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iSM INDEPENDENT SITE MANAGEMENT

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

DEVELOPMENT
An Bord Pleanála – Submission
Dundrum Village Strategic Housing Development

11 March 2022

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 Body:	means An Bord Pleanála (hereinafter referred to as the "Planning Body")
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")
The Applicant:	means Dundrum Retail GP DAC (acting for and on behalf of Dundrum Retail Limited Partnership) (hereinafter referred to as the "Applicant")
The Development:	means the proposed development situated on lands at the existing Dundrum Village Centre, Main Street, Dundrum, Dublin 14 (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 Dundrum Retail GP DAC (acting for and on behalf of Dundrum Retail Limited Partnership) (the "Applicant") within its submission to An Bord Pleanála (the 'Planning Body'), 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).

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 Body 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).

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 operates 6 in-building distributed antenna systems, and 2 large area managed fibre optic networks.

DEVELOPMENT DESCRIPTION

The development comprises 11no.urban blocks arranged around the central pedestrian spine and a series of 4 courtyards corresponding to 4 separate "zones" or character areas.

The buildings range in height from 4-5 storeys on Main Street to 9-16 storeys to the Dundrum Bypass.

The development will consist of c. 881no. residential units. This development also includes a foodstore, retail, café/restaurant and a creche are at ground floor level, fronting Main Street, as detailed in the Schedule of Accommodation included with this submission.

The development will include the demolition of all existing structures on the site with the exception of No.'s 1-3 Glenville Terrace which will be refurbished.

Vehicular and cycle parking is provided below podium with visitor cycle parking spaces in the public realm. Vehicular access to serve the proposed development will be provided via Dundrum Bypass. The existing vehicular entrance on Main Street will be closed.

Pedestrian connections and linkages are proposed through the site, forming connections that are not currently possible from within the site to Main Street; to the south via Church Square and Ballinteer Road Bridge; and west via the proposed new Sweetmount Bridge connecting Main Street to the residential communities west of the Bypass.

