Public Transport Capacity Assessment

Gowan Motor Site, Naas Road, Dublin 12.

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PUBLIC TRANSPORT CAPACITY ASSESSMENT
FOR
GOWAN MOTOR SITE, NAAS ROAD.

1. Introduction.

1.1 Malclose Limited intends to apply to Dublin City Council for planning permission for the Gowan Motor site, Naas Road, Dublin 12. This report, by Derry O'Leary, Transport Consultant, has been commissioned by the developer to provide an overview of the adjacent existing public transport network. The report determines the available spare capacity in the adjacent existing public transport network, both bus and Luas, and post the proposed development. It also reviews the implications for the proposed National Transport Authority's BusConnects network in the area.

The author, a Civil Engineer, qualified as a Traffic Engineer and has over 40 years experience in both the public and private sectors. He has spent nearly 30 years in both planning and operations in Dublin Bus.

This report supplements the Residential Travel Plan undertaken by BMCE Consulting Engineers on the subject site.

1.2 Site Proposal.

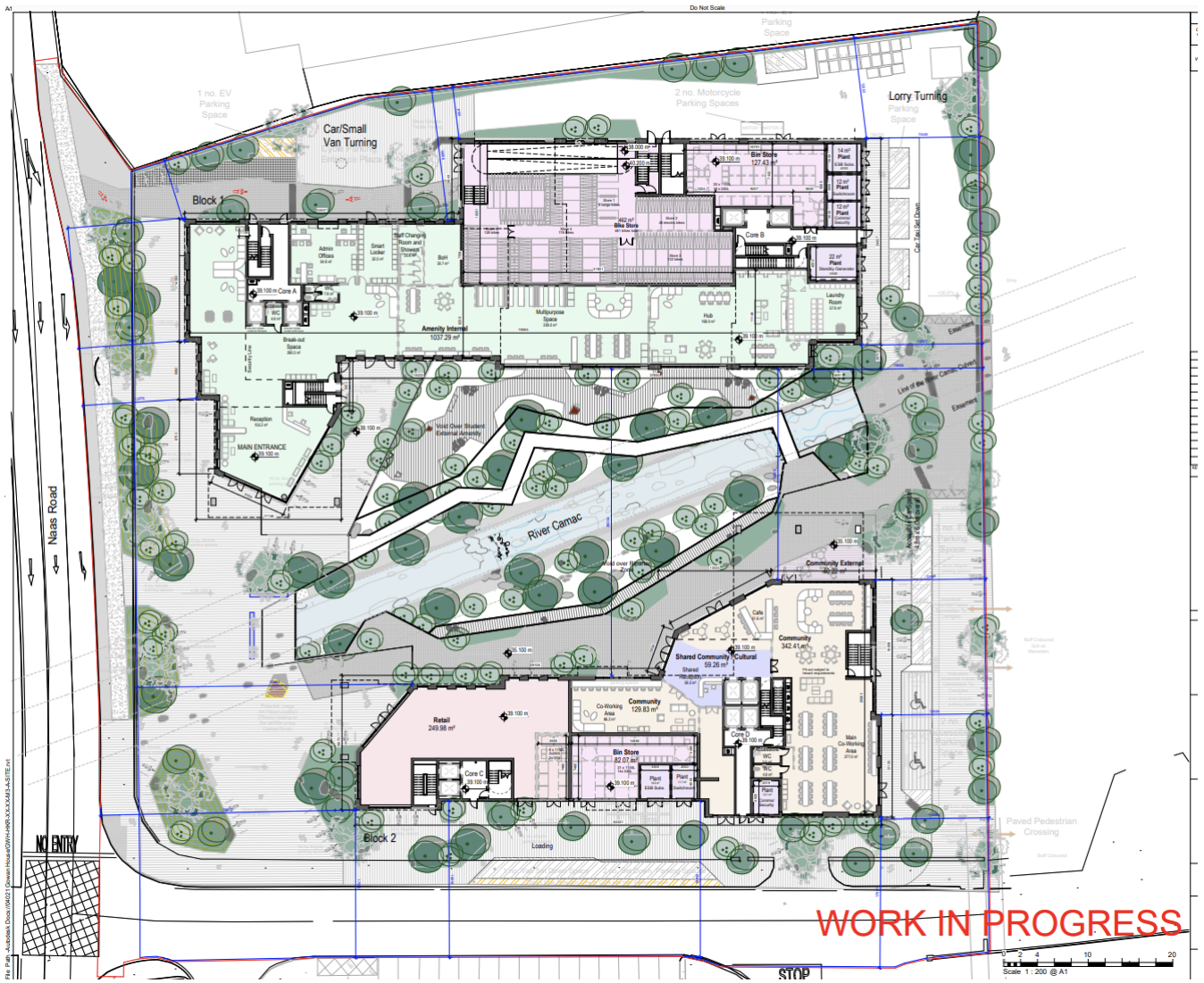

Figure 1. Proposed Site Layout. Source, BMCE Residential Travel Plan.

Figure 2. Location of development site off the Naas Road.

1.3 Development Proposal.

Malclose Limited intends to apply to Dublin City Council for permission for a large-scale residential development principally comprising student accommodation at this 0.962 Ha site at Gowan House, Carriglea Business Park, Naas Road, Dublin 12, D12 RCC4.

Works to upgrade the access road to the west of the site on an area measuring c. 0.087 Ha are also proposed comprising new surfacing to the carriageway, the provision of inbound and outbound bicycle lanes from the development entrance to the Naas Road, the provision of a controlled pedestrian crossing on the access road at the Naas Road junction, and the provision of a further uncontrolled pedestrian and bicycle crossing linking the subject site with the approved Concorde SHD development (ABP Ref: TA29S.312218) to the west.

On the Naas Road, works are proposed on an area measuring c. 0.062 Ha comprising the realignment of the existing pedestrian footpath along the outbound carriageway of the Naas Road to facilitate a possible future bicycle lane, including the provision of linkages from the realigned footpath to the development site.

The development site area and roadworks areas will provide a total application site area of c. 1.11 Ha.

The proposed development will principally consist of: the demolition of the existing two-storey office/warehouse building and outbuilding (5,172 sq m); and the construction of a development in two blocks (Block 1 (eastern block) is part 2 No. storeys to part 15 No. storeys over lower ground floor and basement levels with roof plant over and Block 2 (western block) is part 9 No. storeys to part 11 No. storeys over basement with roof plant over) principally comprising 941 No. Student Accommodation bedspaces (871 No. standards rooms, 47 No. accessible studio rooms and 23 No. studios) with associated facilities, which will be utilised for short-term lets during student holiday periods. The 871No. standard rooms are provided in 123 No. clusters ranging in size from 3 No. bedspaces to 8 No. bedspaces, and all clusters are served by a communal living/kitchen/dining room.

