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iSM INDEPENDENT SITE MANAGEMENT

Telecommunications Report - Section 3.2 of the Building Height Guidelines (2018)

DEVELOPMENT
KILTERNAN VILLAGE LRD

12 July 2024

Prepared by
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DEFINITIONS

Author:	Independent Site Management Limited (hereinafter referred to as "ISM")
Mitigation Measures:	means the allowances made for the retention of important Telecommunication Channels (hereinafter referred to as "Mitigation Measures")
Planning Authority:	means Dun Laoghaire-Rathdown County Council (hereinafter referred to as the "Planning Authority")
Radio Frequency:	means a frequency or band of frequencies in the range 104 to 1011 or 1012 Hz, of the electromagnetic spectrum suitable for use in telecommunications.
Microwave Links:	means the transmission of information by electromagnetic waves with wavelengths in the microwave range (1 m - 1 mm) of the electromagnetic spectrum suitable for use in telecommunications.
Telecommunication Channels:	means Radio Frequency links & Microwave Transmission links (hereinafter referred to as "Telecommunication Channels")
Report Date:	means the date which the assessment was carried out (hereinafter referred to as "Report Date")
The Applicant:	means Liscove Limited (hereinafter referred to as the "Applicant")
The Development:	means the proposed development situated at lands at Wayside, Enniskerry Road and Glenamuck Road, Kilternan, Dublin 18 (hereinafter referred to as the "Development")

EXECUTIVE SUMMARY

Independent Site Management ('ISM') has been engaged to provide a specific assessment that the proposal being made by Liscove Limited (the "Applicant") within its submission to Dun Laoghaire-Rathdown County Council (the 'Planning Authority'), allows for the retention of important Telecommunication Channels ("Telecommunication Channels") such as microwave links, to satisfy the criteria of Section 3.2 of the Building Height Guidelines (2018) and Appendix 5, Section 1.4.2 of the Dun Laoghaire-Rathdown County Development Plan 2022-2028.

To provide this assessment, ISM reviewed the Applicant's proposed development (the "Development"), together with their proposed allowances to retain relevant Telecommunication Channels in the context of the immediate surrounding registered and documented telecommunication sites.

Pursuant to our review, ISM can conclude based on the findings outlined herein that the proposal being made by the Applicant within its submission to the Planning Authority allows for the retention of important Telecommunication Channels, such as Microwave links, and therefore satisfies the criteria of Section 3.2 of the Building Height Guidelines (2018) and Appendix 5, Section 1.4.2 of the Dun Laoghaire-Rathdown County Development Plan 2022-2028.

ABOUT THE AUTHOR

ISM is a consultancy firm and asset management company that provides telecommunication consultancy and services to developers and property owners.

ISM works closely with all providers of wireless and fixed line telecommunication services to bridge their infrastructure requirements with that of private and public development. ISM has successfully been providing this service in Ireland for 20 years.

ISM is a multidiscipline firm proficient in the 3 main areas in the delivery of telecommunication services:

(1) Radio Frequency technology;

(2) Microwave Transmission technology; &

(3) Fixed Line fiber optic & copper technologies.

ISM has had an integral part in procuring, designing, building and subsequently managing over 300 mobile base station and/or fixed wireless sites, the vast majority of which originated in densely populated, urban environments.

ISM has designed, built and now operates 6 in-building distributed antenna systems, and 2 large area managed fibre optic networks.

DEVELOPMENT DESCRIPTION

Liscove Limited intend to apply for permission for a Large-Scale Residential Development on 2 No. sites, measuring c. 14.2 Ha., which will be separated by the future Glenamuck Distributer Link Road (GLDR). The western site principally comprises lands at Wayside, Enniskerry Road and Glenamuck Road, Kilternan, Dublin 18, which include a derelict dwelling known as 'Rockville' and associated derelict outbuildings, Enniskerry Road, Kilternan, Dublin 18, D18 Y199 and the former Kilternan Country Market, Enniskerry Road, Kilternan, Dublin 18, D18 PK09. The western site is generally bounded by the Glenamuck Road to the north; the Sancta Maria property to the north, west and south; a recently constructed residential development named "Rockville" to the north-east; the Enniskerry Road to the south-west; dwellings to the south; and the future GLDR to the east. The eastern site is generally bound by dwellings to the south; the future GLDR to the west; and greenfield land to the north and east.

Road works are proposed to facilitate access to the development from the Enniskerry Road; to the approved Part 8 Enniskerry Road/Glenamuck Road Junction Upgrade Scheme on Glenamuck Road (DLRCC Part 8 Ref. PC/IC/01/17); and to the approved Glenamuck District Roads Scheme (GDRS) (ABP Ref. HA06D.303945) on the Glenamuck Link Distributor Road (GLDR). Drainage and potable water infrastructure is proposed to connect to services on the Glenamuck Road, Enniskerry Road and the GLDR.

At the 'Rockville access point', works are proposed to provide a multi-modal access, including a vehicular connection between the proposed development and the Rockville development (permitted under DLR Reg. Ref. D18A/0566). Surface water and foul drainage infrastructure is proposed to connect into and through the existing/permitted Rockville developments (DLR Reg. Refs. D17A/0793, D18A/0566, D20A/0015 and D23A/0580).