SITE LOCATION/LAYOUT MAP

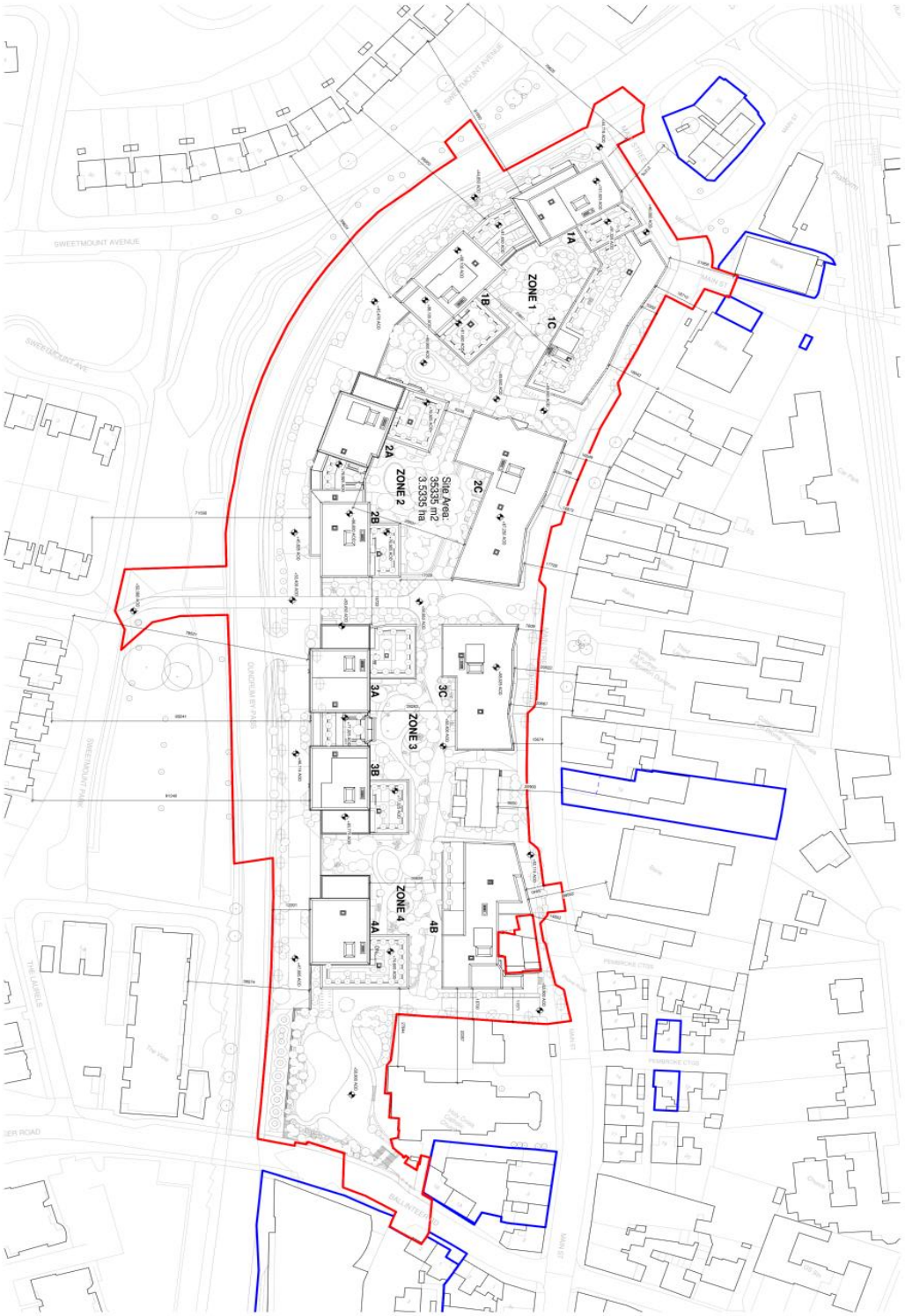


Figure 1

TELECOMMUNICATION CHANNELS

This report assessed 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.

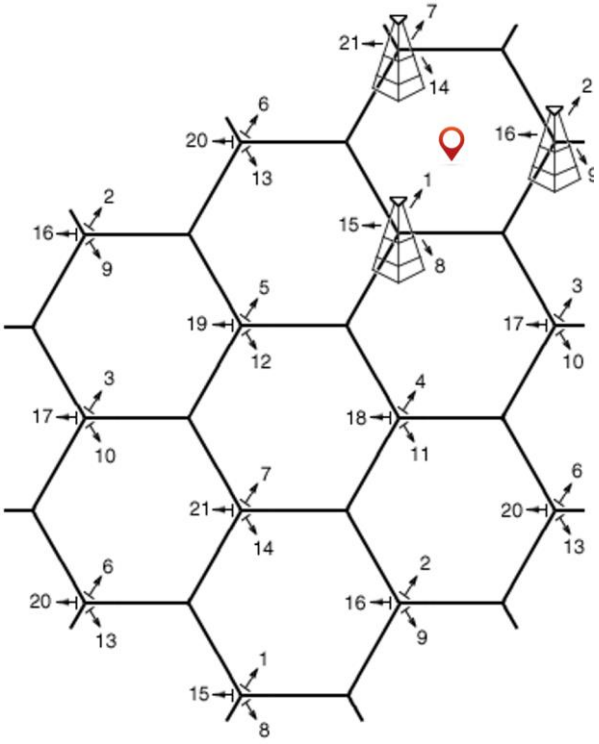


Figure 2

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.