The development also provides: ancillary internal and external communal student amenity spaces and support facilities; cultural and community floor space (1,422 sq m internal and 131 sq m external) principally comprising a digital hub and co-working space with ancillary cafe; a retail unit (250 sq m); public open space; the daylighting of the culverted River Camac through the site; a pedestrian bridge link at first floor level between Blocks 1 and 2; vehicular access at the south-western corner; the provision of 7 No. car-parking spaces, 2 No. motorcycle parking spaces and 2 No. set down areas; bicycle stores at ground and lower ground floor levels; visitor cycle parking spaces; bin stores; substations; hard and soft landscaping; roof gardens; green and blue roofs; new telecommunications infrastructure at roof level of Block 1 including antennas and microwave link dishes, 18 No. antennas and 6 No. transmission dishes, together with all associated equipment; boundary treatments; plant; lift overruns; and all associated works above and below ground.

The gross floor area of the development is c. 33,140 sq m comprising c. 30,386 sq m above lower ground and basement level.

1.4 The **Report Structure** commences with the earlier introduction in **Section 1** followed by the description and site map of the Gowan Motor proposal. **Section 2** describes the changing background to how Dublin's public transport is organised for bus and Luas services. In **Section 3** the report outlines the recent Bus Market Opening process undertaken by the National Transport Authority while **Section 4** presents an overview of the partly implemented BusConnects project and the NTA's longer term strategy for the Greater Dublin Area. **Section 5** describes the existing public transport network, tram and bus, near the subject site. **Section 6** includes analysis of surveys of both bus and LUAS services to determine the existing capacity on the network. Critically, the ability of the network capacity to cater for the generated trips from the new development is determined. The planned BusConnects proposed for the area are briefly outlined in **Section 7** before the key conclusions from this analysis are identified in **Section 8**.

2. Background to Dublin's Public Transport Network

2.1 The customer-facing bus network serving the Greater Dublin Area has been relatively stable for the last decade. Only the recent early phases of the new BusConnects bus network have resulted in any material changes of note. The same cannot be said of the industry structure behind the scenes. The control and organisation of public transport operations has undergone quite significant structural change in the last decade or so. The National Transport Authority (NTA), established in 2009, has a wide range of roles in the transport sector. One of these remits is its role as public transport Regulator. Under this relatively new regime, the overall planning and control of bus and rail services nationwide has moved from the CIE Group of companies to the NTA. In practical terms this means that responsibility for the public transport network and individual route designs, frequencies, fares and timetable details, etc. now lies solely with the Regulator. All bus operators providing services under Public Service Obligation (PSO) or State subvention do so under contract to the NTA. Under this new arrangement even the smallest modification to any bus route or timetable must be agreed with the NTA in advance of implementation. The NTA also approves and allocates licences to commercial bus operators, subject to agreed routes, timetables and conditions. Irish Rail services, including the Dublin Commuter and DART in this instance, also come within the ambit of the NTA.

2.2 The provision of Luas services are broadly organised along similar lines. Contracts for the operation of the Luas, to agreed timetables, etc were originally procured by the Rail Procurement Agency (RPA). The RPA merged with the National Road Authority (NRA) to form Transport Infrastructure Ireland (TII) . All Luas services are now contracted out, following tenders, by TII along similar lines to bus services with agreed service levels and KPIs a feature of the contract.

2.3 In 2015, the NTA commenced a comprehensive review of the efficiency and effectiveness of the Greater Dublin Area's (GDA) bus network, branded as BusConnects. This bus route redesign project has now advanced to reach the implementation stage with four phases launched since 2021. Further phases of BusConnects are planned for this year. In parallel, the NTA also began a Bus Market Opening (BMO) process a number of years ago designed to open up much of the Irish bus market to competition. This involved opening up some existing routes operated by the CIE companies to competition by way of tender. These two key developments are now briefly outlined below.

3. Bus Market Opening (BMO)

3.1 For decades the key urban and interurban bus (and rail) markets have been planned and operated by the CIE group of companies such as Dublin Bus and Bus Eireann. In order to further open the Irish bus market to private sector rivals to the incumbent State owned operators, the NTA, under its remit, first tendered a package of orbital bus routes previously operated by Dublin Bus in 2016. This group of 24 orbital routes, and total fleet of 125 buses, represented roughly 10% of the total bus market in the Greater Dublin Area (GDA). Following the competitive tendering process, the Go-Ahead Group (a largely UK based bus and rail operator with large overseas businesses) was selected to operate these routes. The seamless transfer of routes, in stages, from Dublin Bus to Go-Ahead Ireland (GAI) took place over a 12-month period in 2018/2019. The switch was barely noticed by the general public and passengers alike, as the new operations were introduced under the NTA's Transport for Ireland (TFI) brand. At this point in time the NTA's PSO bus routes operating in the area of the Gowan Motor site include the nearby orbital route 18 operated on Kylemore Road by Go-Ahead and the key radial routes 13 and 68 still operated by Dublin Bus.

3.2 All PSO operators, whether in private ownership or State-owned, operate bus services under contract to the NTA and must meet a set of key performance indicators (KPIs) including those covering reliability, timekeeping and vehicle maintenance. Similar standards are expected of all contracted operators, including Transdev the Luas operator, and failure to meet the targets can result in fines or, ultimately, contract cessation. Both the performance standards expected of contractors and the level of fines exacted for not meeting those standards are published on their websites by the NTA and TII.

3.3 The NTA entirely owns the current fleet deployed by GAI to operate its routes in the Greater Dublin Area. The entire publicly-owned public transport fleet will be owned by the NTA and the Authority obtains the capital funding to buy and replace buses for use in the PSO networks across Ireland. The next tranche of buses ordered by the NTA for the Dublin urban market are fully-electric traction. The delivery of the first of these EV buses is anticipated in 2023, and they are expected to commence operating, following commissioning, in 2024/25.

4. Bus Connects Project Overview.

4.1 The planning stage of this comprehensive re-design of the urban bus network in the Greater Dublin Area (GDA) was commenced by the NTA in 2015. In tandem with the fundamental bus service re-designs, the major radial bus route alignments on existing QBCs, under the NTA proposals, will be upgraded to Core Bus Corridors (CBCs) in order to radically enhance bus priority measures. This capital investment, largely on the existing QBC alignments, is required to further protect the major funding rise in the enhanced bus operation from the adverse impacts on reliability caused by traffic congestion. The key objectives are to improve average bus speeds significantly while ensuring greater service reliability. These CBCs, along which the high-frequent "Spine routes" will run, and the revised routes have been through rounds of extensive consultation phases with both the general public and key stakeholders. Local Authorities have been involved in both the bus route and CBC design process. The route consultation process, which concluded in 2020, modified the proposals following the review of tens of thousands of submissions by members of the public and key stakeholders. The revision of the bus network has commenced with initial phases of the BusConnects project already implemented.

