DMURS Statement of Design Consistency

Proposed Large-scale Residential Development (LRD) in St. Mochta's Lands, Kellystown LAP, Clonsilla, Co. Dublin

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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001:2015 and BS EN ISO 14001:2015)

Issue	Date	Prepared by	Checked by	Approved by
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Comments

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1. Introduction

1.1 Context

This Design Statement based on the Design Manual for Urban Roads and Streets (DMURS) has been prepared by Waterman Moylan on behalf of Castlethorn Developments Luttrellstown Limited, which intends to apply for Permission for a development at a site (c. 4.38ha) at lands in the Townland of Porterstown, Dublin 15.

The proposed development comprises 302no. residential units in a mix of houses, duplex and apartment units consisting of 62no. 2 storey, 3-bedroom houses and 35no. 3 storey, 4-bedroom houses; 205no. Duplex / Apartment Units (98no. 1-bed, 88no. 2-bed and 19no. 3-bed) across 4no. blocks comprising: Block D ranging in height from 5-7 storeys accommodating 57no. apartment units; Block E ranging in height from 5-7 storeys accommodating 77no. apartment units; Block F ranging in height from 4-5 storeys accommodating 39no. apartment and duplex units; Duplex Blocks G1, G2, G3 & G4 3 storeys in height accommodating 32no. apartment units; and all associated and ancillary site development and infrastructural works, hard and soft landscaping and boundary treatment works, including public open space; public lighting; surface car parking spaces; bicycle parking spaces/stores for mid-terrace units; bin stores. Vehicular access to the proposed development is provided by the road network permi2ed under Reg. Ref. ABP-312318-21, as amended by Reg. Ref. LRD0034-S3.

The breakdown of the units is shown in **Table 1** below:

Description	1-bed	2-bed	3-bed	4-bed	Total
House			62	35	97
Apartment / Duplex	98	88	19		205
Total	**98**	**88**	**81**	**35**	**302 units**

Table 1 | *Schedule of Accommodation*

1.2 Scope

The scope of this report is to identify the specific design features that have been incorporated within the proposed residential scheme with the intention of delivering a design that is consistent with both the principles and guidance outlined within the Design Manual for Urban Roads and Streets (DMURS).

1.3 Standards

This Design Statement has been prepared in accordance with the Design Manual for Urban Roads and Streets (May 2019, Version 1.1).

1.4 Site Location

The site is situated in Kellystown, Clonsilla, south of the Royal Canal and the Dublin-Maynooth railway line and west of Diswellstown Road.

Figure 1 | *Site location Map*

The subject site, located in Kellystown, Clonsilla, Dublin 15, forms part of the Kellystown Development Masterplan which includes an important residential area with some 1,900 no. residential units, a primary school for c. 600 no. pupils, a secondary school for c. 1,000 no. pupils and a local centre of 2,500sqm. All developed on approx. 65 hectares the lands located in Kellystown.

The context and the masterplan's requirements are defined in the Kellystown Local Area Plan.

Kellystown is located approximately 1.5 km south-west of Blanchardstown Town Centre, 1.8 km south-west of Blanchardstown Main Street and 9.8 km north-west from O'Connell Street, Dublin.

The subject site is bounded to the west and south by the under construction Kellystown development - Phase 1- (Planning Application Reg. Ref. No. SHDW/004/21), to the east by the elevated Diswellstown Road and to the north by railway infrastructure. The subject development is proposed to be built on land currently occupied by St Mochta's football club. As part of a separate planning application, a new St Mochta's sports ground is proposed to the south of the site.

1.5 Contents of the DMURS Statement of Consistency

This document presents a review of the main section within both Chapters 3 'Street Networks' and 4 'Street Design' of the Design Manual Urban Roads and Streets. It examines how these chapters were implemented during the design phases, with the aim of providing a statement of the coherence of the subject development.

2. Street Networks

2.1 Integrate Street Network

Design Manual Urban Roads and Streets approach encourages the integration of land use and transportation, allowing the consolidation of development along strategic connections and around nodes. According to the Design Manual, the strategic connections represent the principal routes for public transport, whereas the nodes constitute the primary destinations. This results in improved accessibility to services and encourages more sustainable modes of transportation, which in turn reduces reliance on the automobile.

The Subject Development will be integrated into a major road network with two access points along its perimeter (see **Figure 8** below). The local roads will provide access to the various residential cells and link with surrounding developments. The figure below shows the surrounding road network.

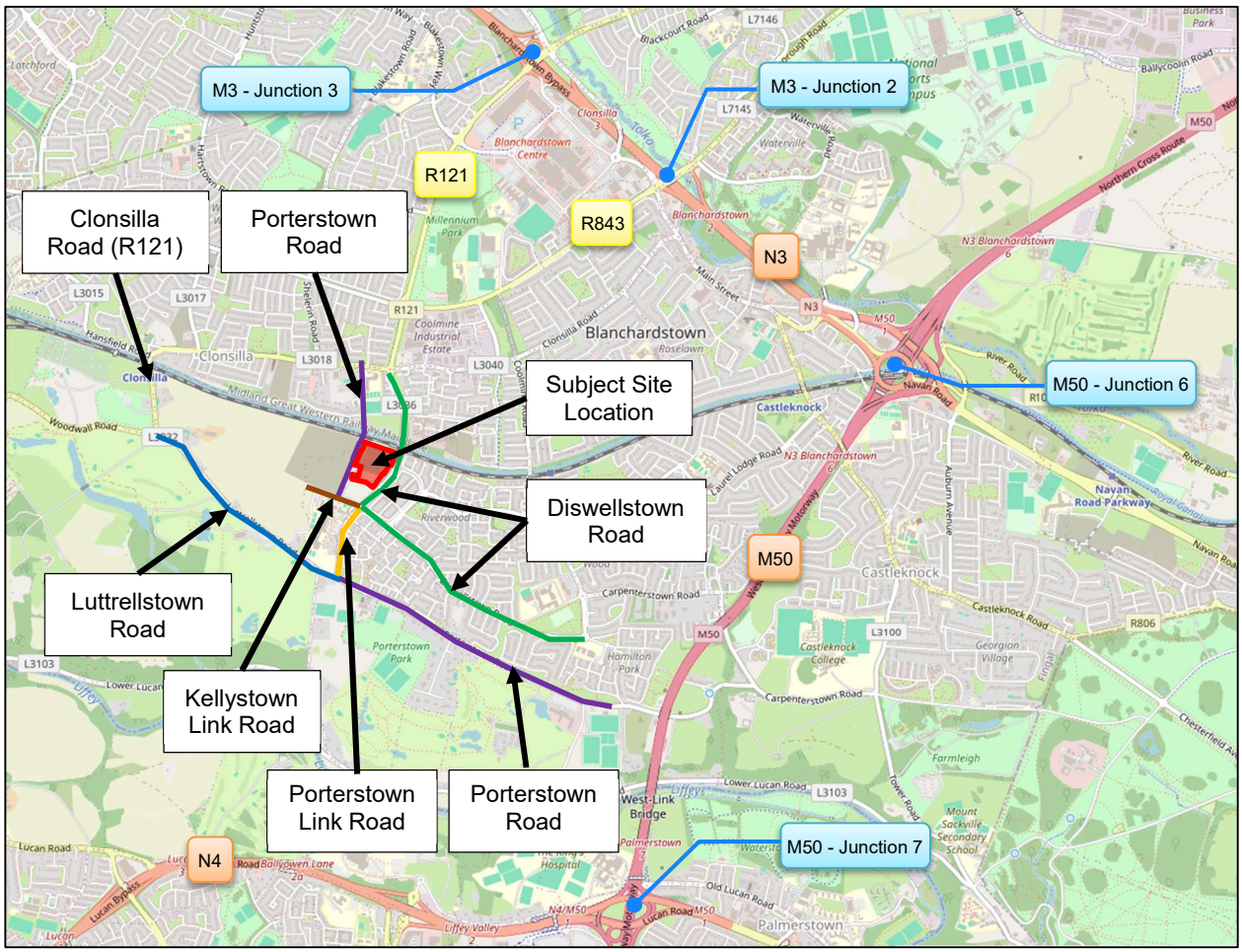

Figure 2 | *Existing Road Network*

Vehicular access to the proposed development is proposed off the western extension of Kellystown Link Road via the internal road of the ongoing Kellystown Development -Phase 1- (Plg. Apl. Reg. Ref. No. SHDW/004/21). The Kellystown Link Road is currently a single carriageway that extends for approximately 280 metres from the signalised crossroads with Diswellstown Road & Porterstown Link Road. As outlined in the Kellystown Local Area Plan, the Kellystown Link Road will be extended westwards to the junction of the Clonsilla Road (R121) and Lutrellstown Road.