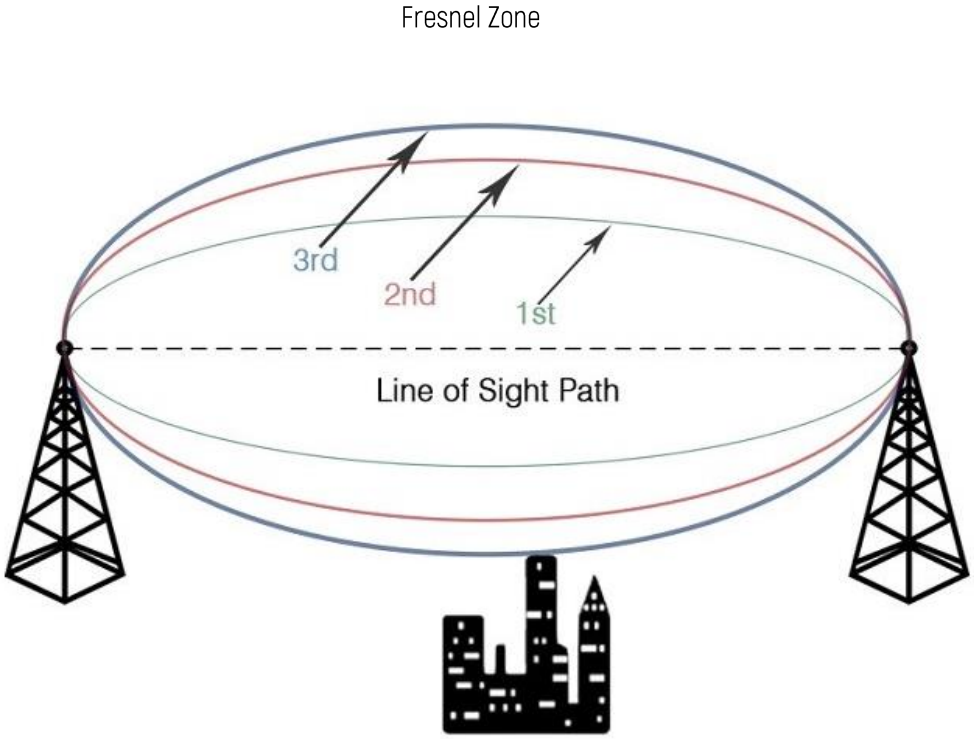


Figure 3

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 has not identified any Radio Frequency links that will require the Applicant to make specific allowances for their retention[1].

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. To assess this, we carried out a both a visual survey and conducted a Request for Information ('RFI') from any telecommunication operators where the visual survey did not yield accurate findings. Refer to Figure 4 & 5 of the appendices for full analysis.

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 walk test throughout the surrounding areas to ascertain what cells were serving the street areas to the north, south, east & west of the Development site. Refer to Figure 6 of the appendices for full analysis

Our assessment identified that Radio Frequency coverage for the local geographic area is served by several cells at close and strategic distances away from the development site on a 360° basis which is typical cell pattern for urban Radio Frequency coverage. The walk test data determined that the business, residential and public road areas to the north, south, east & west of the Development are adequately covered by the cell sites identified in figure 6 and are not reliant on Radio Frequency coverage from any one cell that would be obstructed by the Development.

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

[1] ISM requested information from Transportation Infrastructure Ireland ("TII") with respect to a Radio installation affixed to the top of the William Dargan Bridge suspension bridge (the "Bridge"). The Radio equipment in question is not registered with Comreg, nor was identifiable in our walk test. At the time of writing this report, we did not receive a response from TII so as to be able to include an analysis of that equipment in our findings. Notwithstanding, based on the height differential between the top of the Bridge where the panel antenna are located and the top of Block 1A, ISM we believe it is safe to assume that that the Development will not impact the aforementioned Radio Links.

MITIGATION MEASURES

ISM did not identify any existing Telecommunication Channels that would, as a consequence of the height and scale of the Development, require specific mitigation measures in order to retain them.

ISM has recommended and the Applicant has accepted, to provide a dedicated allocation of space at and on the Lift shaft overrun on Block 1A, together with access to a dedicated power supply, where steel support structures can be fixed at a future date (if required), to provide necessary Mitigation Measures should retention of any Microwave links be required in the future (subject to planning permission if applicable). Refer to Figure 7 of the appendices for full analysis.