The development will principally consist of: the demolition of c. 740 sq m of existing structures on site comprising a derelict dwelling known as 'Rockville' and associated derelict outbuildings (c. 573 sq m) and the former Kilternan Country Market (wooden structure) (c. 167 sq m); and the provision of a mixed-use development principally consisting of 487 No. residential units (196 No. houses, 201 No. duplex units and 90 No. apartments) and a Neighbourhood Centre. The western site will comprise 362 No. residential units and the Neighbourhood Centre, which will provide an anchor retail store (c. 1,310 sq m), retail/commercial (c. 3,284 sq m), a creche (c. 691 sq m), café (c. 326 sq m), and a

community facility (c. 332 sq m), and the eastern site will comprise 125 No. residential units. The 487 No. residential units will consist of 53 No. 1 bedroom units (35 No. apartments and 18 No. duplexes), 150 No. 2 bedroom units (38 No. houses, 16 No. apartments and 96 No. duplexes), 236 No. 3 bedroom units (110 No. houses, 39 No. apartments and 87 No. duplexes) and 48 No. 4 bedroom units (48 No. houses). The proposed development will range in height from 2 No. to 4 No. storeys (including podium/undercroft level in Apartment Blocks 1, 2 and 3 and Duplex Blocks T and U on the eastern site).

The development also provides: a pedestrian/cycle route through the Dingle Way from Enniskerry Road to the future Glenamuck Link Distributor Road; 854 No. car parking spaces; motorcycle parking; bicycle parking; bin storage; provision of new telecommunications infrastructure at roof level of the Neighbourhood Centre; private balconies, terraces and gardens; hard and soft landscaping; sedum roofs; solar panels; boundary treatments; lighting; substations; plant; and all other associated site works above and below ground. The proposed development has a gross floor area of c. 60,504 sq m above ground, in addition to an undercroft/basement (c. 4,485 sq m) containing car parking, bike storage, bin storage and plant under Apartment Blocks 1, 2 and 3 and Duplex Blocks T and U on the eastern site.

SITE LOCATION/LAYOUT MAP

Figure 1

TELECOMMUNICATION CHANNELS

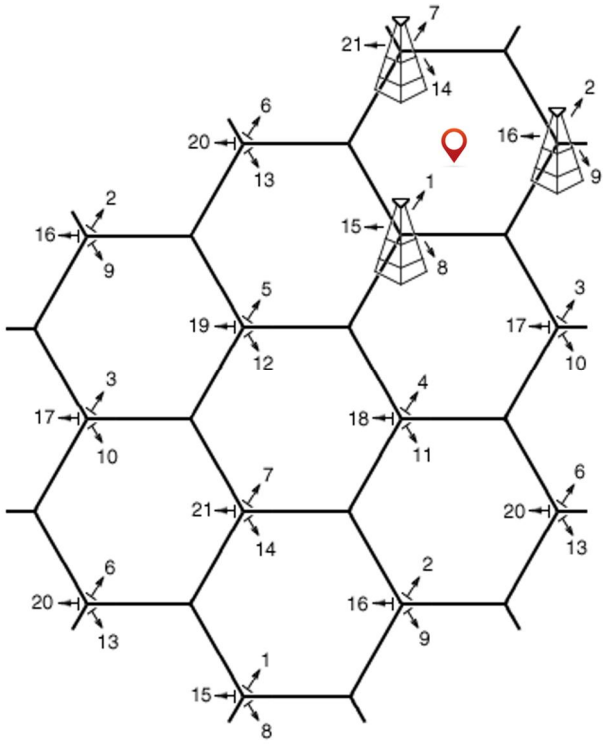
This report assesses the two wireless Telecommunication Channels or networks of Telecommunication Channels that may be affected by the height and scale of a new development, Radio Frequency links & Microwave Transmission links.

Radio Frequency links & Microwave Transmission Links are used in Ireland's mobile phone and fixed wireless networks and disseminate at an average above ground level height of 20m, making them the most relevant Telecommunication Channels to be assessed in relation to the height and scale of a new development and to that end what allowance the Applicant needs to make for their retention.

Mobile phones send and receive signals via links from nearby antenna sites or cellular towers, technically known as base stations, using Radio Frequency waves. Microwave Transmission links use microwave dishes to "transmit" from these base stations to other base stations forming a network. Radio Frequency waves operate at a lower power within lower frequencies of the radio spectrum, whereas Microwave Transmission operates at higher power within higher frequencies of the radio spectrum.

Radio Frequency waves are distributed over land areas in "cells", each served by at least one fixed-location transceiver (base station), but more normally by three cell sites or base stations. These base stations provide the cell with the network coverage, which can then be used for voice, data, and other types of content. A cell typically uses a different set of frequencies from neighbouring cells to avoid interference and provide guaranteed service quality within each cell.

When joined together, these cells provide Radio Frequency coverage over a wide geographic area (Cellular network). This enables numerous portable transceivers (e.g., mobile phones, tablets and laptops equipped with mobile broadband modems, pagers, etc.) to communicate with each other and with fixed transceivers and telephones anywhere in the network, via base stations, even if some of the transceivers are moving through more than one cell during transmission.



As demonstrated on this cell map illustrating Radio Frequency coverage, each Radio Frequency "cell" is supported by at least 3No. base stations sites. This means that should an obstacle occur between an area and a base station site, such as a new development, the affected area will be covered by other base stations from other locations.

= a given location

= base station site

Figure 2

Cellular networks offer a number of desirable features, but most notably, additional cell towers can be added indefinitely and are not limited by the horizon, therefore it can be considered **indeterminable** as to whether a new development affects the Radio Frequency coverage of a geographical area which is being served by multiple base stations, not necessarily the closest.