The main roads in the surrounding area including

- The M50 Motorway is an important orbital motorway around Dublin which is subject to a speed limit of 100kph. It is a 40km, C-shaped ring around Dublin that connects all the National Primary Roads and carries more than 115,000 vehicles per day.
- The N3 road is a national primary road in the Republic of Ireland, running between Dublin, Cavan and the border with County Fermanagh. The A509 and A46 roads in Northern Ireland form part of an overall route connecting to Enniskillen, and northwest to the border again where the N3 reappears to serve Ballyshannon in County Donegal. The route, known as the Navan Road as it leaves Dublin, starts at its junction with the M50 motorway (junction 6). The N3/M3 cross the following counties: Fingal, Meath, and Cavan Donegal in Ireland, and Enniskillen in Northern Ireland.
- The N4 road is a national primary road in Ireland, running from Dublin to the northwest of Ireland and Sligo town. The M6 to Galway diverges from this route after Kinnegad, while the N5 to Westport diverges at Longford town. This national road originates at an intersection with the M50 motorway at Junction 7. This is also Junction 1 of the N4/M4. The road has three lanes and a bus lane in each direction between the M50 and Junction 5 which is also the start of the M4 motorway at Leixlip. The N4/M4 cross the following Counties: Kildare, Meath, Westmeath, Longford, Leitrim, and Roscommon

2.2 Movement and place

2.2.1 Movement Function

DMURS establishes a hierarchy in the use of streets, allowing priority to be given to sustainable forms of transport. It classifies streets into three distinct categories: Arterial Streets, Link Streets and Local Streets. In accordance with the Design Manual, Arterial streets are the major routes via which major centres / nodes are connected. Arterial streets may include orbital or cross metropolitan routes within larger cities and larger towns. Link Streets provides the link to arterial streets or between centres, neighbourhoods, and/or suburbs. Finally, local streets are the streets that provide access within communities and to arterial and link streets.

As a reference, the Design Manual provides a table which shows the terminology used within this Manual compared with other key publications. The table is presented below.

DMURS Description	Roads Act/ DN-GEO-03031	Traffic Management Guidelines	National Cycle Manual
Arterial	National	Primary Distributor Roads	Distributor
Link	Regional (see note 1)	District Distributor Local Collector (see Notes 1 and 2)	Local Collector
Local	Local	Access	Access

Notes

Note 1: Larger Regional/District Distributors may fall into the category of *Arterial* where they are the main links between major centres (i.e. towns) or have an orbital function.

Note 2: Local Distributors may fall into the category of *Local* street where they are relatively short in length and simply link a neighbourhood to the broader street network.

Figure 3 | *Terminology used within DMURS compared with other key publications (sources: Table 3.1 - DMURS)*

The road hierarchy has been defined in Kellystown Local Area Plan. **Figure 4** below reproduces "*Figure 7.10: LAP Road Hierarchy*" of the Kellystown LAP which shows the internal road hierarchy for the overall Kellystown area, and the main roads connected to it. As illustrated, the proposed roads are predominately Local with the Kellystown Link Road being a Regional Road.

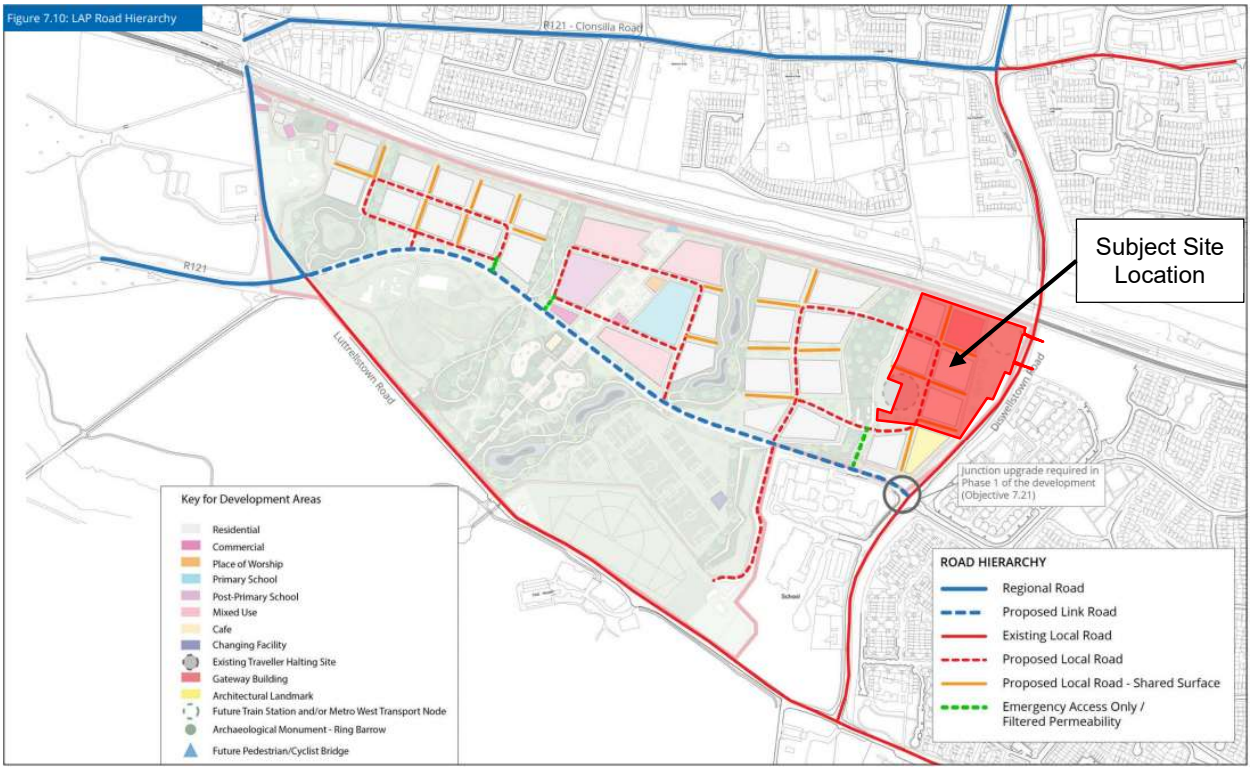

Figure 4 | *Road Hierarchy Proposed within the Kellystown Local Area Plan*
(Source: Figure 7.10 Kellystown Local Area Plan)

Therefore, the street hierarchy of the Subject Development is predominantly composed by local streets linked to the roads of the Kellystown Development -Phase 1- (Plg. Apl. Reg. Ref. No. SHDW/004/21), which is under construction.

The internal Road Layout have been designed following the transport objectives of the Kellystown Local Area Plan, as required by the LRD Opinion Report. The road layout provides a good accessibility to the surrounding Kellystown -Phase 1- Development.

Figure below shows the internal roads of the Subject Development. The figure shows the segregated roads and the shared roads. In general, the internal roads are referred to as Local Street. These have been further categorised as Primary Local and Secondary Local, reflecting the different levels of segregation between shared and segregated roads.