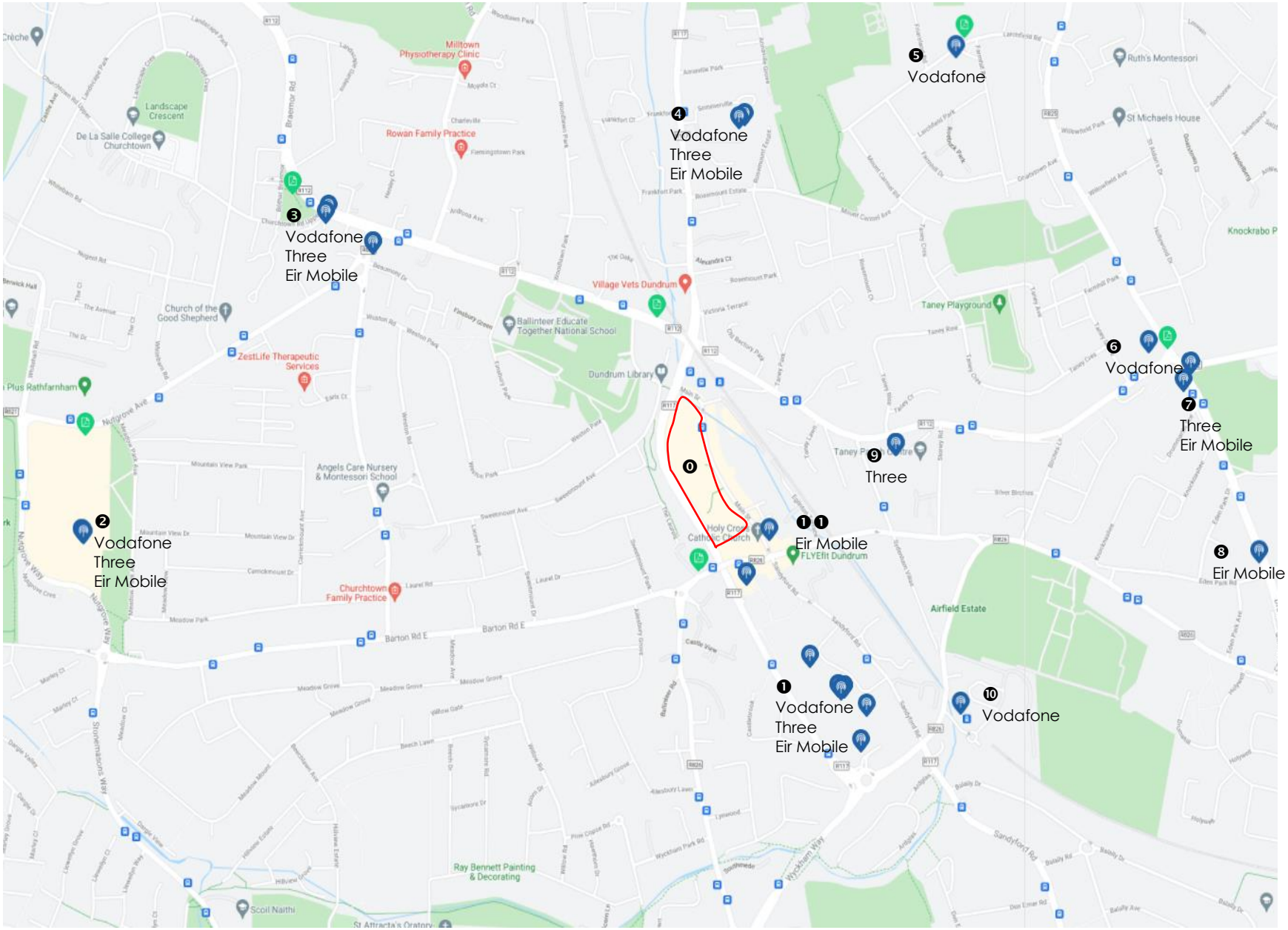
ISM can therefore conclude that the proposal being made by the Applicant within its submission to the Planning Body allows for the retention of important Telecommunication Channels, such as Microwave links, to satisfy the criteria of Section 3.2 of the Building Height Guidelines (2018).