Conversely, Microwave Transmission links are point-to-point links, which are easily determined to be affected, or not, by the height and scale of a new development. In point-to-point wireless communications, it is important for the line of sight between two base stations to be free from any obstruction (terrain, vegetation, buildings, wind farms and a host of other obstructions). As any interference or obstruction in the line of sight can result in a loss of signal.

While installing Microwave links, it is important to keep an elliptical region between the transmitting Microwave link and the receiving Microwave link free from any obstruction for the proper functioning of the system. This 3D elliptical region between the transmit antenna and the receive antenna is called the **Fresnel Zone**. The size of the ellipse is determined by the frequency of operation and the distance between the two sites.

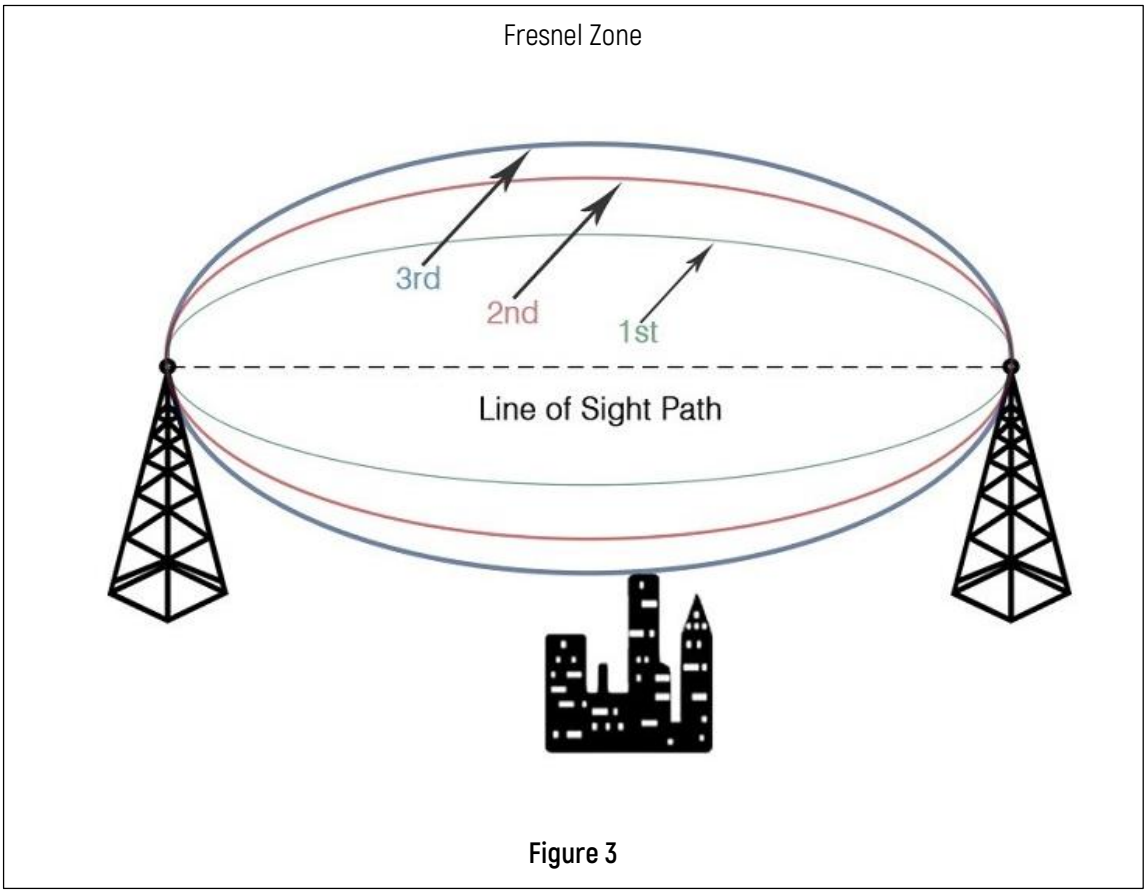


Figure 3

Essentially, if there is an obstacle in the Fresnel zone, part of the radio signal will be diffracted or bent away from the straight-line path. The practical effect is that on a point-to-point Microwave link, referred to herein, the refraction will reduce the amount of energy reaching the receiving microwave dish. The thickness or radius of the Fresnel zone depends on the frequency of the signal – the higher the frequency, the smaller the Fresnel zone. Microwave links are high frequency radio links used for point-to-point transmission.

FINDINGS

ISM's assessment did not identify any Microwave links that will require the Applicant to make specific allowances for their retention ("Mitigation Measures").

Our assessment did not identify any Radio Frequency links that will require the Applicant to make allowances for their retention.

ISM carried out a full assessment of neighbouring registered and documented telecommunication sites to assess what Microwave links would be impacted by the height and scale of the Development. Refer to Figure 5 & 6 of the appendices for full analysis. The assessment of Microwave Transmission links entailed both a visual survey of each identified neighbouring telecommunication site within a reasonable geographic proximity to the Development and a request for information from telecommunication providers where the visual survey was inconclusive.