1.	Clongriffin to City Centre
2.	Swords to City Centre
3.	Ballymun/Finglas to City Centre
4.	Blanchardstown to City Centre
5.	Lucan to City to Centre
6.	Liffey Valley to City Centre
7.	Tallaght/Clondalkin to City Centre
8.	Kimmage to City Centre
9.	Templeogue/Rathfarnham to City Centre
10.	Bray to City Centre
11.	Belfield/Blackrock to City Centre
12.	Ringsend to City Centre

Figure 3. NTA's Core Bus Corridors (CBCs). CBC 7 above - Tallaght/Clondalkin to City Centre - is most adjacent to the site.

4.2 While phased implementation of new Spine and Orbital routes has started, only four of the numerous phases required to modify the bus network in the Greater Dublin Area have been introduced. The C-Spine and H-Spine changes have been introduced in parts of the west and north suburbs of Dublin. In 2022 the first of the new extensive mesh of orbital routes were launched. Routes N4 and N6, both northern orbitals (as the lettering suggests), operate parallel to each other for much of the time and traverse most of the outer suburbs north of Dublin City. Most recently, Phase 5A was launched in June 2023 and featured the introduction of the first of the western orbital services, featuring new routes W4, W61 and W62 operated by GAI. None of the BusConnects changes introduced so far directly impact the Gowan site. All aspects of the existing and planned routes in the surrounding area are discussed in greater detail in sections 5, 6 and 7.

4.3 Further BusConnects phases, including routes of more direct relevance here, have been designed and planned but will take a couple of years to implement. The complete network of new services is now expected to be implemented in phases by 2025. The future BusConnects bus network serving the Naas Road area is addressed in section 7. The Core Bus Corridors, effectively QBC upgrades, shown in Figure 3 above, are the subject of a formal planning application. Of all the proposed CBCs, the planned Tallaght/Clondalkin CBC runs relatively close to the subject site. Of more immediate and direct relevance to this site is the strong presence of the LUAS Red Line corridor that operates along the Naas Road, within yards of the Gowan Motor site. The service is discussed in detail in sections 5/6.

5. Existing Public Transport Network Serving the Gowan Site.

5.1 The subject site is located immediately adjacent to the Naas Road in Dublin 12 as shown in Figure 1 above. Future residents from this site commuting around Dublin and elsewhere wishing to avail of current public transport services have a wide variety of quite different options. Commuters can

- Board the attractive LUAS Red Line services at the nearby Bluebell Stop circa 150m to the east of the subject site;
- Directly access the existing frequent bus services towards either Dublin City Centre and beyond in one direction (or Clondalkin and Newcastle, Co Dublin in the other) within metres of the site entrance;
- Alternatively, commuters can access the orbital bus network connecting Lucan to Sandymount, via Rathmines, on the nearby Kylemore Road.

The decision as to which option to select depends on a variety of factors. Many of these are addressed in the following sections.

5.2 The key public transport services in the area are identified in Table 1 below, together with their morning peak advertised timetable frequencies.

Route	Origin	Destination	Peak Frequency (mins)
LUAS Red Line	Tallaght/Saggart	Connolly, Point Depot	Variable. Typically 3-9 minutes.
13	Grangecastle	Harristown	12
18	Palmerstown	Sandymount	10/20 minutes
68/A	Newcastle/ Greenogue	City Centre	30/45 minutes
51X	Clondalkin	UCD, Belfield	Single Trip, am peak only.

Table 1. Public transport services at the Gowan Motor site on the Naas Road, Dublin 12.

As Table 1 indicates, there are a wide variety of public transport routes and services available to residents in the area. The **LUAS Red Line** services are the stand-out public transport option for future residents of the subject site. This fast and high frequency long established tram route offers high quality public transport services in both directions. The scale of the operation, from early morning (typically 05.30) to past midnight, and its attractive frequency and predictable journey time will dwarf most of the other public transport alternatives available to future residents of the proposed development. While most will likely gravitate towards the city centre, commuters/ students also have the option to move "counter peak" to the south and west to the likes of TUD Tallaght.

Route 13 is the most accessible service for commuters from the subject site, as it passes immediately adjacent to the site of the proposed development on the Naas Road. The planned site exit is within 100 metres of existing bus stops 4406 (Naas Road, Carriglea Industrial Estate) northwards towards Dublin and stops 1954 (Naas Road, Muirfield Drive) and 1955 (Naas Road, Carriglea Industrial Estate) southbound to Clondalkin. The morning peak frequency on this key cross-city route is a bus every 12 minutes over the morning peak period. The route operates via the heart of Dublin City Centre where it interconnects with both the rail network (LUAS, Intercity and DART) as well as the core of the Dublin bus network. In the other direction it serves Clondalkin village and operates the length of Nangor Road before terminating in the expanding Grangecastle Business Park.

The other radial bus service operating to Dublin City centre is **Route 68/A** which runs approximately every 30 minutes in the peak and hourly throughout each weekday also along the Naas Road (R810). (The "A" variant of this route is a minor off-peak variation in the route that operates to/from Bulfin Road, well away from the site. It can be ignored as it is of no consequence to the analysis here). The nearest stops, as per route 13, are immediately adjacent to the planned development site. While this route opens up the prospect of travel to Dublin the absence of any significant frequency limits its potential to attract future residents of the proposed development. The single, daily trip on **Route 51X** will certainly suit some individual students accessing the likes of UCD and the N11 but there is no corresponding return trip. However, its scope to meet the needs of new residents to the area is restricted by the lack of service. Additionally, it can only be accessed at stop 1982 (Kylemore Road junction) which is located immediately before stop 4406 highlighted above. The slightly longer walk will partly undermine its attractiveness.

Route 126, a commuter service from Co Kildare operated by Go-Ahead also operates past the site but under its license is not permitted to board city bound passengers.

Due to extremely attractive, recently introduced, changes to public transport's fare structure launched by the NTA to offer free intermodal transfers available under the Leap card system, the prospect for bus/tram transfers for users of this site is very positive. The 20% fare reduction element of these promotions has already served to further boost demand for public transport services.

5.3 In modelling the behaviour of travellers, whether by car, bus or rail, traffic engineers and transport economists use the concept of "generalised cost" which uses the "value of time" in broadly determining modal split (or between competing routes). The modellers break down the components of alternative possible trips into their constituent parts. Simplistically, in this example, it breaks down the bus/rail trip into four basic time components. In this instance,

- Firstly, the walk time to the target bus/tram stop.
- Secondly, the wait time for the bus/tram.
- Thirdly, the duration of the public transport journey itself and,
- Finally, the walk time to the work or school destination from the alighting bus or tram stop.

The impacts of fares, etc. are ignored in this brief outline. Each component of the bus or tram trip - including any interchange between modes - is assigned different weightings, depending on their relative attractiveness.