APPENDICIES

Figure 6

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

0 Proposed Development
1 Dundrum Town Centre
2 Nutgrove Shopping Cent.
3 Churchtown/Bottle Twr
4 Dundrum Business pk
5 Farmhill Centre
6 Flanigan's
7 Goat Centre/Eir St Furn.
8 Eir Street Furniture
9 Taney Church
10 Rockfeild
11 Dundrum House Pub

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Client
Dundrum Retail GP DAC (acting on behalf of Dundrum Retail Limited Partnership

Project
Dundrum Village SHD

Option	1
Date	11/03/2022
File Name	Dundrum Village SHD

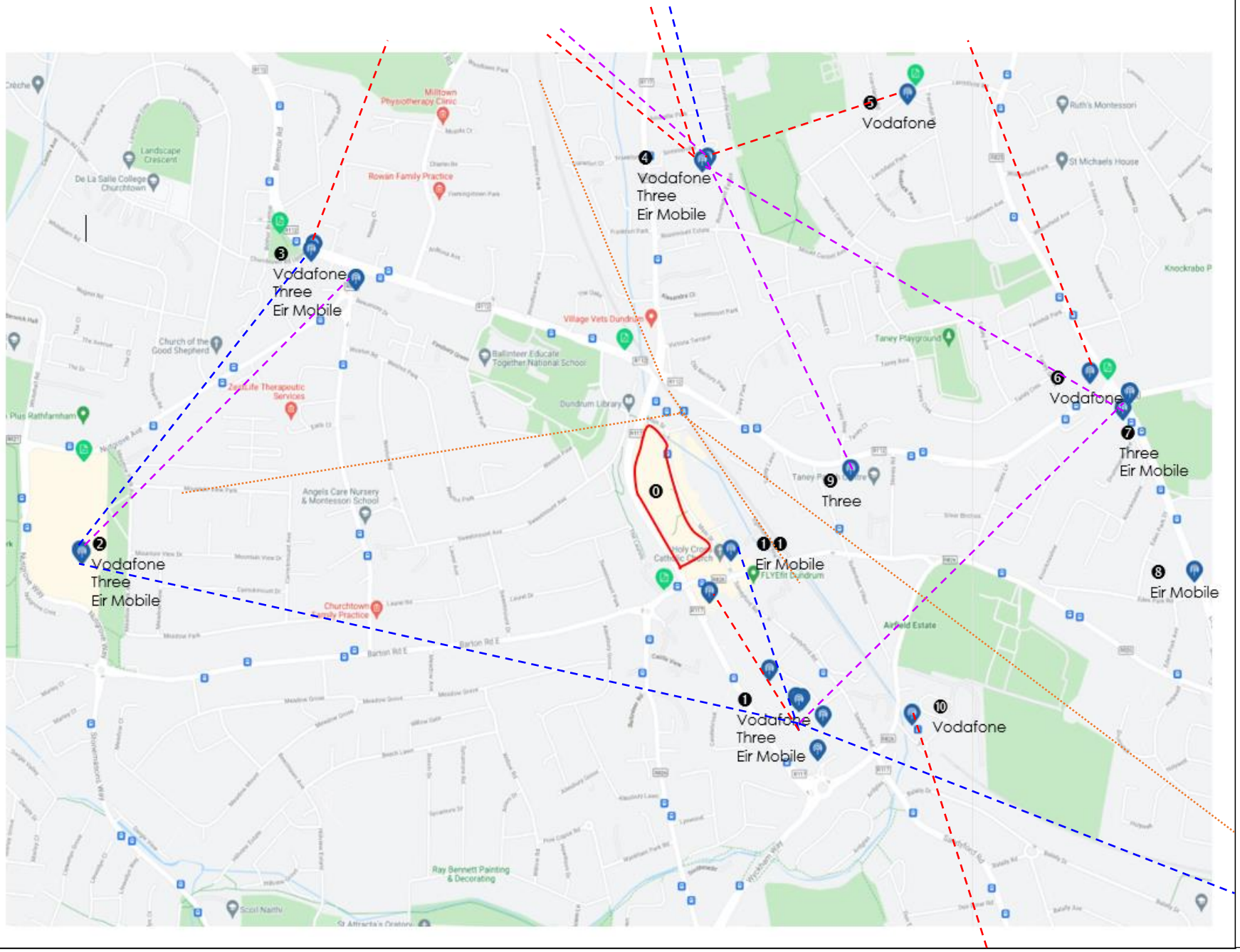
Drawing:
Area Site Analysis

Building	Drawing No.	Zone	Rev
SPN	B1722		1

Figure 7

Microwave Link Analysis

Source: Comreg ISM Vodafone Three & Eir Mobile



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Three Transmission Link
Vodafone Transmission Link
Eir Transmission Link
Luas Signalling Radio Links [2]

[2] This is projected based solely on visual survey.

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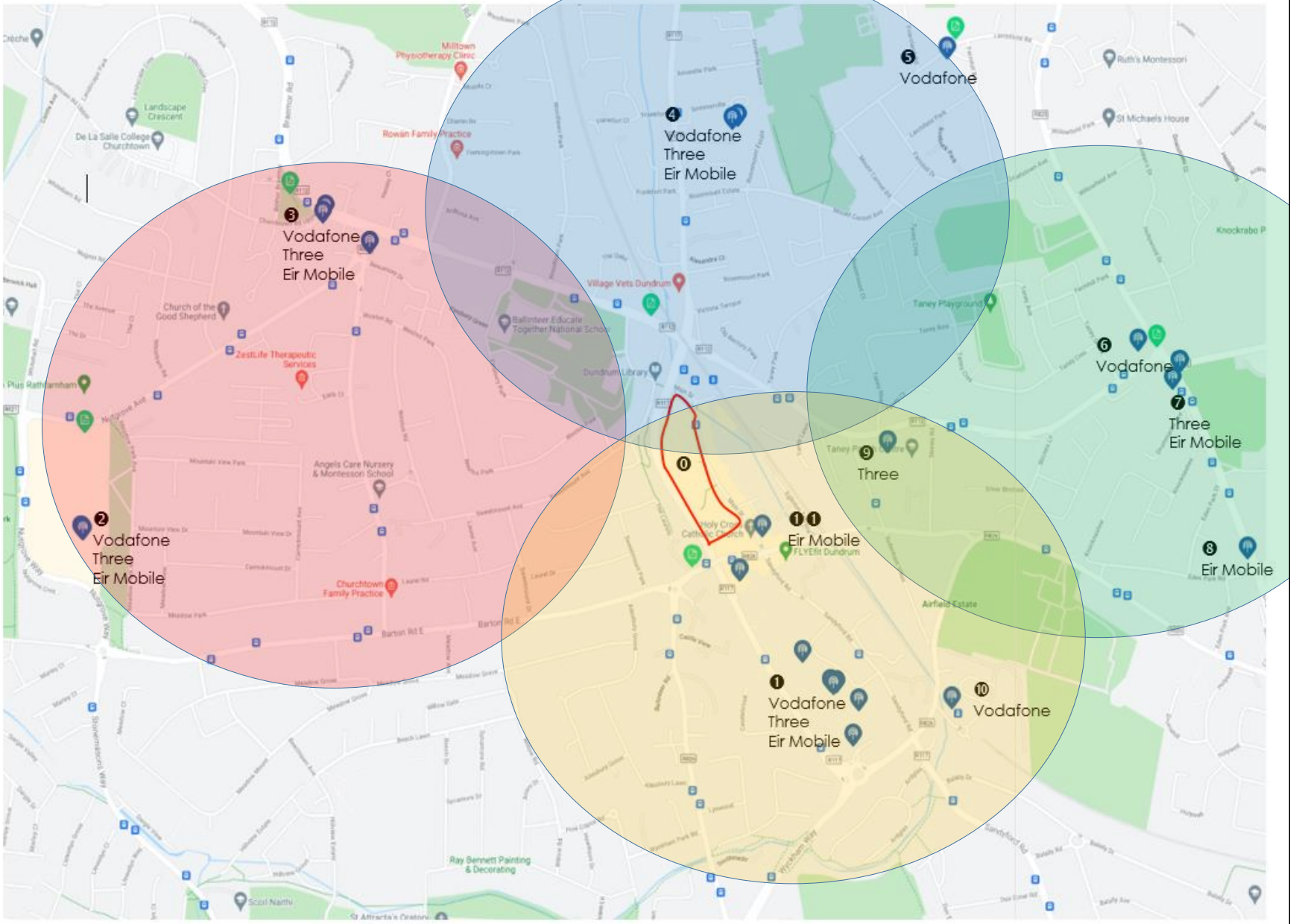
Drawing:
Link Analysis

