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MICROCLIMATE ASSESSMENT IN SUPPORT OF A PLANNING APPLICATION FOR A DEVELOPMENT AT GLEBE HOUSE AND CORUBA HOUSE SITE, ST AGNES ROAD, CRUMLIN, DUBLIN 12

Technical Report Prepared For

Seabren Developments Ltd and Circle VHA CLG

Technical Report Prepared By

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EXECUTIVE SUMMARY

AWN were commissioned to undertake an assessment with regard to Microclimate Effects associated with a proposed development at Glebe House which includes the lands to the rear and the Coruba site, St Agnes Road, Crumlin, Dublin 12. The aim of the assessment was to determine if there was considered to be potential microclimate effects with a particular focus on wind-speed impacts.

The site of the proposed development was characterised as a site which experiences average wind speeds of B3, which corresponds to gentle breeze on the Beaufort Scale.

Based on the analysis conducted it was concluded the proposed development would have no significant effects with regard to microclimate.

Document History

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Name	Fergal Callaghan	Elaine Neary
Title	Director	Associate
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1.0 INTRODUCTION

AWN were commissioned by Seabren Developments Ltd and Circle VHA CLG to undertake an assessment with regard to Microclimate Effects associated with a proposed development at Glebe House which includes the lands to the rear and the Coruba site, St Agnes Road, Crumlin, Dublin 12. The aim of the assessment was to determine if there was considered to be potential microclimate effects with a particular focus on wind-speed impacts. The assessment comprised:

- Determination from available data of the baseline (current) classification of the site with respect to The Beaufort Scale for Wind on Land.
- Examination of the proposed development and the potential for wind-speed amplification factors.
- Assessment of the impacts with regard to Microclimate

The development will consist of:

Seabren Developments Ltd and Circle VHA CLG intend to apply to An Bord Pleanála for planning permission for a strategic housing development at this site located at Glebe House (Protected Structure, RPS Ref. 7560), including the vacant Glebe light industrial lands, and the vacant site of the former Coruba House, Saint Agnes Road, Crumlin, Dublin 12 all on a site of 0.88 Hectares. The site bounds Somerville Drive and Somerville Green to the southeast and southwest, respectively, and includes the grass margin between the Coruba site boundary and Somerville Drive. The Glebe House lies within the Crumlin Architectural Conservation Area.

A residential development of 150 no. apartments consisting of 74 one beds, 72 two beds and 4 three bed residential units, a creche and café. The proposed scheme has an overall Gross Floor Area of 15,767 sq.m.

Two apartment buildings are proposed ranging in height from 4 – 6 storeys and linked by a carpark at ground floor and a podium at first floor level comprising the following:

- Block A is 5-6 storeys and consists of 79 apartments and includes 35 no. one beds and 44 no. two beds units, ESB substation/switch room/metering room of 85sqm, 42 no. secure bicycle storage and bin storage of 44sqm
- Block B is 4-5 storeys and consists of 66 apartments and includes 38 no. one beds, 25no. two beds and 3 no. three beds, a Creche of 147 sqm at ground floor level with associated outdoor area, ground floor plant rooms of 74sqm, ESB substations/switch room/metering room/telecoms of 89sqm, 188 no. secure

bicycle storage spaces in two locations, 6 no. motorbike spaces and bin storage of 75sqm.

Two no.three storey pavilion buildings either side of Glebe House to accommodate:

- One number two storey duplex 2 bed apartment above one number 1 bed apartment at ground floor in the north west pavilion and,
- One number two storey duplex 2 bed apartment above a 55 sqm ground floor café, in the south east pavilion.

The repair of fire damaged elements (following a fire 21st April 2022) and the refurbishment of Glebe House, a protected structure, into two apartments, one number 2 bed unit at lower ground floor and one number 3 bed unit at upper ground and first floor;

- Repair of fire damaged elements including the replacement of all roof coverings and structure, replacement of all first floor timber stud walls, replacement of first floor rear return joists, replacement/repair of floor joists at first floor level, replacement of internal render to kitchen/dining area in rear return building and replacement/repair of stair from upper ground to first floor level,

- the refurbishment of Glebe House including the removal of extensions to the rear and sides of the building, restoration of the façade, replacement of pvc windows with sliding sash windows and associated works to the interior and to the curtilage of Glebe House.