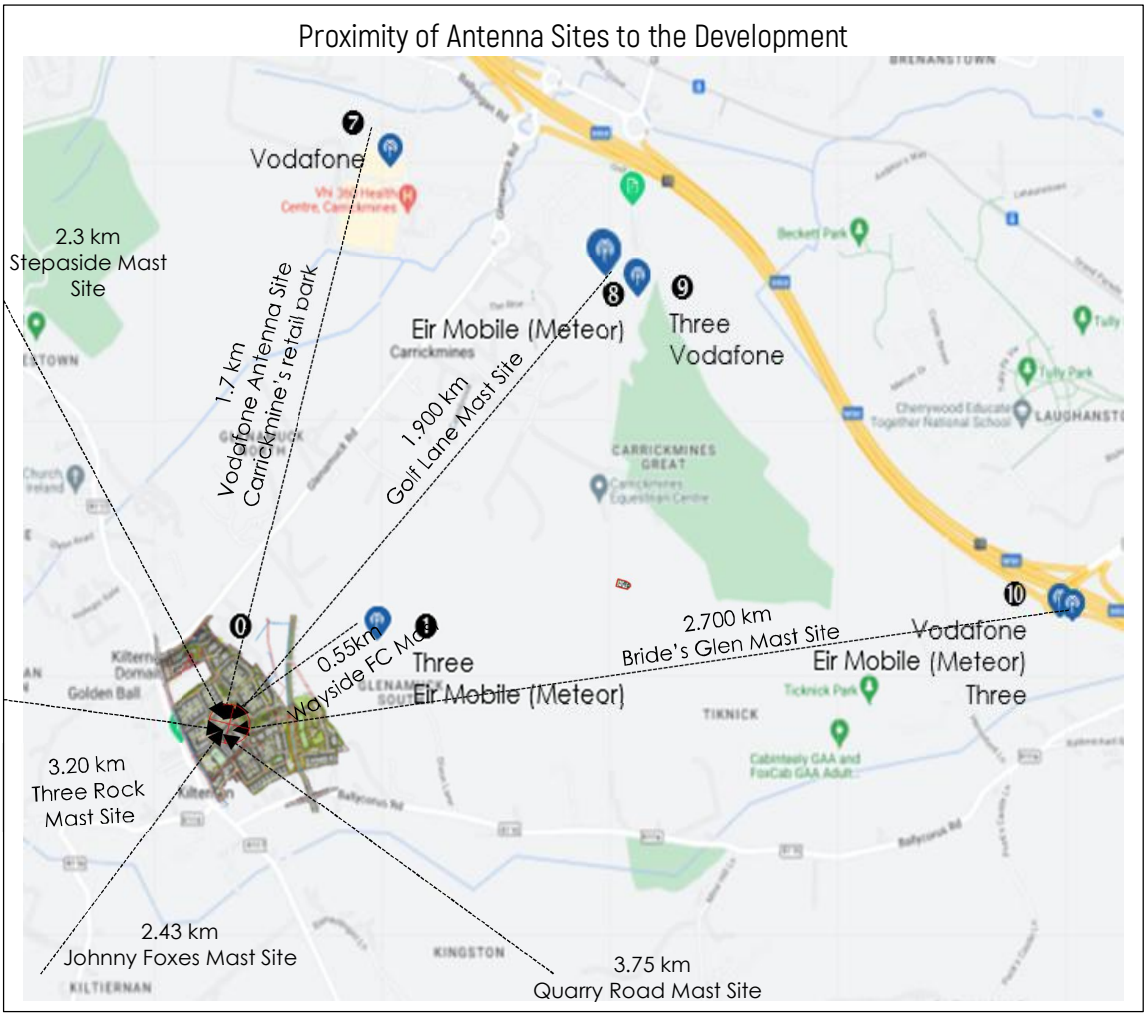
ISM carried out a full assessment of neighbouring registered and documented telecommunication sites to assess what Radio Frequency links might be impacted by the height and scale of the Development. To assess this, we carried out a drive test throughout the surrounding areas to ascertain what cells were serving the residential neighbourhoods and business districts to the north, south, east & west of the Development site. Refer to Figure 7 of the appendices for full analysis.

Our assessment identified Radio Frequency coverage for the local geographic area is served by a **distinct lack of cells** at a range of distances to the Development, which is not a typical cell pattern for urban/suburban Radio Frequency coverage where the population density is exceed more than 1,500 occupants living working and residing. The drive test data determined that most local businesses (agricultural or otherwise), residential, and the public road and amenity areas to the southeast, southwest, and west of the development site receive signal below optimal thresholds from the Radio Frequency links emanating from telecommunication antenna sites located up to 3.75km from the development site to the west by southeast, up to 3.2km to the west by northwest, and 2.7 km to the east of the development site. The mast at the Wayside FC at 0.55km to the northeast of the development site, however it only supports 2 of the 3 mobile

network operators and is only capable of supporting up to 2- 3,000 people exclusively on those 2 networks. We currently estimate it to be operating at around two thirds of its total capacity at current population levels, therefore we predict that it could only support about another 500 people maximum exclusively on those 2 networks.

By way of comparison, a typical cell pattern for urban or suburban Radio Frequency coverage, has antenna sites at distances from each other ranging from 250 to 500 metres depending on the population density. The technological prerequisite is to apply mobile cellular sites (1 per Mobile Network Operator) on a ratio of 1 site per 1,500 – 2,000 people. Combine this with the movement from low frequency (2G/3G) to higher frequencies bands (4G/5G) with the added obstacles of modern, energy saving building trends, such as insulation and triple glazing, the internal penetration of mobile signal has become significantly challenging, resulting in a potential requirement for 1 mobile cellular site per 1,500 head of population.

Proximity of Antenna Sites to the Development



Our assessment recorded an average indoor coverage signal of -99db-105-db for Three and Eir mobile networks and ≥115db for Vodafone at the current population levels. With -85db being the benchmark optimal coverage signal, with anything over -100db being considered poor too bad. Being that population density is a huge factor related to signal level and quality, it is our view that existing limited mobile signal conditions will become weaker as the area is continuously developed. This report also is not factoring in other permitted (or to be permitted) yet undeveloped schemes in the local area, however the author is aware and has reported on several such permitted (or to be permitted) yet undeveloped schemes along Glenamuck road, and Stepaside to the north by northeast of the development.