Building	Drawing No.	Zone	Rev
SPN	B1722		1

Figure 6

Walk Test Data

Source: Comreg



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Option	**1**
Date	11/03/2022
File Name	Dundrum Village SHD

Drawing:
Cell Identification Analysis

Building	Drawing No.	Zone	Rev
SPN	B1722		1

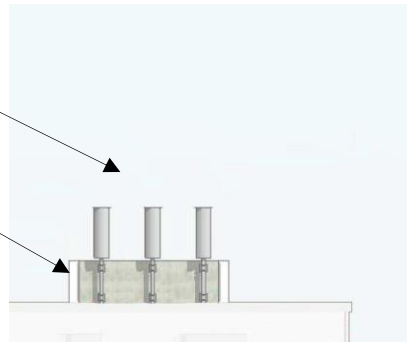
Figure 7

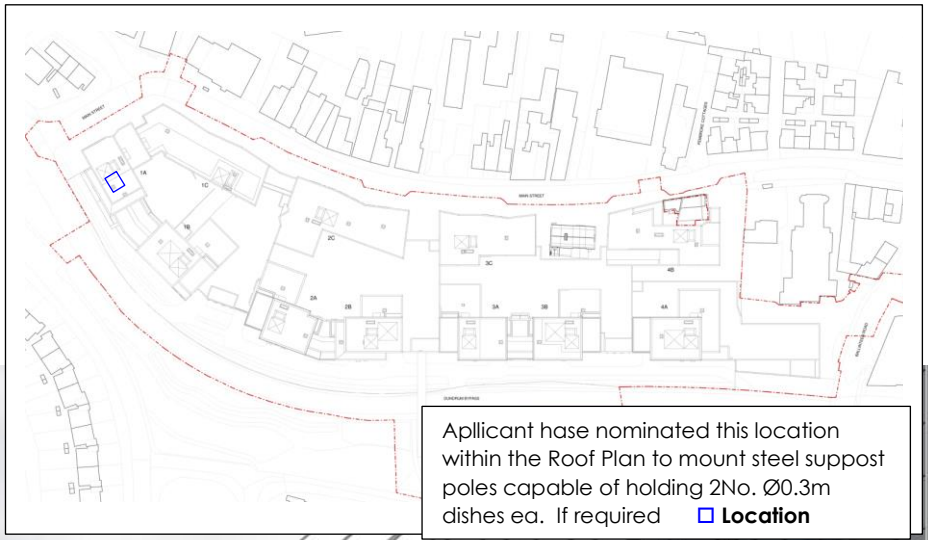
2No. Ø 0.3m Microwave link dishes mounted on steel support poles affixed to Lift shaft overrun with in radio friendly GRP shrouds