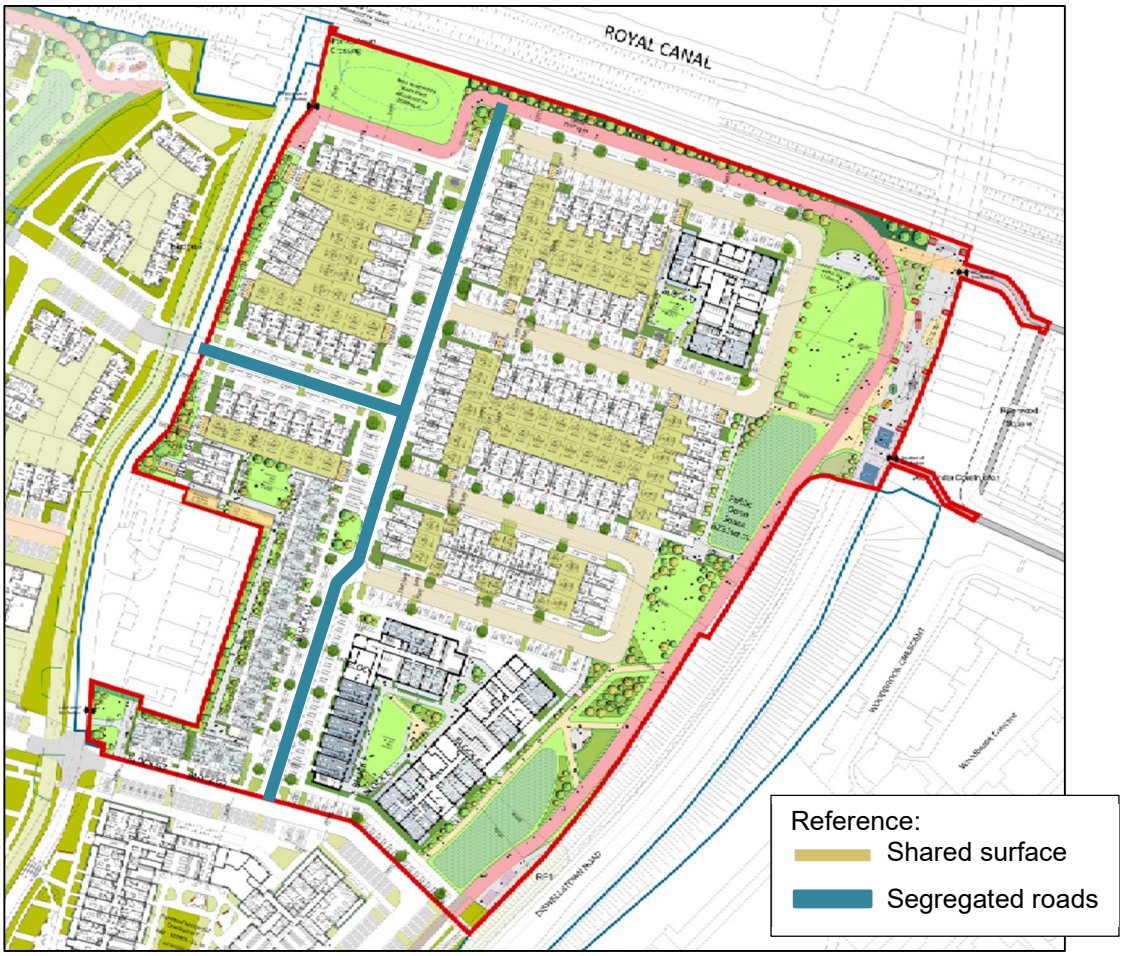

Figure 5 | *Proposed development - Internal roads*

2.2.2 Place Context

DMURS recognises that urban roads and streets pass through a variety of areas with different characteristics, requiring different design solutions in each of these different contexts. Consequently, based on the Irish urban landscape, the Design Manual has divided urban areas according to their collective similarities, defining the following categories: Centre, Neighbourhood, Suburb and Business Park/Industrial Estate.

Centres include areas that are the focus of economic and cultural activity, where pedestrian activity is highest, and contain a concentration of retail and commercial frontages that open directly onto the street. Neighbourhoods include new and existing areas that are intensively developed with medium to high density housing and/or a broad mix of uses. Suburbs consist mainly of existing lower density housing developed over large areas. Business parks / industrial estates are areas primarily focused on providing areas of commercial and industrial activity outside of centres.

The Subject Development is located in a neighbourhood area within the Kellystown Local Area Plan (see **Figure 6** below). Kellystown Local Area Plan includes the following areas:

- Eastern Development Area (DA1): is bounded to the north by the Dublin-Maynooth railway line/Royal Canal, to the east by Porterstown Link Road, to the south by Luttrellstown Community

College, Choilm Community National School and the alignment of the Kellystown Link Road, and to the west by Central Development Area (DA2). This area shall "*provide for a mixed typology of high-quality residential units including apartments, duplexes and townhouses*", with an approximate range of units varying from 571 to 857.

- Central Development Area (DA2): is bounded to the east by the Eastern Development Area (DA1), to the west by the Western development Area (DA3), to the north by the Dublin-Maynooth railway line/Roycal Canal and to the south by the alignment of the Kellystown Link Road. This area shall provide for a mixed typology of high-quality residential units including apartments, duplexes and townhouses, with an approximate range of units varying from 119 to 179, together with a local centre of c. 2,500sqm, a new primary school to accommodate c. 600 pupils (16-24 classrooms) and a new secondary school capable of catering c.1,000 pupils.
- Western Development Area (DA3): is bounded to the west by the R121, to the north by the Dublin-Maynooth railway line/Royal Canal, to the east by the Central Development Area (DA2) and to the south by the alignment of the Kellystown Link Road. This area shall provide for a mixed typology of high-quality residential units primarily comprising apartments and duplexes, with an approximate range of units varying from 365 to 547.

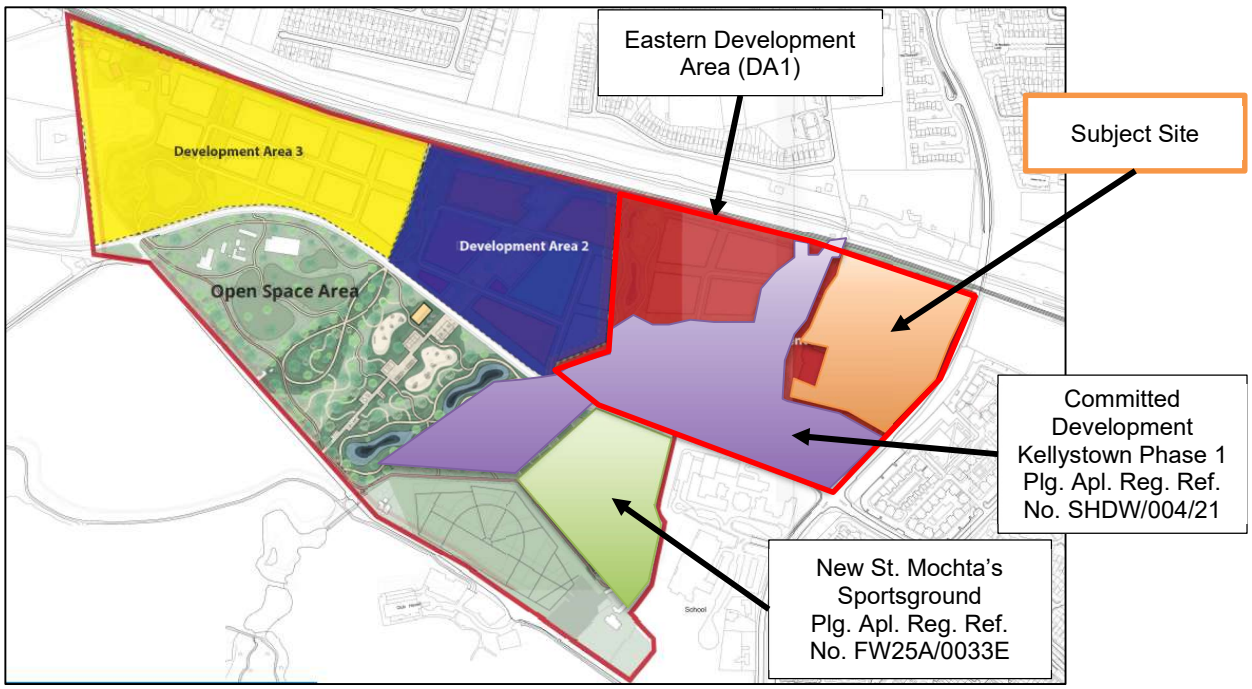

Figure 6 | *Development Areas in Kellystown*
(Source: Kellystown Local Area Plan)

As can be seen in figure above, the subject site is located within the DA1, and it is bounded by the under construction Kellystown Development -Phase 1- (Plg. Apl. Reg. Ref. No SHDW/004/21).

2.3 Permeability and Legibility

2.3.1 Street Layouts

DMURS indicates that the design of new road networks should incorporate solutions that facilitate the development of sustainable communities. The networks should be based on layouts that facilitate connectivity between streets and maximise the number of walkable and cyclable routes between

destinations. The use of cul-de-sacs, which provide no through access, should be limited to areas where mid-block penetration is desirable.

To provide a baseline, the DMURS set out three possible network typologies that can be adapted to the needs of the place, as shown in the figure below.