Data from recent projects of similar scale and density that have completed and reached occupational status, particularly but not limited to, those within the Dun Laoghaire-Rathdown County Council jurisdiction such as Belarmaine, Cherrywood SDZ and Clay Farm, as well as existing residents and businesses in the Murphystown area, are suffering from a lack of coverage due to the deterioration of existing cells which significantly shrink as population density increases. This can be said even by locations such as Clay Farm whereby mast sites are situated 500 - 800m away. In these aforementioned areas, data overwhelmingly demonstrates that the ability to make a voice call to emergency services from an internal location within the given development (we tested) is extremely limited if not non-existence.

It is therefore our finding that the local area is significantly underserved by telecommunication channels (mobile phone signal/voice & data services) and any increase in the population density residing in the area resulting from the proposed development will create a significant strain on existing capacity and cell size, which becomes smaller the greater number of people using or accessing it for voice and data services. We believe the findings herein support a technical justification for a new telecom site to be included in the Development strategy, thus providing for the retention of important Telecommunication Channels (Mitigation Measures).

We have set out the impact to the area within Figure 8.

MITIGATION MEASURES

To provide an adequate allowance to support the density and scale of the Development with the appropriate level of telecommunication channels (mobile phone signal /voice & data services), the Applicant is seeking planning permission to install the following:

- 9No. support poles, affixed to ballast mounts on the neighbourhood centre rising 2.8 metres above parapet level. These support poles are sufficient to each accommodate 1No. 2m 2G/3G/4G antenna & 1No. 5G antenna each.
- 3No, support poles, affixed to the rear of the ballast mounts, rising 1 .5 metres above roof level. These support poles are sufficient to accommodate 2No. Ø0.3m Microwave links each.
- Together with all associated telecommunications equipment and cabinets,
- To adequately screen the infrastructure, the support poles used for the antennae will be installed within Radio friendly GRP shrouds.

This will provide an adequate solution for the Applicant to mitigate the impact the Development will have on the existing poor mobile phone signal in the area and provide both the occupants of the Development and the local area with adequate voice and data services to meet modern demands.

Refer to Figure 9 of the appendices for full analysis and installation parameters for all the proposed replacement telecommunication infrastructure set out herein.

ISM can therefore conclude that the proposal being made by the Applicant within its submission to Dun Laoghaire-Rathdown County Council allows for the retention of important Telecommunication Channels, such as Microwave links, to satisfy both the criteria of Section 3.2 of the Building Height Guidelines (2018) and Appendix 5, Section 1.4.2 of the Dun Laoghaire-Rathdown County Development Plan 2022-2028.

DISCLAIMER

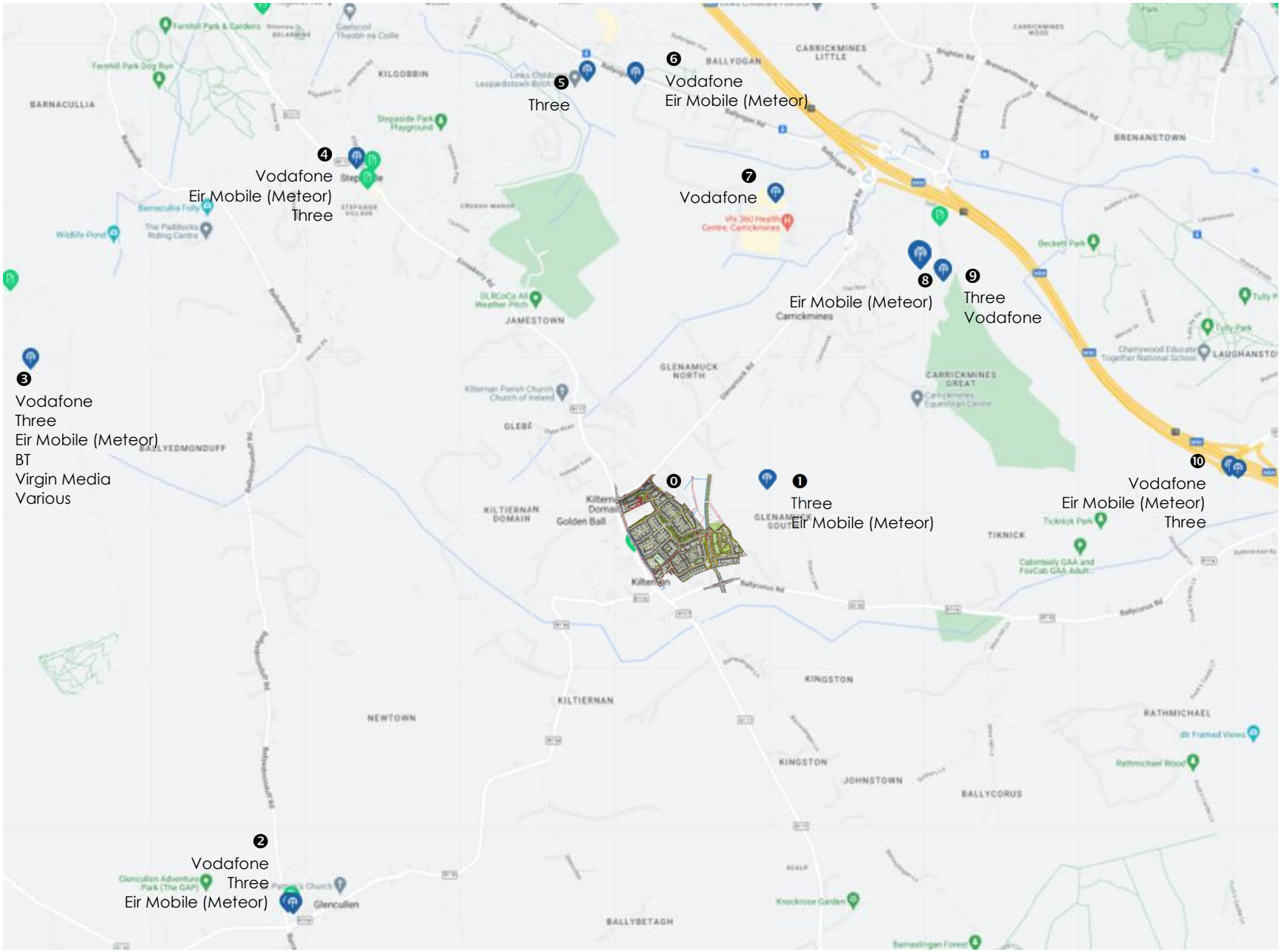
Due to the confidential nature of planning applications/submissions, ISM does not, as standard practice, contact or involve Ireland's licenced Mobile Network Operators, namely: Vodafone Ireland; Three Ireland; or Eircom Limited t/a Eir Mobile, when preparing this report. If contact is made with a Mobile Network Operator, we duly note the source information within our reports.