Mitigatio

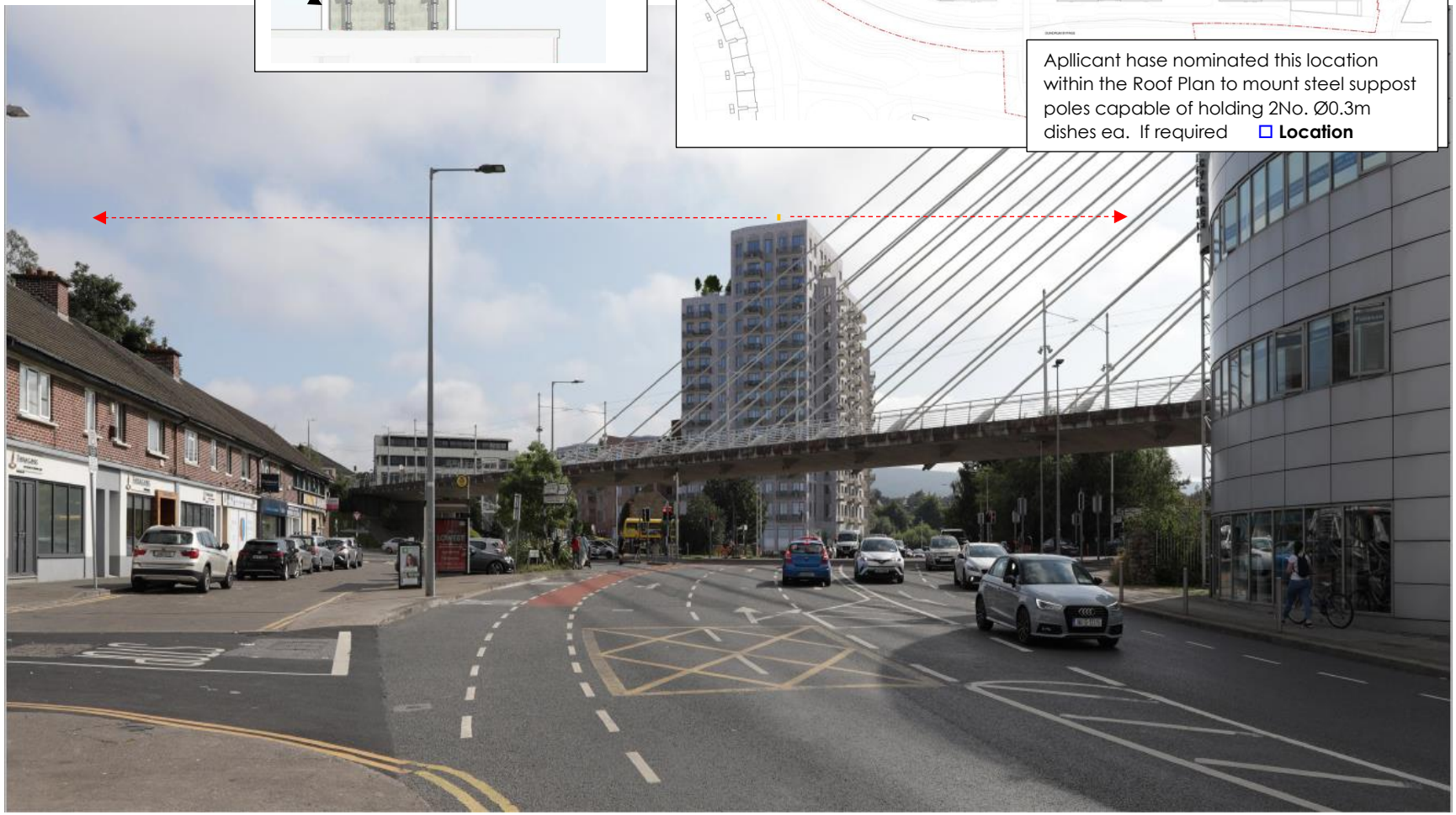
Lift Shaft Overrun

EXAMPLE





Apllicant hase nominated this location within the Roof Plan to mount steel suppost poles capable of holding 2No. Ø0.3m dishes ea. If required ☐ **Location**



Note
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---- Example Transmission Link

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File Name	Dundrum Village SHD

Drawing:
Mitigation Measure

Building	Drawing No.	Zone	Rev
SPN	B1722		1