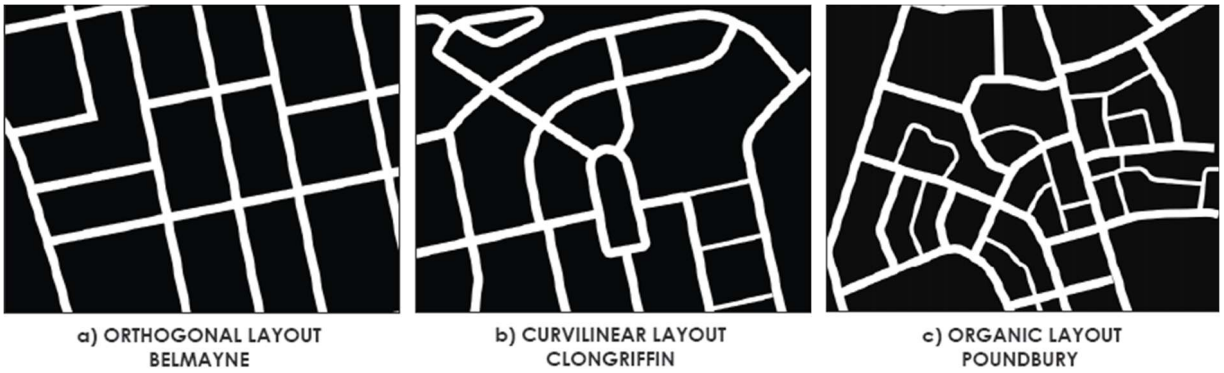

Figure 7 | *Permeable Street layouts (Source: Figure 3.8 – DMURS)*

DMURS highlight that an orthogonal layout is the most effective in terms of permeability. A curvilinear layout may also be highly effective, while streets with an organic layout have usually developed over time in a haphazard manner but can also offer high connectivity. Furthermore, it emphasises the importance of clearly defining the points of access to the development, which should be aligned with the major destinations and the hierarchy of the road network (refer to **Section 2.2.1**)

Figure 8 below illustrates the street layout of the Subject Development which, according to the classification above, corresponds to an "orthogonal layout". In addition, the **Figure 8** shows the vehicular access point to the Subject Development.

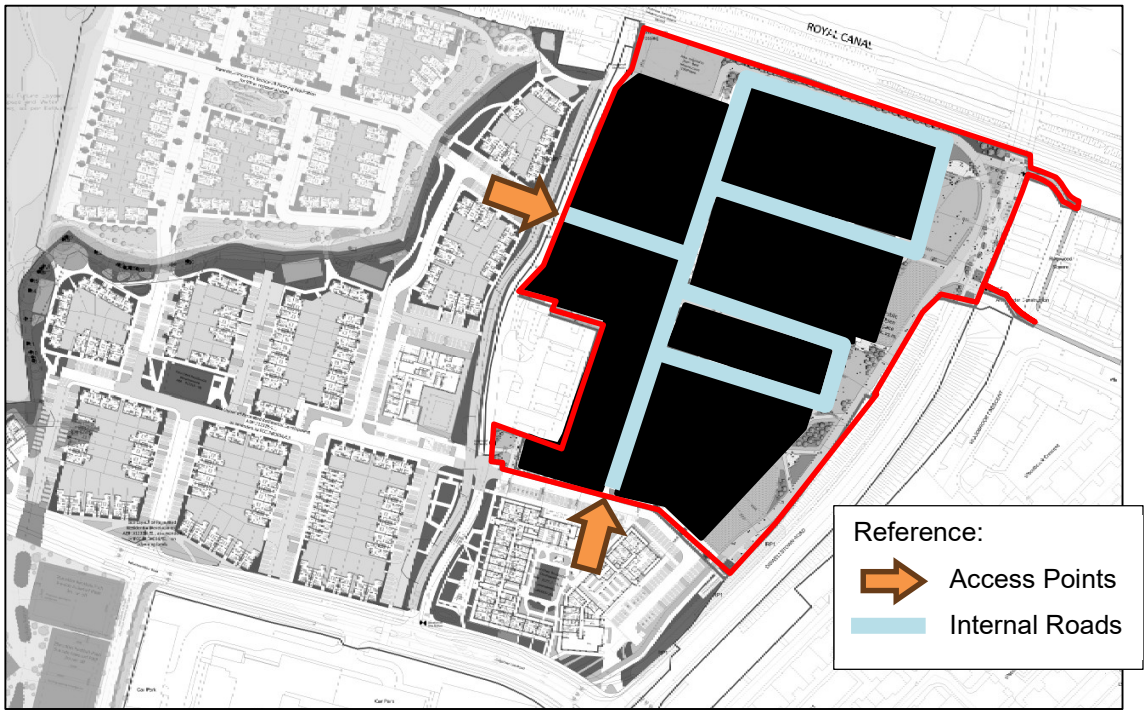

Figure 8 | *Subject Development – Street Layout*

2.4 Management

2.4.1 Vehicle Permeability

DMURS has classified the degree of permeability provided for different transport modes into four categories, as outlined below.

- Dendritic Networks, which severely restrict the movement of all users, should be avoided by the designer as they severely restrict movement.
- Open networks that allow full permeability for all users are the best accessibility. This is desirable for all users, such as within town centres and business park / industrial areas. The latter to allow more efficient access for commercial vehicles.
- 3-way offset networks, which comprise a significant number of 3-way junctions, permit through movement for all modes. However, this results in slower speeds for faster modes, as vehicles are required to decelerate, stop and/or change direction on numerous occasions when traversing local streets. This configuration presents a number of advantages and disadvantages with regard to its overall effectiveness. The use of multiple junctions can reduce legibility and discourage walking and cycling, as the network becomes challenging to navigate, and the route becomes unclear.
- Filter permeability network may be employed to permit full permeability to some users while imposing greater restrictions on others. This may be applied in instances where designers seek to prioritise the movements of more sustainable modes over private vehicles.

The figure below shows an elementary diagram of the types of road networks.

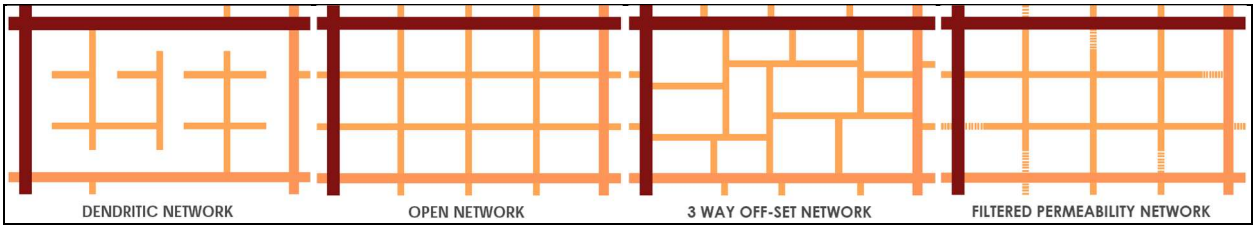

Figure 9 | *Type of Street Network (Source: Figure 3.22 – DMURS)*

The Design Manual outlines two final considerations regarding cul-de-sacs and one-way streets. For the former, DMURS considers that they should be used with caution to prevent the formation of dendritic networks. Regarding the one-way streets, the manual considers that the use of one-way streets can encourage faster car speeds and can be confusing for users if they divert people away from destinations. Nevertheless, the Design Manual also indicates that one-way streets may be beneficial in narrow carriageways in shared streets and where the implementation of this street type provides more space for pedestrian use.

The Subject Development is an open network as can be seen in the figure below which highlights the main road within the development. It is important to note that the eastern edge is bounded by Diswellstown Road which is elevated above ground level.