- Lowering the front boundary wall and return boundary wall to the front of Glebe House.

Demolition of all workshops, offices and sheds to the rear and sides of Glebe House Demolition of boundary walls around the Coruba land on Somerville Drive, the front entrance and between Coruba and the Glebe lands. Demolition of non-original brick column's at St Agnes Road entrance to Glebe House (1,636 sqm).

75 car parking spaces are proposed:

- 66 no. car parking spaces (includes 2 Go Car spaces) in ground floor car park below podium and partly in Block A and 4 No. visitor car parking spaces in front of Glebe House all with vehicular access from St Agnes's Road
- 5 No. assigned car parking spaces on the eastern side of Block B with vehicular access from Somerville Drive.

The development provides 905 sqm of Public Open Space to the front and side of Glebe House, and within the southeast public plaza. with a pedestrian route to the side of the Café at Pavilion B and 1,632 sqm of Communal Open Space located at podium level and to the rear of Block A.

76 no. visitor bicycle parking spaces are provided in the public accessible areas of the site.

The application also includes the provision of a new footpath along the south-eastern boundary at Somerville Drive, a new controlled gate between Somerville Drive and St Agnes Road allowing public access through the site within daylight hours and a new pedestrian access from the public open space onto St. Agnes Road, boundary treatment, landscaping, Solar Panels on the roof of Blocks A and B, provision of 4 no. Microwave link dishes to be mounted on 2 No. steel support posts affixed to the lift shaft overrun on Block A, lighting, services and connections, waste management and other ancillary site development works to facilitate the proposed development.

The site layout at ground floor is shown in Figure 1.1 below.