While there can be some debate over the values of these weightings, extensive international research has confirmed that travellers generally dislike both the walking and waiting elements of the journey more than the in-vehicle journey time. (Hence the underlying attraction of car use where both of these elements are near zero and within one's control). On this basis, the walk element, being relatively unattractive, is usually assigned a value greater than 1. The weighting assigned to waiting for buses typically has a higher value, normally 2 or greater. This reflects the degree of relative discomfort or uncertainty associated with the, often unknown, arrival time of buses. The weighting value

of the actual bus trip itself is closer to 1 if it has a very predictable and repetitive journey time. The value of any equivalent heavy rail or tram weightings for both the waiting component and journey time are typically somewhat lower due to their greater general predictability, especially given the near certainty around the rail journey time and protection against congestion that rail systems such as the LUAS generally enjoy.

5.4 One outcome of this modelling based on behavioural research conducted over decades is that the trade-offs that travellers use in determining what mode they use can be assessed. In the case of future residents of the Gowan Motor site heading to their place of college/school they have a wide number of options if deciding to commute by public transport. On the one hand, as indicated earlier, future residents of the site have the **extremely attractive option** of a commute to Dublin City Centre and TUD Tallaght by LUAS Red Line services. The tram service can be accessed within 2/3 minutes of the subject site from the Bluebell stop. The combination of LUAS's strong peak (and off-peak) frequency and the reliable journey times by tram, will materially reduce its relative generalised cost and draw many future residents to LUAS.

On the other hand, future residents of the site can easily board the existing Dublin-bound route 13 and 68 services and alight at the point closest to their ultimate destination. The former route's all-day high frequency and its different alignment towards Dublin will suit many accessing Trinity College, Dublin, with bus stops very adjacent to the college. Route 13, being cross-city in nature, also has the added advantage of direct access to many areas north of the city and beyond to Phibsboro and Dublin City University on the Ballymun Road. The proximity of the existing bus stops means that access to these bus routes is even closer than the already nearby tram service.

The orbital alignment of route 18, which traverses many of the southern suburbs of inner Dublin, opens up connections to a range of workplaces, retail centres and attractions, including Rathmines College. The routing from Palmerstown close to the N4 via Drimnagh, Kimmage, Ranelagh, Rathmines and Ballsbridge to Sandymount will suit some residents who do not need to access the city centre. The slightly less attractive current peak frequency and distance to the nearest stops on Kylemore Road will deter some given the good access to other public transport
services. However, regular commuters will tend to target a specific bus to get them to their destination at the appointed time using travel Apps that track buses in real-time. The alignment of route 18 to Sandymount generally does not benefit from extensive bus lane

priority, which causes some uncertainty around journey time. The generalised cost weightings in these circumstances will tend to be relatively high and thereby limit the overall attractiveness of this bus service.

The existing single journey limited stop 51X Express service might suit residents heading to destinations on the N11 or UCD. The longer walk to access this service will deter some but the enormous benefits of a direct service for students attending the Belfield campus will outweigh this.

5.5 The relative attraction of bus and LUAS services with the planned Bus Connects proposals for the area is discussed in section 7 after the current demand for these services is examined. The surveys conducted to determine current passenger use for public transport in the area are now outlined in section 6, together with the network capacity assessment pre and post the development.

6. Public Transport Capacity Assessment.

6.1 The main objective of this analysis is to determine whether or not the incremental demand for public transport generated by the development of the subject site will put the existing public transport services (bus and LUAS) in the wider subject site area under undue pressure. Surveys of existing bus and LUAS patronage have been undertaken in April, 2023 by IDASO Limited. An appropriate share of the newly generated peak hour patronage from the new development, as already determined by the BMCE Residential Travel Plan, will be added to these surveyed levels of public transport usage. On that basis the impact on public transport capacity can be assessed.

6.2 The demand profile for public transport services, like road traffic, is quite seasonal in nature. The basis for the surveys undertaken is vindicated by the reality of public transport usage patterns.

- Demand for bus and LUAS services, in general, is materially lower in the Summer and school holiday periods.
- Demand tends to be somewhat higher in the late Autumn, Spring, Early Summer and in the run up to the busy Christmas holiday. Surveying in the none-holiday weeks in the opening four or five months of the year, and early Autumn, represent a reliable indication of base-level pre-development expressed demand for transport.
- Demand also varies by day of the week, with traffic/public transport demand post pandemic materially lower on Mondays and Fridays, with few exceptions. Public transport usage on Saturdays and Sundays (in particular) remains lower than mid-week demand but has increased since the demand upheavals in recent years.
- Demand for travel varies throughout the busier weekdays. The morning peak is somewhat shorter but usage levels are higher than the corresponding evening peak flows.

6.3 In determining whether spare public transport capacity is available to meet increasing demand from any development site it is best to undertake surveys and test the midweek morning peaks prior to the Summer period, and when schools are open. This advice was followed in the surveys undertaken for this report while primary, secondary schools and colleges were open.

LUAS and Bus Surveys at Bluebell LUAS stop and nearby Bus Stops 4606, 1954, 1955 on the Naas Road and 2787 on Kylemore Road.

6.4 On the basis of the generalised cost discussion around the relative attractiveness of the main public transport options (see 5.3 and 5.4 above) the decision was taken to survey demand on both the LUAS Red Line service and the key local bus stops identified earlier. Furthermore, most of the surveys were undertaken at Bluebell LUAS Stop and the immediately adjacent bus stops at the same time. In keeping with the demand profile for bus/tram travel outlined in 6.2 above the surveys were undertaken between 07.00 and 10.00 on Tuesday, April 18, 2023. Details of the surveys are now outlined.

Survey of LUAS Demand Profile

The passenger volumes counted on each Dublin-bound (northbound) tram leaving Bluebell LUAS Stop are shown in Table 2 below.

Tram Time	Fleet Number	Destination	Passengers
7.02	4001	Point	102
7.07	4007	Point	78
7.11	3013	Point	109
7.18	4003	Connolly	116
7.20	3004	Point	96
7.26	3007	Point	109
7.29	3023	Connolly	96
7.36	3002	Point	132
7.40	3008	Point	102
7.44	3014	Connolly	126
7.52	4010	Point	112
7.55	3025	Connolly	34
7.59	4004	Point	120
07.00 - 07.59			1,332

Tram Time	Fleet Number	Destination	Passengers
8.00	3006	Connolly	87
8.10	4030	Point	138
8.12	3026	Point	129
8.14	4005	Connolly	134
8.19	4011	Point	158
8.20	4006	Point	120
8.24	3015	Connolly	89
8.25	3020	Point	152
8.30	4002	Point	128
8.37	3021	Connolly	173
8.42	3022	Point	159
8.45	3017	Point	80
8.47	3004	Connolly	62
8.55	4001	Point	144
08.00 - 08.59			1,753
9.03	3008	Connolly	123
9.04	4007	Point	67
9.12	4003	Point	110
9.16	3023	Connolly	106
9.22	3013	Point	133
9.27	3007	Point	67
9.29	3004	Point	60
9.33	3002	Point	47
9.41	3006	Connolly	90
9.48	3014	Point	107
9.50	3005	Point	30
9.52	4004	Point	35
09.00 - 09.59			975
TOTAL			4,060

Table 2. Peak Dublin-bound LUAS Services from Bluebell Stop.

