT
Green Roof
TERRACE
TERRACE
TERRACE
TERRACE
REFUSE
REFUSE
REFUSE
Green Roof
Flat Roof
Block 2
Green Roof
42
41
31
30
7
6
1
9252
HAYDEN'S LANE
7900
DB32 Refuse Vehicle
2400
2450
4000
1450
VEHICLE TRACKING DETAILS
FOR PLANNING PURPOSES ONLY
REV
DATE
DESCRIPTION
CHECKED
TPS
TPS LTD.
RATHANGAN ROAD, NAAS, CO. KILDARE
CLIENT
GREEN CONSTRUCTION LTD
PROJECT
HAYDEN'S LANE, LUCAN, CO. DUBLIN
STAGE
PLANNING
DWG NO
121-A27-SP05
DRAWING CONTENT
SWEPT PATH ASSESSMENT
REFUSE VEHICLE
SCALE
1:300 @ A3
DATE
15-12-21
CHECKED
MM
DRAWN
EF



FOR PLANNING PURPOSES ONLY

REV	DATE	DESCRIPTION	CHECKED

TPS LTD.
RATHASKER ROAD, NAAS, CO. KILDARE
Tel: (045) 448882 Fax: (045) 448883
e-mail: tpsltd@eircom.net

CLIENT
GREEN CONSTRUCTION LTD

PROJECT
HAYDEN'S LANE, LUCAN, CO. DUBLIN

STAGE
PLANNING

DWG NO
121-A27-SP06

DRAWING CONTENT
SWEPT PATH ASSESSMENT FIRE TENDER

SCALE
1:300 @ A3

DATE
15-12-21

CHECKED
MM

DRAWN
EF