ISM has wholly relied upon the publicly available information provided by Commission for Communications Regulation, "ComReg", its own extensive record of wireless infrastructure, and the results of a comprehensive visual survey carried out on the Report Date notated herein. Therefore, the specific Mobile Network Operator transmitting the identified telecommunication channel is recorded on a best endeavour basis.

Lastly, please note that telecommunication networks are always evolving, and as such, these findings remain subject to change.

APPENDICES

Figure 5 Area Telecommunication Analysis Source: Comreg



Note
All Dimensions to be checked on site
No Dimensions to be scaled from this Drawing
This drawing to be read with relevant Consultant Drawings

- ❶ Proposed Development
- ❶ Wayside FC
- ❷ Johnny Foxes
- ❸ Three Rock*
- ❹ Stepaside Garda St
- ❺ Carrickmines Bird Cage
- ❻ Carrickmines ESB
- ❼ Vodafone Sales Office
- ❽ Golf Lane 1
- ❾ Golf Lane 2
- ❿ Brides Glen

*Three Rock Mountain hosts a high concentration of telecommunication channels.

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Client
Liscove Limited

Project
Kilternan Village LRD

Option	1
Report Date	05/06/24
File Name	Kilternan Village LRD

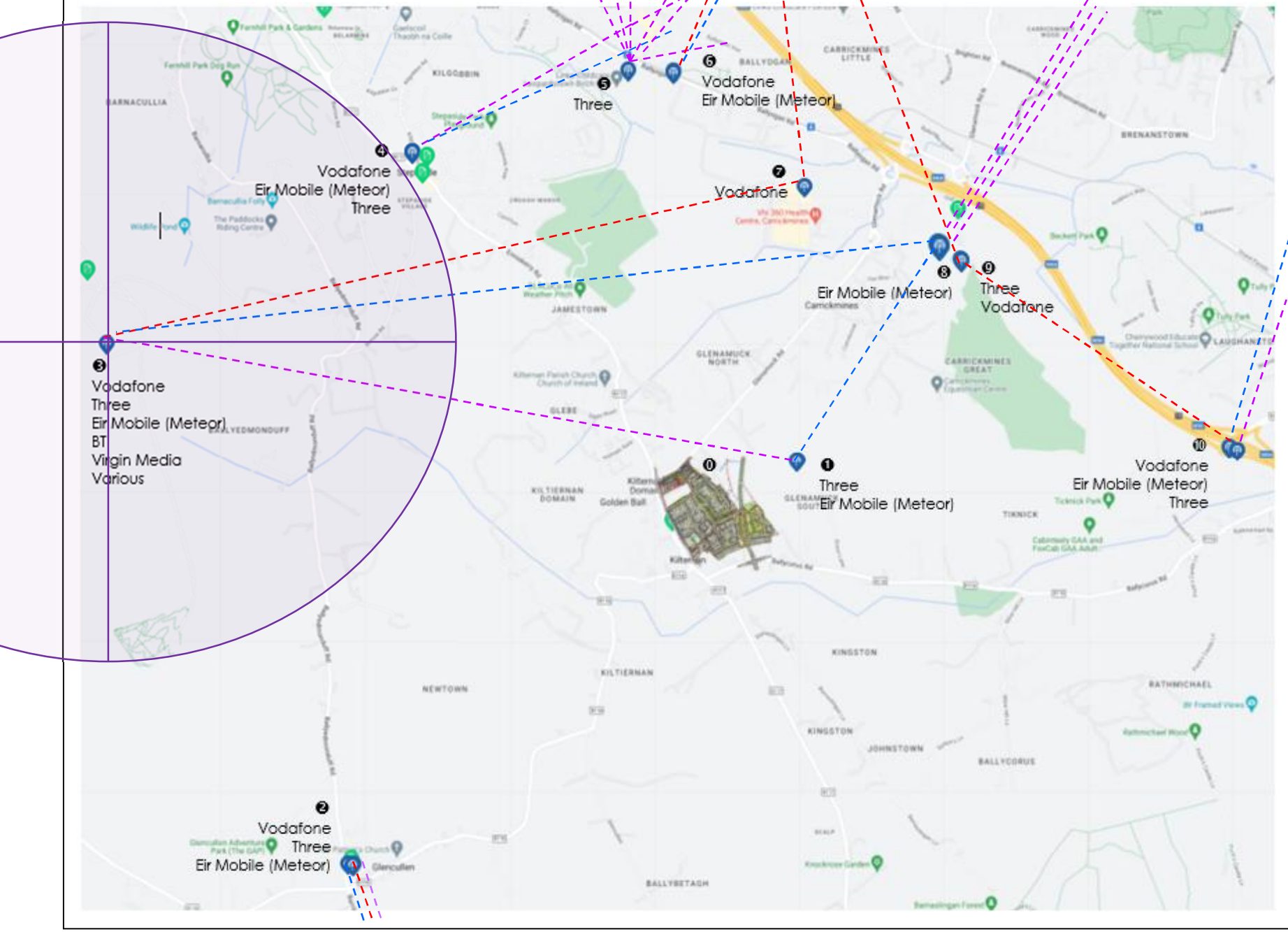
Drawing:
Area Site Analysis

Building	Drawing No.	Zone	Rev
SPN	F 0524		1

Figure 6

Microwave Link Analysis

Source: Comreg ISM Vodafone Three & Eir Mobile



Note
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No Dimensions to be scaled from this Drawing
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---- Three Transmission Link
---- Vodafone Transmission Link
---- Eir Transmission Link

Three Rock Mountain hosts a high concentration of telecommunication channels. It is not impacted by the development because of its height which far exceeds those sought by the applicant

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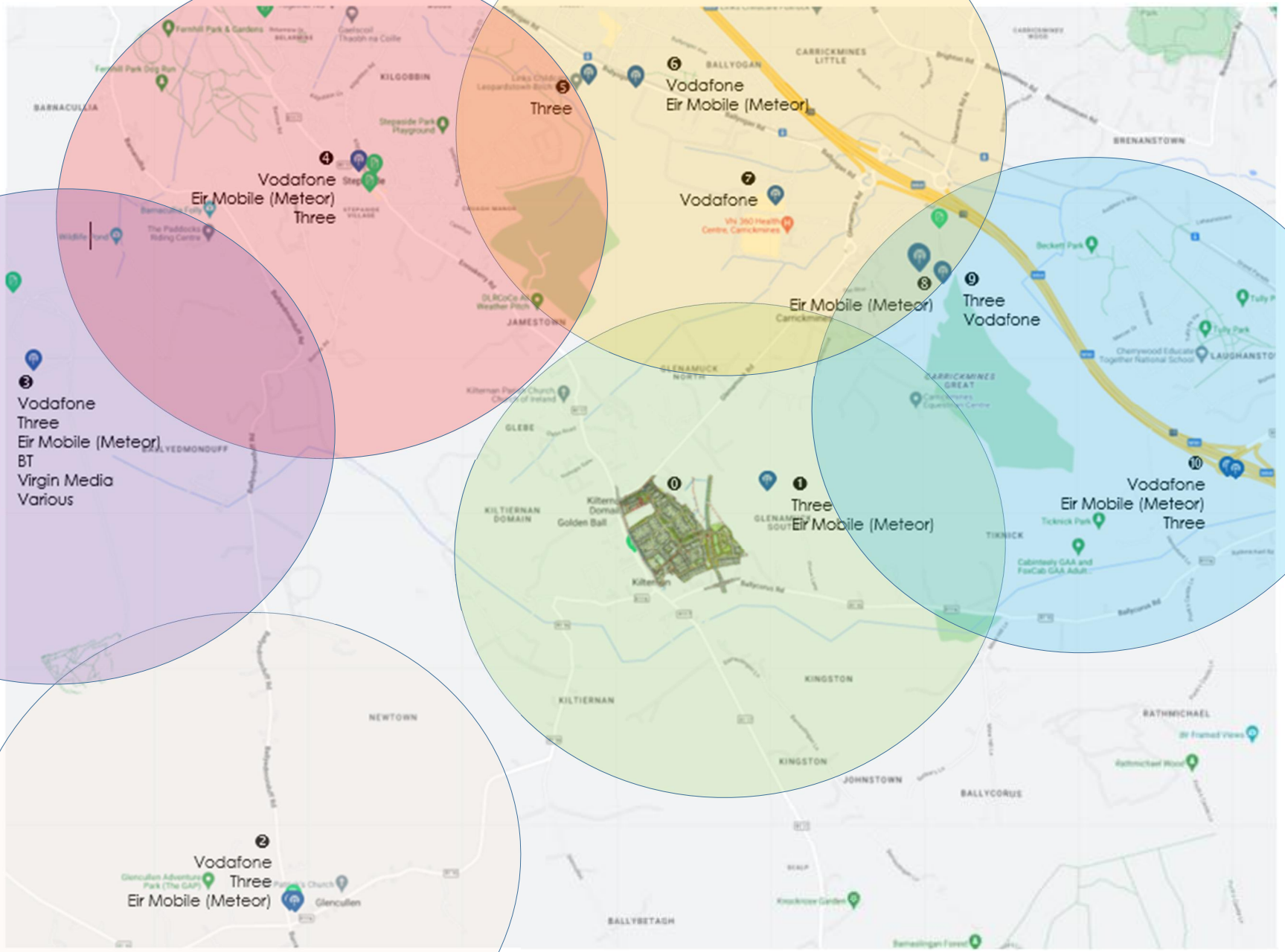
Drawing:
Link Analysis