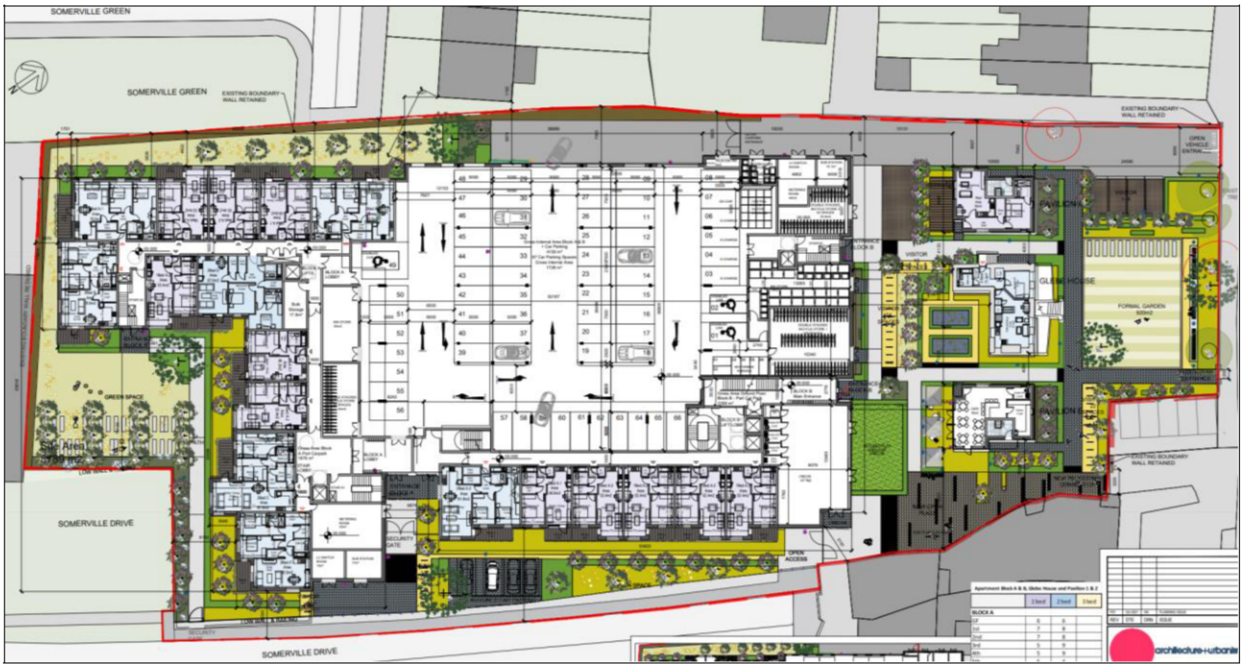

Figure 1.1 Site Layout

The building elevations are shown in Figures 1.2, 1.3, 1.4 and 1.5.

Figure 1.2 Elevation A

Figure 1.3 Elevation B

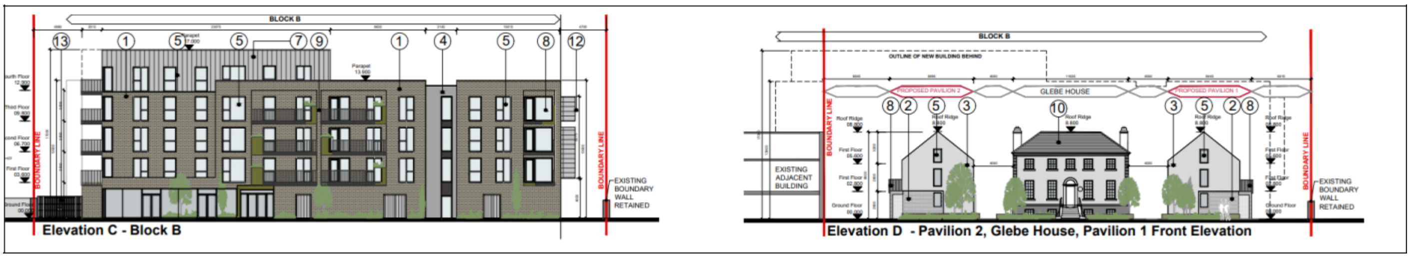

Figure 1.4 Elevation C and D

Figure 1.5 Elevation E

2.0 CHARACTERISATION OF THE SITE

The Beaufort Scale for Wind on Land is used to express the wind speed velocity recorded as a value which can be related to possible wind related impacts such as tree movement or building damage.

The nearest representative weather station collating detailed weather records is Dublin Airport, which is located approximately 12km north of the site. Dublin Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 2.1 below). For data collated during five representative years (2017-2021), the predominant wind direction is south-westerly with an average wind speed of approximately 3-5 m/s.

The Beaufort scale and its relationship to wind speed in metres/second is shown in Table 2.1 below. It can be seen that the site typically experiences Beaufort 3 (B3) wind conditions for much of the time.

Beaufort Scale	Wind speed(m/s)
0	<0.3
1	0.3-1.5
2	1.6-3.3
3	3.4-5.4
4	5.5-7.9
5	8.0-10.7
6	10.8-13.8
7	13.9-17.1
8	17.2-20.7
9	20.8-24.4
10	24.5-28.4
11	28.5-32.6
12	>32.7

Table 2.1 Beaufort Scale and Wind speed

The site of the proposed development can therefore be characterised as a site which experiences average wind speeds of B3, which corresponds to gentle breeze on the Beaufort Scale.