Table 2 shows that the total number of LUAS passengers on northbound trams at the survey site over the morning period 07.00 to 10.00 was 4,060 passengers on the 39 Dublin City Centre-bound trams surveyed. The average load was therefore 104 customers on the services surveyed. Tram frequency varied little from hour to hour. The average frequency over the entire period was an attractive 4.6 minutes. Most trams were destined for the Point Depot, with 30% stopping short at Connolly Station Stop. The number of passengers boarding per tram at Bluebell stop were mostly in single figures with the exception of some trams post 08.00. Those alighting at the surveyed stop were in small single figures, with none leaving a number of the trams.

Tram capacity varies between the Red and Green LUAS lines. The 26 initial Red Line '3000' Class trams were 30-metre long Citadis 301 configurations with a capacity of 256. Starting in 2007, all the Red line trams were upgraded to 40 metres (131 ft 3 in) by inserting two more articulated sections, with the last one converted by June 2008. All Red Line trams now have a **capacity of 358** including two wheelchairs. (Following the LUAS Green Line Capacity Enhancement project the trams on the north/south route have increased in size from 44m to 55m long. The capacity of each has increased from 319 to 408 per tram with the introduction of the LUAS Citadis 502 type trams.) The 3,000 and 4,000 series fleet numbers are recorded in Table 2.

6.5 Table 3 below shows the passenger demand profile by time band and the extent of capacity utilisation. Tram capacity is taken as 358 persons.

Timeband	Tram Numbers	Passengers	Passengers/ Tram	Capacity Utilisation %
07.00 - 07.29	7	706	101	28.2
07.30 - 07.59	6	626	104	29.1
08.00 - 08.29	8	1007	126	**35.2**
08.30 - 08.59	6	746	124	**34.6**
09.00 - 09.29	7	666	95	28.5
09.30 - 10.00	5	309	62	17.3
Total	39	4060	104	**29.1**

Table 3. Passengers and capacity utilisation at LUAS Bluebell Stop, by time band.

The number of trams in each of the six 30 minute peak periods varied little at around seven per time band, only falling off somewhat after 09.30 as one would expect. The average load per tram, aside from the decline post 09.30, also varied little. Most trams averaged loadings across each timeband exceeded 100 passengers. The heaviest loaded trams - in the heart of the am peak between 08.00 and 09.00 hours - still only accounted for one third of trams capacity as column 5 of Table 3 above shows. **The average capacity utilisation of the 39 trams surveyed was less than 30%, given the stated capacity of each tram of 358 passengers**. While accepting that the trams surveyed at this point still had some length to operate in its trip to the city centre, and consequently other passengers to board, this level of capacity utilisation suggests **considerable spare capacity in the Red Line LUAS network in the key morning peak period.**

The numbers show that the current scale of peak loading is unremarkable. Equally, **the peak itself is not that pronounced** in that both the number of trams per 30 minute time band and the total passengers carried in each period varied little prior to 09.30. The average tram headway (minutes between trams) over the survey period of three hours was surveyed at 4.6 minutes. This compares with the advertised minimum headway of 3 minutes. This surveyed headway improved to 3.75 minutes between 08.00 and 08.29.

While Red Line trams operating in the opposite (southbound) direction were also surveyed the loadings per trams were materially lower. The 35 trams surveyed in the other direction over the same three hour survey period carried a total of 2,325 passengers or 57% of the busier direction. This represents 66 passengers per tram, compared with 104 northbound. While not insignificant in its own right, this clearly indicates that spare capacity at this point southbound in the Red Line LUAS system is nearly 82% in the am peak period.

6.6 In summary, the LUAS survey undertaken at Bluebell stop indicated that

- The service on offer was attractive in terms of frequency throughout the survey period.
- Loadings on the tram were somewhat low, possibly reflecting the work-from-home (WFH) patterns evident in recent times post pandemic.
- The significant tram capacity on offer means that actual capacity utilised was low at approximately 29%.
- All passengers had seats available to them, though a small number were still observed standing.

Survey of Bus Demand Profile

6.7 In parallel with the LUAS surveys undertaken at the Bluebell Stop a series of surveys were also undertaken at nearby bus stops. The key stops surveyed included stops 4406, inbound and opposite the Gowan site, stop 1954 immediately adjacent to and outside the subject site and stop 2787 on the Kylemore Road.

The survey results for stop 4406, conducted in conjunction with the LUAS survey, are summarised in Table 4 below.

Time	Buses Surveyed	Passengers	Passengers/Bus
07.00 - 07.29	4	74	19
07.30 - 07.59	3	80	27
08.00 - 08.29	2	67	34
08.30 - 08.59	5	34	7
09.00 - 09.29	2	87	44
09.30 - 10.00	3	94	31
TOTAL	19	436	**24**

Table 4. Bus passenger demand, Stop 4406, Carriglea Industrial Estate.

The key point to note from Table 4 is t**he limited numbers carried by buses versus the twice as frequent tram network**. Bus passengers in total in the northbound direction amounted to less than 11% of the surveyed tram usage (436 v 4060) over the same time period. Table 4 shows the passenger numbers on the three Dublin bus routes at this location - routes 13, 68/A and 69. The same bus data, reconfigured on a route basis , is shown in Table 5 below.

Route	Buses Surveyed	Passengers	Passengers/Bus	Capacity utilisation %
13	12	278	23	34
68/A	3	74	25	37
69	4	84	21	31
TOTAL	19	436	**23**	**34**

Table 5. Stop 4406 loading by bus route. Seated bus capacity is 67 seats.

The table above illustrates the key aspects of the current demand for the existing bus routes along the Naas Road area in the am peak. Firstly, the level of service is quite limited. Only route 13 could be described as frequent, with an average of four buses an hour. It is the key cross-city route serving this area. By comparison, routes 68/A and 69 are quite infrequent radial bus routes serving commuters from the outer suburban towns of Newcastle and Rathcoole respectively. Passenger demand is limited for these routes with averages per bus all in the twenties. The minor routes will however supplement the frequency on the stronger routes as they all access the core city centre. The resultant capacity utilisation rate (% of seated capacity only) amounts to only 34%. The use of seated capacity only (which can be measured definitively) understates the ultimate true capacity of buses by roughly 20%. Inverting the 34% figure shows that **spare capacity for all the routes averages 66%, suggesting that there is more than adequate spare capacity in the existing radial bus network serving the subject site heading to the city centre.** The passengers surveyed at stop 1954, in the southbound direction, amounted in total to only 200 passengers, less than half the northbound total of 436. This indicates that spare bus capacity in this lower demand direction approaches 80%, while recognising that few students are expected to use these routes.