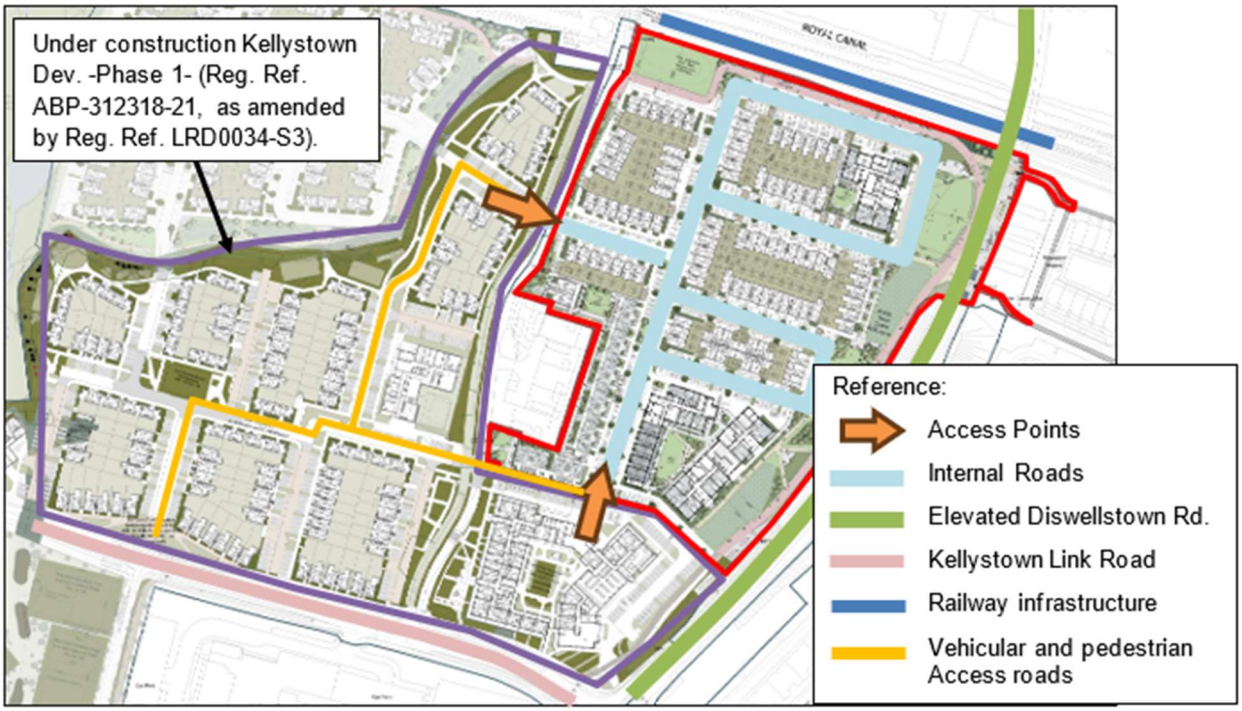

Figure 10 | *Subject Development – Street Network*

The developed has been designed with the following considerations:

- The subject site is located within an undeveloped section of the Kellystown Area, as illustrated in **Figure 6** above.
- The site is bounded to the south and west by the Under construction Kellystown Dev. -Phase 1- (Plg. Apl. Reg. Ref. No SHDW/004/21), and to the east by the elevated Diswellstown Road (see **Figure 10** above).
- According with the Kellystown Local Area Plan, vehicular access is provided off the Kellystown Link Road via the internal road of the under construction Kellystown Development -Phase 1-, as can be seen in **Figure 10** above.
- The internal layout consists of a group of local roads designated as Primary Local and Secondary Local, reflecting the different levels of segregation between shared and segregated roads, as was indicated in **Section 2.2.1** above.

It is reasonable to conclude that the configuration is appropriate and that drivers will not be inclined to travel at high speeds or experience any significant disruption to their journey times as a result of driving on the network roads.

It is important to note that the main junction located at Kellystown Link Road has been designed to provide access for residents of the entire Kellystown development, which includes the Phase 1 development, the subject site and the future potential development on Molloy Lands, located to the east of the subject site. The junction was designed as part of the traffic and transport assessment carried out by Waterman Moylan Consulting Engineers as part of the Kellystown Development -Phase 1- (Plg. Apl. Reg. Ref. No. SHDW/004/21).

2.4.2 Traffic Congestion

It is acknowledged by DMURS that the establishment of a more connected and traffic-calmed network will result in a reduction in car dependency and an increase in the utilisation of more sustainable modes of

transport. Nevertheless, it is predicted that the use of private vehicles will persist, and that delays, and congestion will continue to be prevalent at junctions. It is therefore essential to ensure that all junctions, both the new and existing infrastructure, prioritises the movement of pedestrians and cyclists over that of vehicles.

The Subject Development has been designed considering the vehicular flows in the surrounding area. Waterman Moylan Report No. 15-038r.028 Traffic and Transport Assessment, which is included in the documentation package, has assessed the behaviour of the main junctions in the vicinity of the development. The results of the analysis demonstrated that all junctions would operate within their respective capacities for all years and scenarios analysed.

3. Street Design

3.1 Movement, Place and Speed

3.1.1 A balanced Approach to Speed

In order to achieve an effective and balanced design solution, DMURS advises the designer to consider the management of speed, the values of place and the reasonable expectations of appropriate speed in accordance with the context and functions in question. In order to facilitate this, DMURS has outlined a matrix which allows for the selection of an appropriate design speed on the basis of the links between place, movement and speed. The matrix is presented in the figure below.

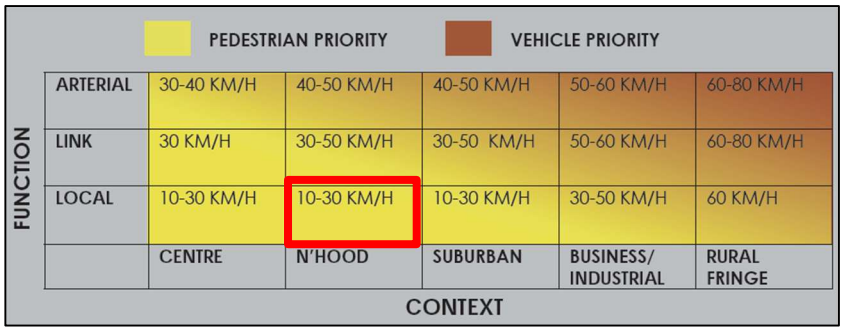

Figure 11 | *Design speed selection (Source: Table 4.1 – DMURS)*

The roads within the Subject Development were designed with a maximum speed of 30 km/h.

As previously discussed in **Section 2.2.1**, the internal roads are local streets, and is situated in a neighbourhood area, as outlined in **Section 2.2.2**. Accordingly, the speed must be between 10 and 30 km/h, in accordance with the maximum speed considered.

3.1.2 Self-Regulation Streets

It is acknowledged by DMURS that the place can be used to manage movements with an appropriate design response, which can balance the functional needs of different users, enhance the sense of place and manage speed in a manner that does not rely on extensive regulatory controls and physically intrusive measure for enforcement.

The Design Manual provides a several number of examples that can assist designers in the creation of a safe road, including the incorporation of a continuous street-tree walls, pedestrian activity zones, horizontal and vertical deflection, narrow carriageways, on-street parking, tighter corner radii, and shared surfaces, among others

The Subject Development use several strategies in its design to manage movements:

- Streets with horizontal deflections indeed of straight roads
- Narrow streets
- Raised crossings at road intersections with ramps
- On-street parking
- Shared surface

The detailed strategies considered within the site provide a low risk of high vehicle speeds. Figure below shows some of the main self-regulatory strategies developed in the subject site.

Figure 12 | *Subject Development – Self regulation streets*

3.2 Streetscape

3.2.1 Material and Finishes

DMURS emphasises that the use of materials and finishes is one of the most defining elements of a street, particularly where it is used to define the levels of segregation and integration within a street. The material range can define space, calm traffic and improve legibility, reducing the need for barriers, signage and line marking in favour of texture and colour. Materials can be used to enhance the value of place and produce more attractive and cost-effective streets.

The subject site comprises a variety of materials and finishes, which are used to delineate the different functional areas. The shared surface (see **Figure 5** above) is constructed with a different material than the surrounding road surface and is designed to have the same elevation as the footpath (no kerb).

The internal junctions have been designed as courtesy crossings with different surface material treatments. The intention is to alert drivers to a new condition and influence their behaviour and vehicle speeds.

The two access roads are designed as priority-controller T-junctions with zebra pedestrian crossings on the access roads.

In order to facilitate the crossing for pedestrians with visual limitations, it is proposed that tactile paving be integrated into the design.