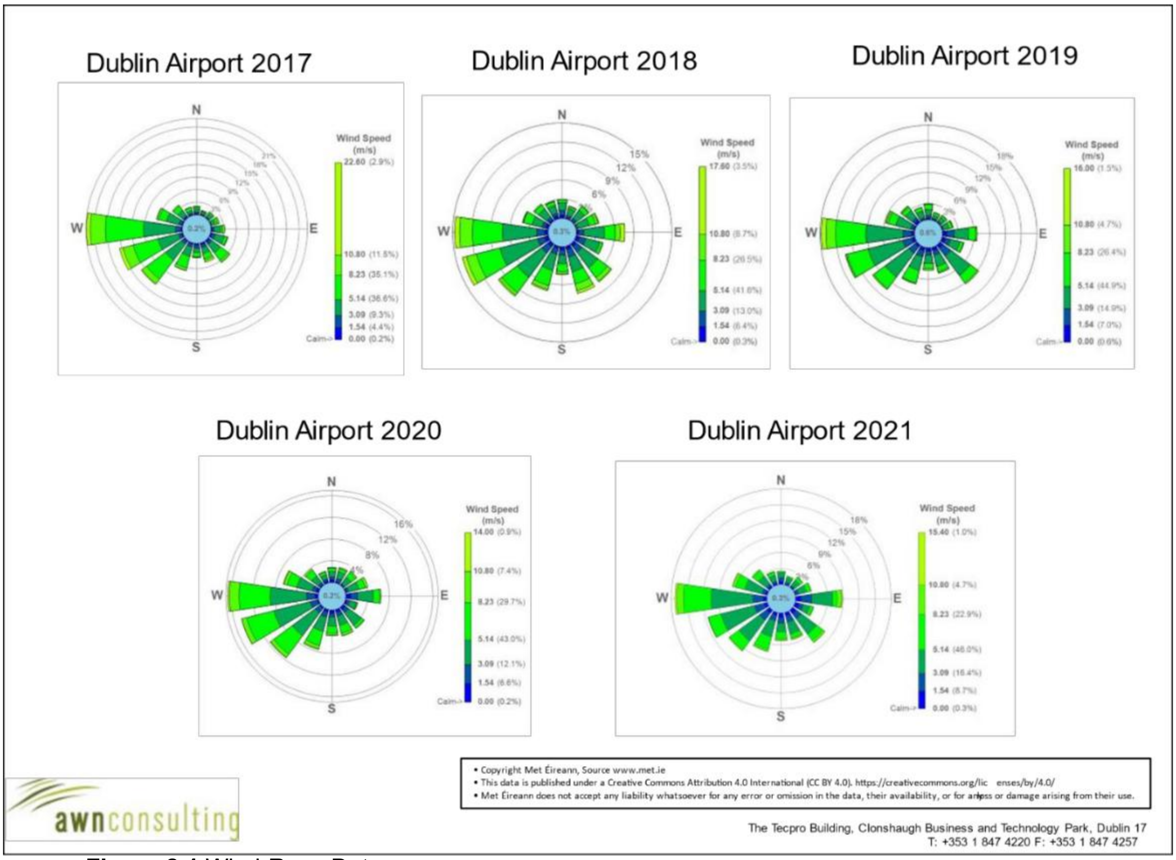

Figure 2.1 Wind-Rose Data

3.0 THE PROPOSED DEVELOPMENT AND MICROCLIMATE IMPACTS

Wind is normally described by its speed, either as a mean or gust speed. However, people sense the effect of the wind force, which is what we can feel, see and hear during windy conditions. Wind force is proportional to wind speed squared, therefore a relatively small increase in the wind speed can have a large effect on pedestrian comfort.

All buildings obstruct the free flow of the wind, causing it to be deflected and accelerated, resulting in very complex flow patterns. When the wind strikes the front face of a building, it will produce positive pressures that reach a maximum value at a point between about two thirds and three-quarters of the building height.

Below this height the wind will tend to be deflected down the front face towards the ground, often called ‘downwash’, and accelerated around the corners at ground level potentially producing areas of high wind speed and strong negative pressure. Above this height the wind will be deflected upwards and accelerated over the roof, again causing areas of high wind speed and increased turbulence. This can be a concern for roof gardens and roof terraces. A significant proportion of the wind will also spill around the side faces. Downwind, the flows around the building will recombine into a region of negative pressure known as the ‘wake’.

Wind speed increases with height above ground; it follows, therefore, that the taller a building the higher the wind speeds acting on it. However, not all tall (where tall is greater than 10 storeys) buildings cause wind problems; what is important is the relative height of the building compared with that of neighbouring buildings.