Orbital Bus Route Survey

A bus survey was also conducted at Stop 2787 on the Kylemore Road. Route 18, operated by Go-Ahead Ireland on contract to the NTA, is a frequent orbital route that traverses many of the southern inner suburbs of the city. The route operates between Palmerstown and Sandymount via Ballyfermot, Kimmage, Rathmines, Rathgar and Ballsbridge. This stop, on the nearby Kylemore Road, will open up alternative non-central destinations and will prove attractive to future residents of the subject site. Table 6 below outlines the survey results from this stop;

Time	Buses Surveyed	Passengers	Passengers/Bus	Capacity Utilisation %
07.00 - 07.29	2	50	25	37
07.30 - 07.59	2	30	15	22
08.00 - 08.29	2	50	25	37
08.30 - 08.59	2	59	30	45
09.00 - 09.29	1	17	17	25
09.30 - 10.00	1	24	24	36
TOTAL	10	230	**23**	**34**

Table 6. Route 18 passengers departing Stop 2787, Kylemore Road.

Passenger demand for this important orbital route, as evidenced by this survey, shows reasonable peak loadings. While demand for these routes is typically lower than radial services, route 18 loads averages per bus was in the twenties at this relatively early point on the route. The resultant capacity utilisation rate (% of seated capacity only) amounted to 34%, identical to the radial routes surveyed. This means that **spare capacity for route 18 averaged 66%, suggesting that there is more than adequate spare capacity in the existing orbital bus network serving the subject site.**

It should be noted that the survey data analysed above relate in each case to the busier of the service directions. For example, as already outlined, northbound (ie citybound) trams and buses were materially busier than their southbound equivalents. Equally, eastbound route 18 services are busier in this area than westbound services to Palmerstown.

6.8 In summary, the bus survey showed that

- The demand for bus services was a small share of overall public transport usage with tram loadings an order of magnitude higher.
- Both the supply of buses and passenger demand was well spread throughout the survey period.
- The peak period was not very pronounced with average loadings per bus never approaching even seated bus capacity.
- The average number of passengers per bus was low at 23 for the radial and orbital routes surveyed.
- While the % of bus seat capacity occupied was slightly higher than the tram equivalent, spare capacity was still excessive.
- The spread of the bus arrival times by route suggested that they seemed to operate very much to schedule throughout the survey period.

Spare Capacity after Generated Trips

6.9 In assessing the impact of estimated generated trips from the proposed development at the Gowan Motor site on the public transport network this section of the report has drawn extensively on the work done by BMCE Consulting Engineers in their Residential Travel Plan for the subject site.

The analysis undertaken identified the anticipated model splits for students from the Gowan Motors development. The proposed accommodation schedule for the development is 941 student beds. In summary, it was assumed that

- Only 90% of students travelling on a particular morning.
- A 70 % : 30 % modal split between public transport and cycling by students.
- A directional and modal split between LUAS and bus usage by students.

The resultant assumed modal split, and direction of travel, is shown in Table 7 below

	07.00 - 08.00	08.00 - 09.00	09.00 - 10.00	Post 10.00	
LUAS - City Centre	100	**141**	100	61	401
LUAS - Tallaght	13	**40**	22	13	88
BUS - City Centre	25	**35**	25	15	100
Total	138	**216**	147	89	**589**

Table 7. Anticipated public transport direction, and modal, splits.

The total number of students expected to travel by public transport on departure from the Gowan Motor site, as outlined in the table above, is 593 (or 70% of 90% of 941 students in accommodation). In assessing the impact of these newly generated trips on the existing LUAS and bus network of services the peak hour demand, here between 08.00 and 09.00 hours, the passenger numbers in the busiest time period are combined with the survey data outlined above.

From Table 3 above for LUAS passengers numbers surveyed it can be seen that the time period between 08.00 and 09.00 is also the busiest on the existing services. The busiest time period on the corresponding current bus loadings in Table 4 above also occur in this peak hour period. In this sense, the addition of the newly generated trips to the existing passenger numbers in this time band is a genuine test of these services' ability to handle the additional patronage. The combination of existing (surveyed) LUAS and Bus passengers with anticipated generated passengers is shown in Tables 8 and 9 below. This is done for both citybound LUAS and bus data, the directions with the highest existing and anticipated demand for both modes.

Impact of LUAS Generated Trips

	08.00 - 08.30	08.30 - 09.00	Total Peak
Existing LUAS trips	1007	746	1,753
Generated LUAS trips	71	70	140
Total Forecast Trips	1,078	816	1,893
Luas Trams	8	6	-
Survey Passengers/ Tram	126	124	-
Forecast Passengers/ Tram	135	136	-
Future Capacity Utilisation %	**37.7**	**38.0**	-

Table 8. Combination of existing and generated LUAS passenger numbers on capacity.

It is clear from Table 8 that the additional 141 peak-hour (08.00-09.00) morning trips estimated to travel by LUAS barely impact the tram capacity available to them. Excessive spare capacity of over 60% still remains when the current demand is supplemented by the newly generated trips from the Gowan Motors site. On the basis of this analysis one can conclude that there is more than adequate spare capacity on the LUAS network at this point. It is also worth noting that the LUAS capacity surveyed is below the maximum that can be offered. More concentrated use of lower frequencies (down to a headway of every three minutes) is achievable. But it appears tailored to more than meet current, post-Covid 19, levels of demand.

Impact of Bus generated trips

The busiest time period on the corresponding current bus loadings in Table 4 above also occur within the same peak hour period. The addition of the newly generated bus trips with the existing passenger numbers in the 08.00-09.00 time band is a genuine test of these the bus service's ability to handle the additional patronage. The combination of existing (surveyed) Bus passengers with anticipated generated bus passengers is shown in Table 9 below. This is done for citybound bus data, the directions with the highest existing and anticipated demand for bus services. No generated trips are allocated to the smaller orbital route network in the area. This increases the loadings on the radial routes.

	08.00 - 08.30	**08.30 - 09.00**	**Total Peak**
Existing BUS trips	67	34	1,753
Generated BUS trips	18	17	**35**
Forecast Trips	85	51	1,893
Buses in timeband	2	5	-
Survey Passengers/ Bus	34	7	-
Forecast Passengers/ Bus	43	10	-
Future Capacity Utilisation %	64.2	14.9	-

Table 9. Combination of existing and generated BUS passenger numbers on capacity. The seated capacity is 67 for a double-deck bus.