3.3 Pedestrian and Cyclist Environment

3.3.1 Footways, Verges and Strips

DMURS indicates that a strong sense of enclosure and active street edges contribute to pedestrians' and cyclists' sense of security and comfort. In addition, it suggests that the provision of wider and better-quality walking facilities may result in an increase in walking. Well-designed footpaths are free of obstacles and wider enough to allow pedestrians to pass each other comfortably. In this regard, the Design Manual presents a guideline for the design of each area thought of as the footpath:

- Footway: is the area along which people walk. The minimum width for a footway is 1.8 metres. In areas of high population density and along streets with high traffic volumes, additional width must be provided to facilitate the passage of people in larger groups. **Figure 13** below illustrates the requisite space for pedestrians to pass each other comfortably, with reference to the levels of activity within a street.
- Verges: serve to provide a buffer between pedestrians and the vehicle traffic. The verges wide depend on the function of the street and the presence of on-street parking. The Design Manual has established that on arterial and link streets without on-street parking, a verge of 1.5-2.0m should be provided. In contrast, there is no minimum verge requirement for local roads. Where on-street parking is provided, a verge (and change of kerb line) may be needed on approaches to junctions to enforce the visibility splay. In addition, a verge of a minimum of 0.3m should be provided in areas of perpendicular parking a verge should be provided. Finally, where cycle tracks are located adjacent to parking spaces, a verge should be provided.
- Strips: are spaces provided directly to the front of a building that may be occupied by activities generally associated with retail/commercial uses and may be incorporated into the private spaces of a dwelling.

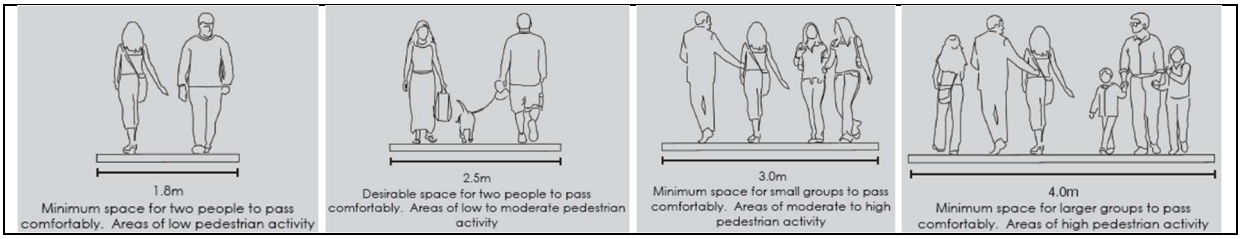

Figure 13 | *Spaces needed for pedestrian to pass each other (Source: Figure 4.34 – DMURS)*

The Subject Development is situated within a residential neighbourhood (refer to **Section 2.2.2** above) with no presence of commercial areas. In addition, the subject site offers parking options both perpendicular and parallel to the street.

Figure 14 below shows the pedestrian infrastructure and well-connected footpath with the surrounding area including the local bus and rail service (refer to Traffic and Transport Assessment, Waterman-Moylan report No. 15-038r.028).

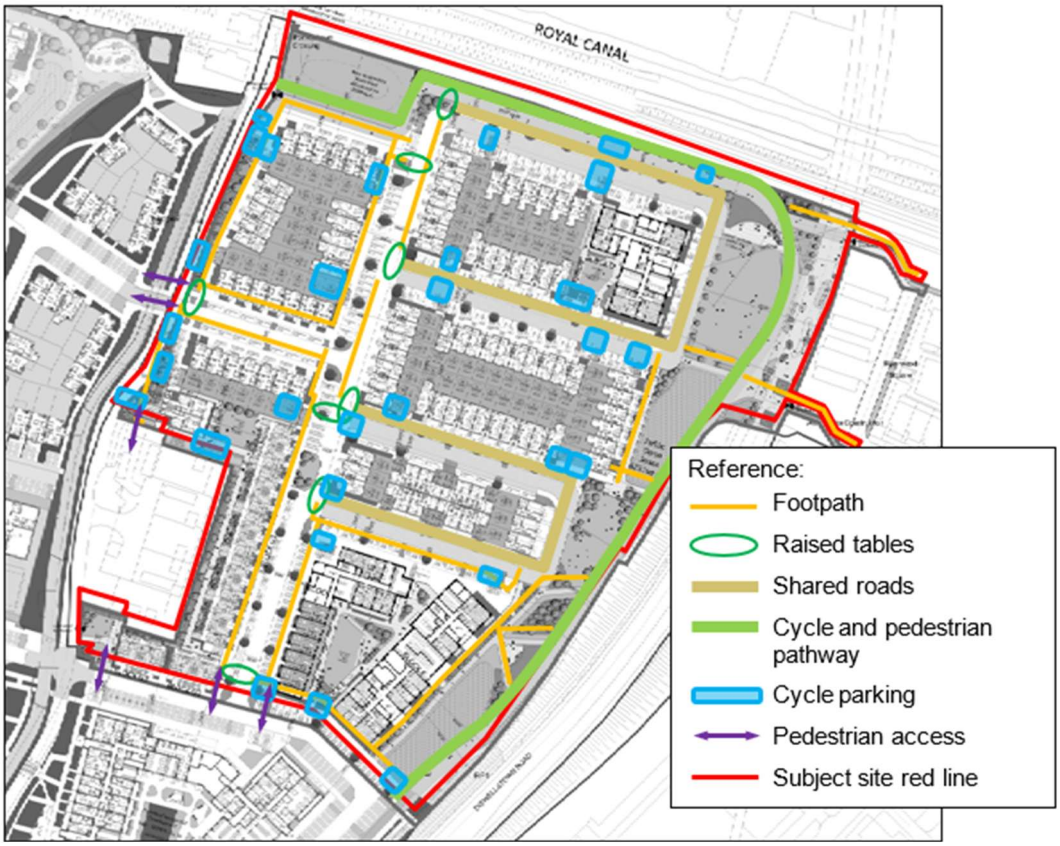

Figure 14 | *Proposed Development – Pedestrian Infrastructure*

3.3.2 Corner Radii

DMURS indicates that the reduction of corner radii will markedly enhance the safety of pedestrians and cyclists at junctions. This is achieved by reducing the speed at which vehicles can turn corners and by increasing inter-visibility between users. Furthermore, it is essential to verify the swept path of the main vehicles that will utilise the streets. In this regard, designers must consider the following:

- On junctions between arterial and / or link streets, a maximum corner radius of 6m should be applied.
- Where turning movements occur from an arterial or link street into a local street, corner radii may be reduced to 4.5m.
- Where design speeds are low and movements by larger vehicles are infrequent, a maximum corner radius of 1-3m should be applied.
- In circumstances where there are regular turning movements by articulated vehicles, the corner radii may be increased to 9m.
- In instances where designers find difficulties in applying the aforementioned radii, they should consider the following: (i) the implementation of setback vehicular stop lines at signalised junctions, which would permit turning vehicles to traverse the enter line of the intersection street without conflicting with oncoming movements, and (ii) the removal of obstacles from corners to facilitate the passage of emergency vehicles.

The Subject Development has been designed with 4.5 metres corner radius in junction roads.

3.3.3 Pedestrianised and Shared Surfaces

DMURS has identified the implementation of pedestrianisation and shared space as an effective way of promoting place and providing a more enjoyable experience for pedestrians and cyclists. The pedestrianisation streets entail the segregation of pedestrians and cyclists from the flow of motorised traffic, whereas the shared surface streets represent an integrated space where pedestrians, cyclists and vehicles share the main carriageway.

The Design Manual indicates that the implementation of pedestrianised streets is most appropriate in town centres situated in proximity to areas of retail, commercial and cultural activity. While shared surface streets are recommended in locations where the priority is to facilitate movement at a low level and to enhance the liveability of streets, such as on local streets within neighbourhoods and suburbs. Furthermore, shared surfaces may be use in areas where pedestrian activity is high and vehicle movements are only required for lower-level access, such as streets within town centres.

DMURS outlines that shares surfaces streets may comprise carriageway where the entire street reserve is shared, or where designated sections may provide for pedestrians and/or cyclists use only, with a shared surface carriageway along part of the street. The key condition for the design of any shared surface is that drivers recognise that they are in a shared space and react by driving very slowly (20km/h), to ensure this, designers should:

- Use a variety of materials and finishes that indicate that the carriageway is an extension of the pedestrian domain.
- Avoid raised kerb lines.
- Minimise the width of the vehicular carriageway and / or corner radii.

The Subject Development comprises several streets with a shared surface, as shown in **Figure 5** above. The roads have been designed with the objective of generating a safer environment, incorporating a differentiated rolling surface (in texture and level) that is easily identifiable by the drivers.