Building	Drawing No.	Zone	Rev
SPN	F 0524		1

Figure 7

Drive Test Data

Source: Comreg, ISM



Note
All Dimensions to be checked on site
No Dimensions to be scaled from this Drawing
This drawing to be read with relevant Consultant Drawings

- Multiple Cell IDs
  - ❽ Golf Lane 1
  - ❾ Golf Lane 2
  - ❿ Brides Glen
- Multiple Cell IDs
  - ❺ Carrickmines Bird C.
  - ❻ Carrickmines ESB
  - ❼ Vodafone Sales Office
  - ❽ Golf Lane 1
- Multiple Cell IDs
  - ❶ Wayside FC
- Multiple Cell IDs
  - ❹ Stepaside Garda St
- Multiple Cell IDs
  - ❸ Three Rock*
- Multiple Cell IDs
  - ❷ Johnny Foxes

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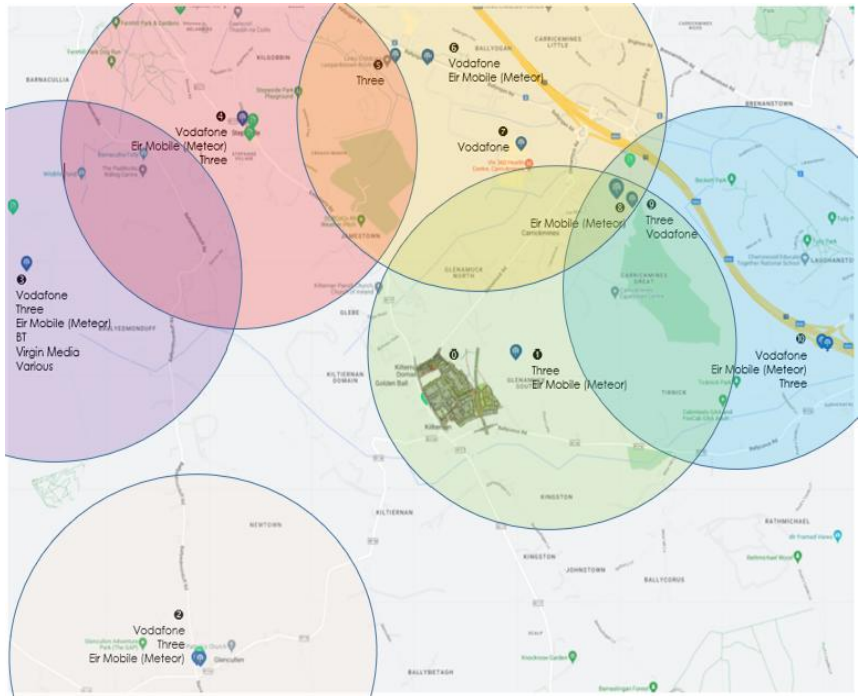
Drawing:
Cell Identification Analysis

Building	Drawing No.	Zone	Rev
SPN	F 0524		1

Figure 8 Cell Impact Source: Comreg ISM



Coverage Cells recorded May 2024

Coverage Cells Prediction POST Development

The increase in the population created by the population will cause the local area cells to shrink and areas both within the proposed development as well as areas outside the Development, will see a large reduction in coverage for voice and data services from all of Ireland's 3 mobile network providers

Note
All Dimensions to be checked on site
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Drawing:
Mitigation Measure

Building	Drawing No.	Zone	Rev
SPN	F 0524		1

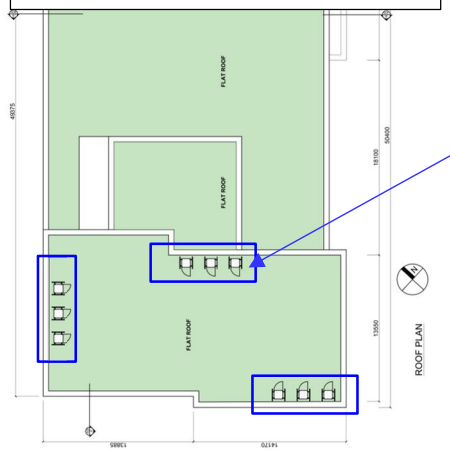
Figure 9

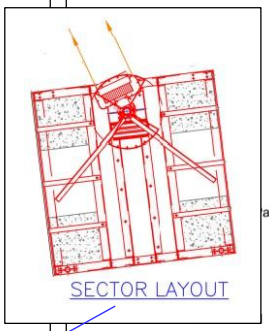
Mitigation Measure Design

Source: Comreg ISM

Location at roof level of Neigbiorehood Centre Block B for 9No. Ballast Mounts with steel poles affixing 9No. 2G/3G/4G Antennas (2mL) & 9No. 5G Antennas (0.8mL)

☐ **Locations**





Side Elevation

SIDE ELEVATION (NORTH WEST)

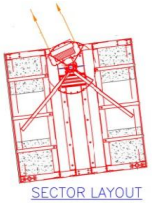
2G/3G/4G Antennas (2mL) & 5G Antennas (0.8mL) to be mounted on Proposed Ballast Support Pole within Radio Friendly GRP Shroud

Front Elevation

FRONT ELEVATION (SOUTH WEST-VILLAGE GREEN)

Note
All Dimensions to be checked on site
No Dimensions to be scaled from this Drawing
This drawing to be read with relevant Consultant Drawings

Ballast Mount / steel support poles, antennas and shroud



☐ Location of Steel support Poles on Ballast Mounts

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Mitigation Measure

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