A total of 35 additional bus trips are anticipated in the am peak hour from the subject site. They are split evenly (18/17) across the 30-minute time bands. When added to the relatively small passenger numbers surveyed on buses at this point in the network they represent quite a material increase in bus patronage. Nevertheless, less than two-thirds of bus capacity is utilised in the busier of the two 30-minute periods. While more impactful on existing bus capacity than their LUAS equivalent the generated bus passengers are

easily catered for by existing levels of bus service. It should be noted that the 20% extra capacity associated with a full bus, including standees, is also available to commuters. Under the assumptions outlined in section 6.9 earlier all bus passengers are assumed to travel towards the city centre. We see that in this worst case scenario bus capacity is not under any threat. In practice, some students leaving the Gowan Motors site will take buses either outbound (away from the city centre) or travel on the orbital services within reach of the subject site. The likely demand, based on the volume of generated trips for the subject site outlined above, will be handled given the level of spare capacity on buses in this area.

Other Committed Developments in the Area

A series of other committed development build-outs which could potentially occur over the coming years have been reviewed by BMCE. They have identified four planned developments in the immediate area of the subject site. These are

1. The Nissan site
2. The Royal Liver site
3. The Concorde site
4. The Carriglea site

Information on the levels of peak travel by public transport for the combined sites is patchy. Should all four sites be developed, a review by BMCE has estimated that a total of 1,433 trips are made by residents from these developments over the entire morning peak (07.00-10.00). Roughly 75% of trips are from the first two, larger sites listed above. Based on the recently surveyed pattern of bus and LUAS usage in the immediate area of these other potential developments, it has been assumed that the split between bus and LUAS will follow a broadly similar pattern for all the sites, if they are developed.

The existing relative scale of LUAS and bus usage is clear from Tables 3 and 4, with only 436 (less than 10%) of 4496 passengers surveyed at this point travelling by bus. The pattern of travel, by mode, and time band, for the Gowan Motor site was outlined earlier in Table 7. This table has now been modified to incorporate the appropriate share of peak travel from the potential neighbouring developments. In the absence of other details, this

followed the same assumptions as made for the subject site. The time band illustrated in Table 10 below is 08.00-09.00, the busiest in the morning peak period.

	Gowan Site	Four Adjacent Sites	Total Combined Sites
LUAS - City Centre	**141**	340	**481**
LUAS - Tallaght	**40**	97	137
BUS - City Centre	**35**	85	**120**
Total	**216**	522	738

Table 10. Increased Peak Hour Public Transport Demand for Combined Sites

It is clear from Table 10 that the scale of potential public transport demand from the four adjoining sites in the Naas Road area is not insignificant. They potentially amount to nearly 2.5 times the scale of the demand arising from the subject site. The extent to which these increases impact the scale of spare capacity on both LUAS and bus services is shown in Tables 11 and 12 below. They mirror tables 8 and 9 above for the LUAS and Bus respectively. Only the busier directions to the city centre are relevant in terms of estimating spare capacity. The additional trips are split 50:50 between the two 30 minute time bands in the peak hour.

	08.00 - 08.30	08.30 - 09.00	Total Peak
Existing LUAS trips	1007	746	1,753
Combined LUAS trips	241	240	**481**
Total Forecast Trips	1,248	986	1,893
Luas Trams	8	6	-
Survey Passengers/ Tram	126	124	-
Combined Passengers/ Tram	156	164	-
Future Capacity Utilisation %	**43.6**	**45.8**	-

Table 11. Estimated Impact of Combined Adjacent Sites on LUAS Capacity Utilisation.

Total forecast trips include additional peak hour trips only.

The examination of the impact of the combined adjacent site, together with the subject site, on LUAS loadings has the effect of increasing the capacity utilisation rate by roughly 6% in the peak. This still leaves **spare capacity of the order of 55%** (the corollary of the utilisation rate of 45%).

The same process was followed for the bus data. Table 9 earlier was modified in a similar manner to produce Table 12 below.

	08.00 - 08.30	**08.30 - 09.00**	**Total Peak**
Existing BUS trips	67	34	1,753
Combined BUS trips	60	60	**120**
Total Forecast Trips	127	94	1,893
Buses in timeband	2	5	-
Survey Passengers/ Bus	34	7	-
Combined Passengers/ Bus	64	19	-
Future Capacity Utilisation %	**95.5**	**28.4**	-

Table 12. Estimated Impact of Combined Adjacent Sites on Bus Capacity Utilisation. Assumes seated bus capacity of 67 passengers. Total forecast trips include additional peak hour trips only.

From Table 10 we see that an additional 120 bus trips (representing the potential trips from the combined developments in the area) were envisaged in the morning peak hour. These were split 50:50 across the two 30 minute time bands with an additional 60 bus passengers per 30 minute period.

The examination of the impact of the combined adjacent site, together with the subject site, on bus loadings has the effect of increasing the capacity utilisation rate materially in parts of the peak. **In the busier time band demand approaches seated bus capacity.** But total bus capacity, allowing for standees, is 20% higher. There are significant levels of spare capacity elsewhere in the peak. In practice, passenger loading will spread

further throughout the peak and closer to equalisation over time as customers seek spare capacity leaving **spare capacity of the order of 35 - 40%**. It must be borne in mind that with staggered lecture times, many students are expected to travel of-peak.

Crucially, and on an ongoing basis the NTA, under its Measure Bus5 process, will continue to monitor and enhance bus services as required to meet demand (see 7.3 below). But, on the basis of the survey analysis, one cannot envisage a major enhancement of any scale being required in the case of the Naas Road bus services in the medium term. Neither the bus network nor tram service operate anywhere close to maximum capacity in this area.

6.10 In summary, we see that the impacts of the newly generated public transport trips from the subject site (both LUAS and bus) are limited and the **extra demand is easily catered for by the current public transport network capacity in the key morning peak hour**.

The potential demand placed on the public transport by adjoining developments has been shown as being manageable for both LUAS and bus services.

7. Future Bus Connects Network in Area Surrounding Gowan Motor Site.

7.1 In the next year or so the bus services in this area will be modified. The BusConnects project, as it directly applies to the subject site area, is now described. Figure 4 below shows the proposed Bus Connects network for the Naas Road and Longmile Road area. It is extracted from the NTA's most recently revised "Big Picture Network" following a number of rounds of public consultation and revision. The NTA proposals, in summary, are for broadly similar bus services to serve the wider Naas Road area.