The internal pedestrian infrastructure has been designed following the transport objectives of the Kellystown Local Area Plan, as required by the LRD Opinion Report. The road layout provides a good accessibility to the surrounding Kellystown -Phase 1- Development.

All road intersections within the development itself will be courtesy crossing.

Furthermore, with focus on mitigate potential future issues with pedestrian accessibility and recognising that providing a well-connected pedestrian path will provide a reduction in journey times, several paths to the surrounding area of the Subject Development are proposed. Figure below illustrates the proposed links.

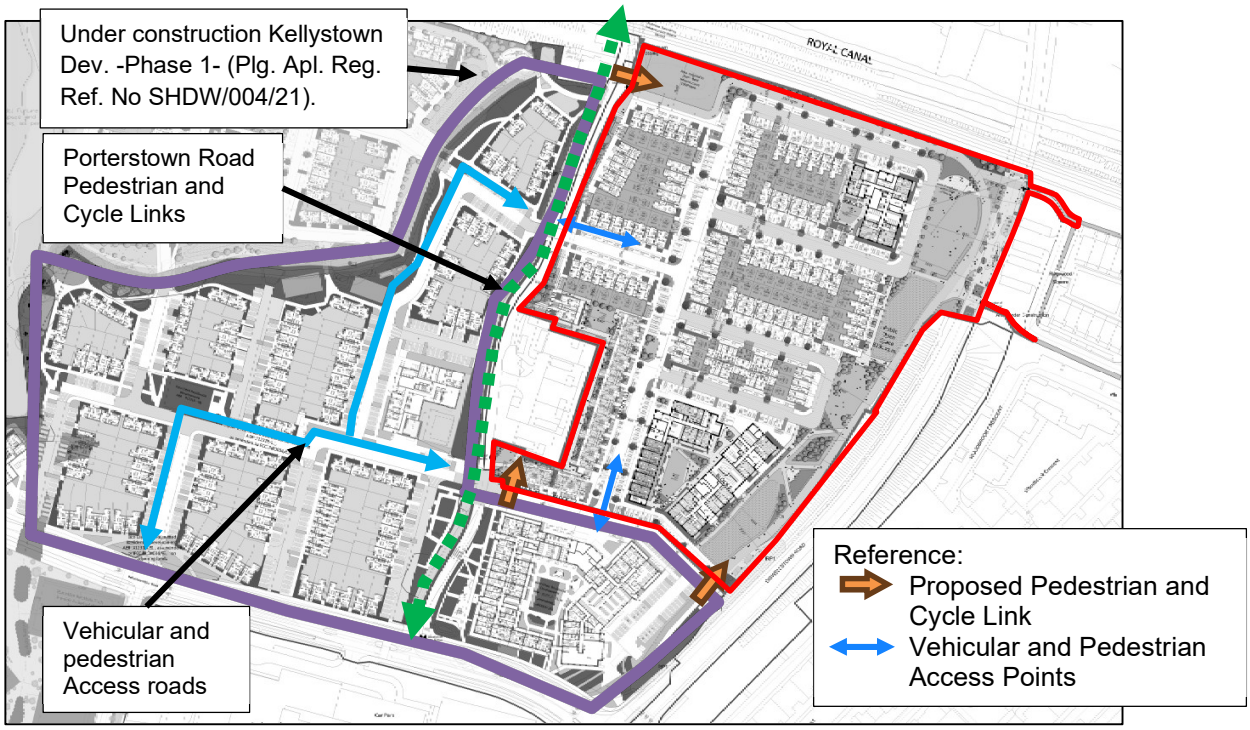

Figure 15 | *Subject Development – Link Path*

3.3.4 Cycle Facilities

DMURS promotes cycling as a sustainable mode of transport and seeks to rebalance design priorities to promote a safer and more comfortable environment for cyclists. In this regard, the Design Manual follows the baseline described in the National Cycle Manual and refers to it in the design of cycle facilities.

DMURS highlights that on lightly-trafficked / low speed streets, designers are generally directed to create shared streets where cyclist and motor vehicles share the carriageway. However, on busier / moderate speed streets, designers are generally directed to apply separate cycle lanes / cycle tracks.

The Subject Development incorporates the provision of cycle facilities, as cyclepath and cycle storage for the units as shown figure below. Further information about the number of cycle parking spaces can be found in the Waterman-Moylan Report No. *15-038r.028 Traffic Transport Assessment*, which are accompanying the documentation package.

The internal cycle layout has been designed following the transport objectives of the Kellystown Local Area Plan, as required by the LRD Opinion Report. The road layout provides a good accessibility to the surrounding Kellystown -Phase 1- Development.

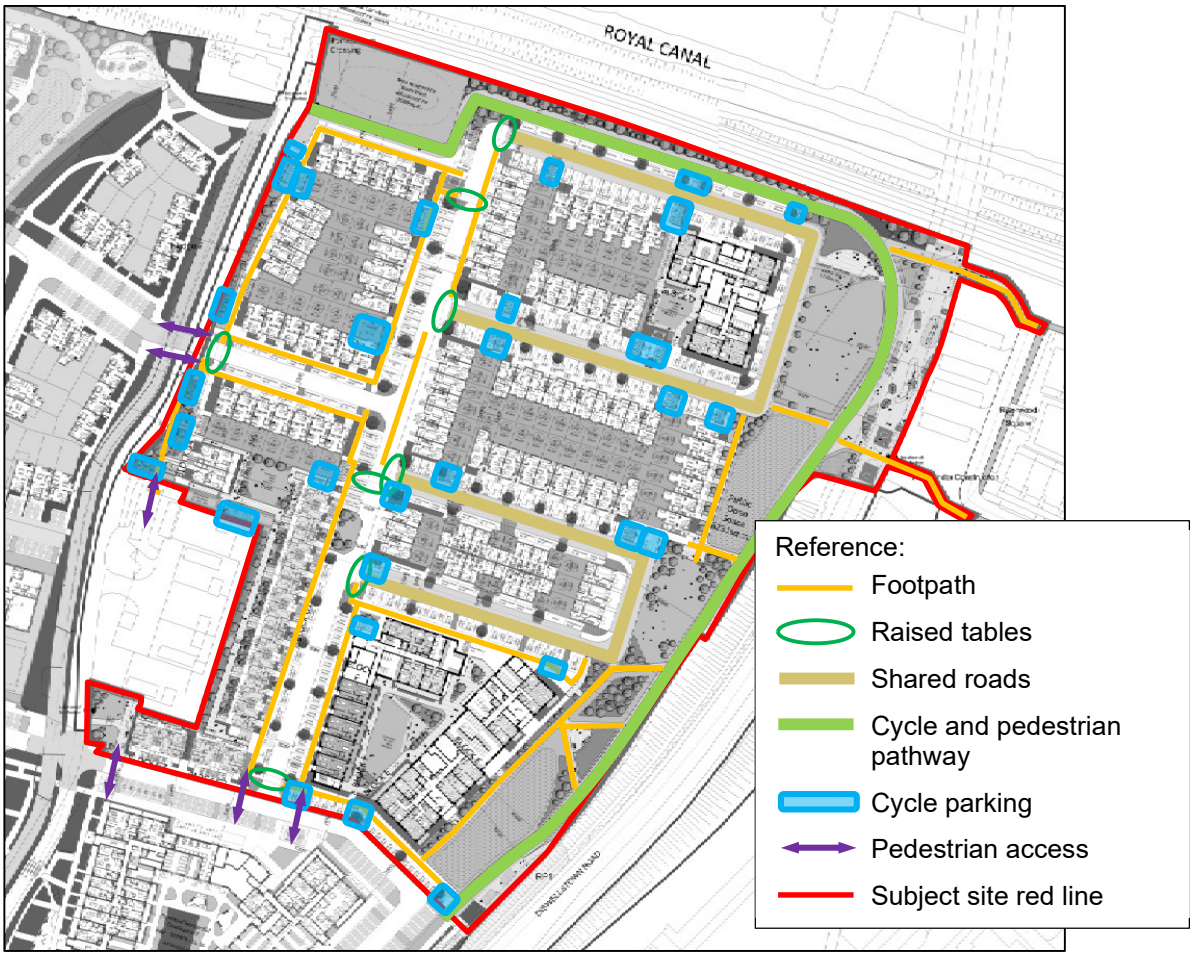

Figure 16 | *Proposed Development – Pedestrian and Cycle Infrastructure*

The figure above shows the cyclepath, the shared surface that will provide convenient access to residents on this bikeway, and the location of the bike storage for the residential units.