A tall building in a group of tall buildings might not cause problems whereas a mid-rise building can cause unacceptable conditions if it is adjacent to an open area. When the wind strikes a building, it will generate positive pressures on the windward face and suctions on the side, roof and leeward faces.

The wind will flow in the direction of decreasing pressure gradient, that is, from areas of high pressure to areas of lower pressure. This causes wind flow down the front face, which brings high-speed wind from higher levels down to ground level. This can significantly increase ground-level wind speeds. The downwash on the windward face will tend to ‘roll up’ in front of a building, creating a windward vortex. The highest wind speed-up will occur near the centre of the face a short distance in front of the building, where the wind speed-up factor, S, can vary between about 1.2 and 2.0 depending on the building height. The flow then accelerates around the sides towards the low-pressure area in the wake. The S factor can reach 2.0 to 2.5 close to the corners of tall buildings, although values closer to 1.5 are likely for mid-rise buildings.

In general, tall, rectangular, sharp-edged buildings will generate the highest local ground-level wind speeds and the largest 'footprint' area of unpleasant wind speeds.

The UK Buildings Research Establishment (BRE DG 520: Wind Microclimate Around Buildings) has noted that wind speeds in the vortex between a tall building and a lower building (this occurs in the space in front of a tall building behind the lower building) can be up to 1.5 times the free wind speed (free wind speed being that measured in an open area with no buildings).

Wind speeds in the corner streams around either side of a tall building can be up to 2.5 times the free wind speed.

A useful document on wind speeds and tall buildings notes that tall buildings are generally taken to mean buildings more than 10 storeys high, "Sustainable Design and Construction, The London Plan Supplementary Planning Guidance, 2006, Mayor of London's Office". Section 2.4.5 notes that a wind environment assessment should be carried out for every tall building (e.g. a building over 10 storeys)". *Sustainable Design and Construction, Supplementary Planning Guidance, April 2014*" published by the Mayor of London's office provides further guidance in this regard.

The proposed development comprises a building with a proposed maximum height of approximately 17-20 metres (4 to 6 storeys). The proposed development therefore does not fall into the category of tall building and the risk of elevated wind-speeds being generated is considered extremely low.

It is acknowledged that the construction of new buildings can lead to changes to the local wind environment around the building. Generally elevated wind speeds around tall buildings are generated at two main points, either at ground level in the space behind a lower building and in front of a tall building or at building corners. Elevated wind speed can also be generated where a street runs between two tall buildings, leading to a “canyon effect”.

T.V. Lawson in Building Aerodynamics, Imperial College London, Imperial College Press, 2001, has noted that when wind approaches a built-up area it is displaced upwards to roof level and generally flows across landscape at roof level, with gusts down to street level that are a function of the relative height to width of the street canyon.

It will be noted that as the predominant wind directions are from the west and from the south west, wind striking the proposed development will therefore already have travelled across the built-up landscape of Dublin City.

Oke (T.R. Oke, Boundary Layer Climates, Routledge, 1987) has noted when the Height to Width Ratio is greater than 0.7, the Skimming Flow Regime tends to predominate, with little in the way of wind flow down to street level.

When the H to W ratio drops to 0.4 or less, the wind speed at ground level tends to increase and the street behaves more is if it were in open country, with much more of the wind now gusting down into the street.

Similarly, the BRE DG 520 document notes that H to W ratio of > 0.65 should be a target to minimise any wind related impacts.

The street width down-wind of the proposed development is approximately 9 metres, and the proposed building height is approximately 20 metres, the H to W ratio is therefore is circa 2.1 and is therefore well above 0.4 and in summary, it can be expected that the skimming regime will dominate, with little in the way of wind flow down to street level.

4.0 CONCLUSION

It was concluded that:

The existing environment experiences B3 conditions for much of the time which correspond to a gentle breeze.

Based on the analysis conducted it was concluded the proposed development would have no significant effects with regard to microclimate.

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END OF REPORT