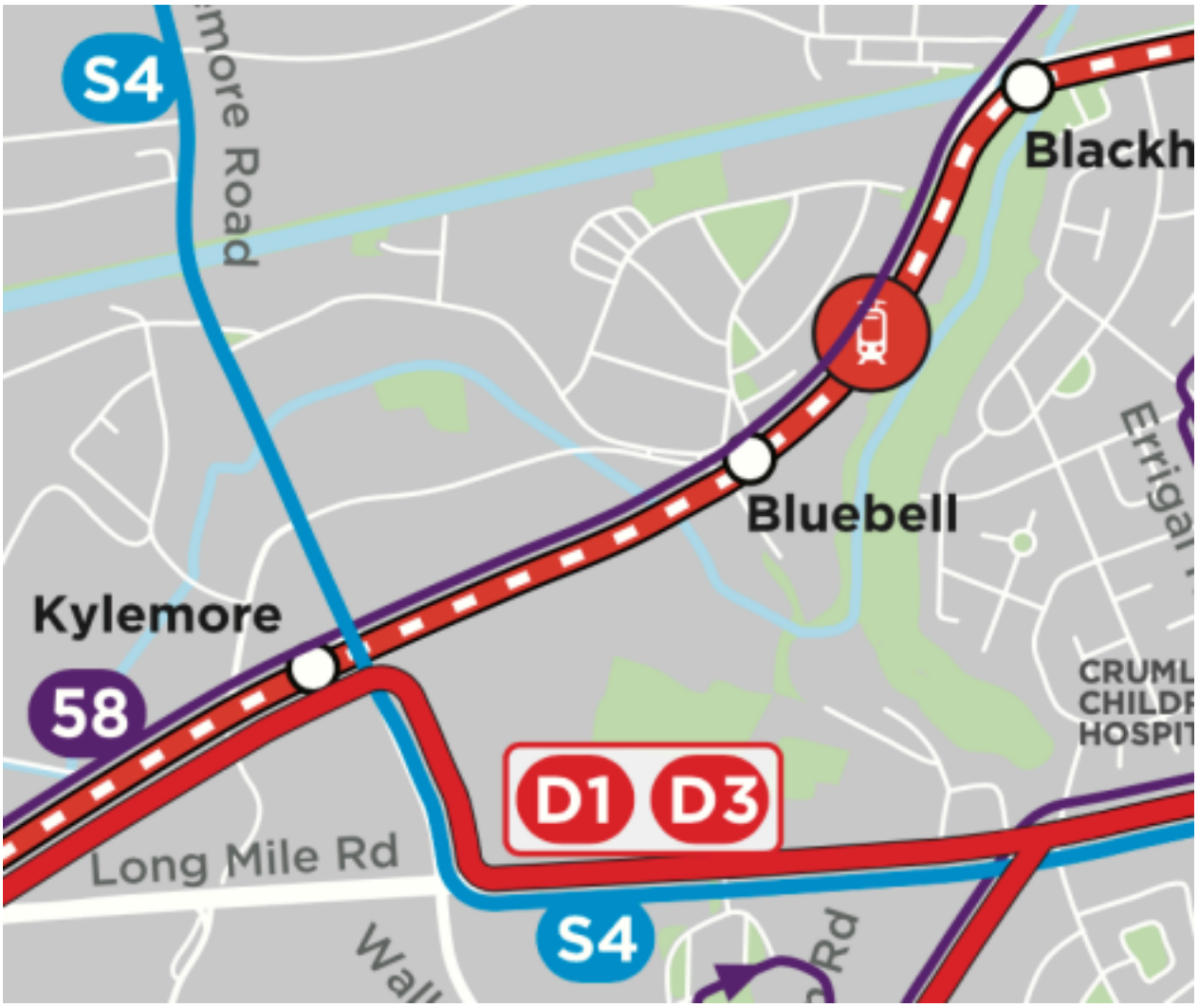

Figure 4. Extract from the NTA's Big Picture Network (latest version, 2020).

7.2 The NTA BusConnects proposals are similar to the existing bus network, but with some notable changes. The route proposals together with the latest NTA Bus Connects Frequency Table that accompany the network shows four services forming the basis for the bus network in the area. The comparison of existing versus proposed routes is best summarised in Table 13 below.

Existing Route	Current Peak Frequency (Mins)	Bus Connects Replacement	Peak Frequency (mins)
13	12	D1	15
		D3	15
18	10/20	S4	10 minutes
68/A	30/45	58	60
51X	Single am Trip	X55	60

Table 13. Comparison of existing and proposed Bus Connects routes for Naas Road area.

Route 13 on the Naas Road will be replaced, indirectly, by **Route D1** (which like 13, will operate from Grangecastle) and **Route D3**. The new D routes will operate on the "D Spine" corridor which diverts off the Naas Road onto Kylemore Road and continues to the city centre along the Long Mile Road, as can be seen on Figure 3. The combined route frequency of 7.5 minutes represents a material improvement on the current route 13 frequency. This will help offset the longer walk to access the two D routes on either the Kylemore Road or, more likely, the Long Mile Road from the Gowan Motor site.

Route S4, one of the new set of southern orbitals soon to be launched as part of the revised Bus Connects network, will operate from Liffey Valley and terminate in UCD and is ideally placed to attract many of the planned student residents of the site. It largely replicates the existing route 18 in the area but benefits from two major revisions. These are direct access to UCD and significantly improved frequency during both weekdays and weekends. The route S4 will operate every 10 minutes throughout each weekday and on Saturdays.

As far as the relatively minor routes are concerned, **Route 58,** operating along the Naas Road, has a slightly reduced frequency than there current 68 services while the Route X55, a direct replacement for the 51X, has three am peak services, or one every hour. In summary, the significant changes to the BusConnects network in this area are direct access to UCD, and increased frequency but on a slightly different alignment, still very accessible to residents of the subject site.

7.3 The combination of both transport and climate policy will continue to drive public transport's share higher into and out of Dublin. The NTA's Greater Dublin Area Strategy 2022-2042 clearly indicates that "demand for bus services in 2042 would require routes additional to those set out in the network review" (Bus Connects). It proposes that "periodic reviews will be undertaken during the period of the Transport Strategy to evaluate the impacts of changing development and transport patterns, and to implement appropriate additions or adjustments to the overall bus system to accommodate the changing arrangements". This forms the basis for what is termed "Measure Bus5" to continually monitor the bus network and enhance or amend it accordingly. The BusConnects project, now underway, together with the assurances of Measure Bus5, represent as good a guarantee of high quality bus services for the Dublin area as anyone could expect. This assurance applies to all routes, large and small.

8. Conclusions.

This report outlined the assessment of the existing public transport network near the Gowan Motor site, the existing and anticipated spare capacity on the key bus routes and nearby LUAS tram service. The analysis, when combined with the very strong attractions of the nearby LUAS Green Line services from the Bluebell Stop together with the planned BusConnects routings, lead to the following key conclusions.

1. The surveys and analysis of both tram and bus services showed **very high levels of spare capacity** in the morning peak period.
2. The new demand arising from the proposed development is not insignificant, especially for the bus network, but can be easily catered for due to the planned increased frequencies of the revised BusConnects network of bus services.
3. The LUAS frequency will have no difficulty catering for the anticipated demand arising from the proposed development.
4. The NTA's strategy sees continued significant investment in bus and rail services in order to meet growing demand. The NTA's high profile BusConnects project proposes bus routes in the area to build on the existing network. The new network of bus services will improve connectivity to third level institutions, retail centres and adjacent LUAS services.
5. Future residents of the subject site are also well positioned to benefit from both the soon to be introduced BusConnects routes and existing LUAS Red Line service.