3.4 Carriageway Conditions

3.4.1 Carriageway Widths

As indicated by DMURS, narrow carriageways represent one of the most effective design measures for calming traffic. This is measured from the kerb to the kerb, from the outside line of a cycle lane, or from the edges of parking spaces.

Figure below, extracted from the design manual, illustrates various examples of width road.

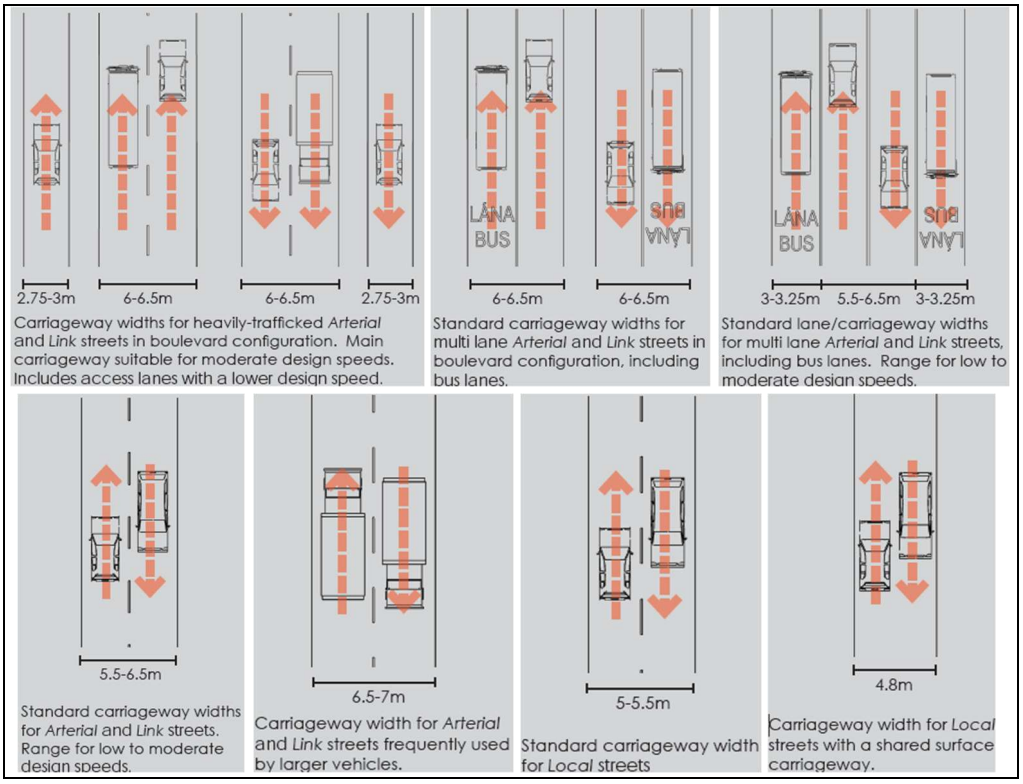

Figure 17 | *Carriageway widths (Source: Figure 4.55 – DMURS)*

The internal roads of the Subject Development are local streets, as previously described in **Section 2.2.1**. It should be noted that some of these roads are shared between pedestrians and vehicles, as illustrated in **Figure 5** above. The road width has been set at 6 metres for segregated roads and 5 metres for shared roads. In the case of segregated streets, it is important to note that self-regulating street strategies have been included in the study area, reducing the street width to 3 metres in some areas, as shown in **Figure 12** above.

3.4.2 Forward Visibility

DMURS defines the term 'forward visibility' or 'forward sight distance' (FSD) as the distance along the street ahead which a driver of a vehicle can see. Furthermore, it is stated that the minimum level of forward visibility required for a driver to stop safely if an object enters their path is based on the Stopping Sight Distance (SSD), as illustrated in the figure below.

SSD STANDARDS

Design Speed (km/h)	SSD Standard (metres)
10	7
20	14
30	23
40	33
50	45
60	59

Forward Visibility

Design Speed (km/h)	SSD Standard (metres)
10	8
20	15
30	24
40	36
50	49
60	65

Forward Visibility on Bus Routes

Figure 18 | *Reduced SSD standards for application within cities towns and villages (Source: Table 4.2 – DMURS)*

The Subject Development has a good forward visibility along its internal streets. It has been verified that the requisite forward visibility has been met, given that the segregated roads are designed with a maximum speed of 30 km/h, which, according to **Figure 18** above, require 23 metres of forward visibility. The shared streets have been designed with a maximum speed of 10 km/h, which requires 8 metres of forward visibility.

3.4.3 Visibility Splays

It is emphasised by DMURS that visibility splays are applicable to junctions of particular importance, where drivers are required to exercise their own discretion in determining the optimal moment to enter the junction.

The junction visibility splay is composed of two elements: the X distance, which is the distance along the minor arm, and the Y distance, which is the distance a driver exiting from the minor road can see to the left and right along the major arm. The former is gotten from the stop line, and a distance of 2.4 metres should be considered in the major case, while a distance of 2.0 metres may be used where vehicle speeds are slow and flows on the minor arm are low. The Y distance should correspond to the Stopping Sight Distances set out in **Figure 18** above. The methodology for measuring distances is illustrated in **Figure 19** below.

Design Manual indicates that visibility splay should be kept clear of obstructions. However, objects that would not be large enough to wholly obscure a vehicle, pedestrian, or cyclist may be acceptable, provided that their impact on the overall visibility envelope is not significant.

DMURS indicates that designers may have reservations about reducing visibility splay at junctions that experience higher traffic volumes at relatively moderate speeds.

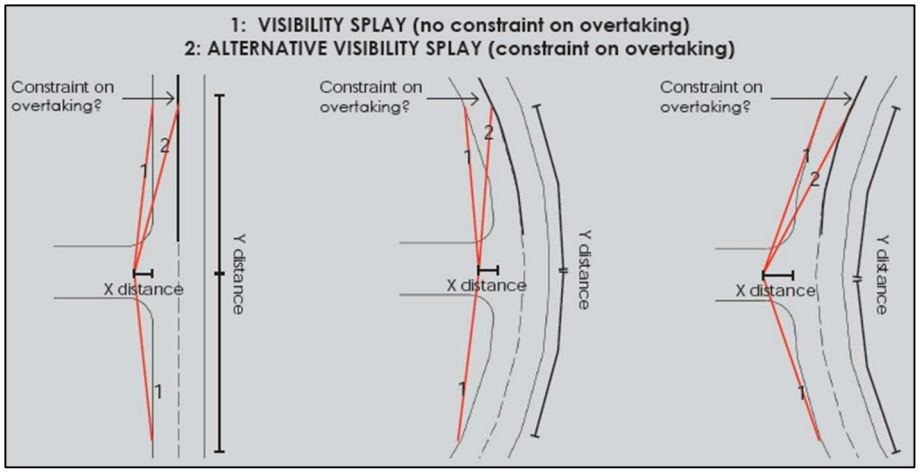

Figure 19 | *Visibility splay refer to an X and Y value (Source: Figure 4.63 – DMURS)*

Subject Development has the access roads from the western development link road have been designed as priority T-Junctions with stop line and therefore visibility splays have been verified.

In order to facilitate pedestrian movements and enhance the safety of pedestrians at internal junctions, courtesy crossings have been designed with a change in the material surface of the street and vertical deflection. It is anticipated that these uncontrolled junctions, situated in a low-speed street environment (as discussed in **Section 3.1.2** above), will function effectively without the need for further assessment.

4. Conclusion

Waterman-Moylan Consulting Engineers have been commissioned by Castlethorn Developments Luttrellstown Unlimited to provide as part of the planning application documentation a proposed new Long-Residential Development (LRD) for St. Mochta's, in lands within the Kellystown Local Area Plan (LAP), Clonsilla, Dublin 15.

The statement set outs how the proposals align with the objective outlined in DMURS, which aims to enhance street design to encourage individuals to opt for walking or public transportation over private vehicle use.

Considering the assessment carried out in this report, the proposed development is aligned with the standards set forth for the design of urban roads and streets as outlined in DMURS.

UK and Ireland Office Locations