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INTRODUCTION

- 7.1 This chapter of the EIS addresses issues relating to potential climate impacts of the proposed development and operation of an inert waste recovery facility to facilitate restoration of an existing quarry void at Calary Quarry, Kilmacanogue, Co. Wicklow by backfilling it to ground level using imported inert soil and stone waste and re-establishing a heathland / grassland habitat similar to that which existed prior to quarrying.
- 7.2 The assessment has been undertaken by SLR Consulting Ireland (SLR), to inform the wider Environmental Impact Assessment (EIA) process and production of an Environmental Impact Statement (EIS), to accompany the planning application by Roadstone Limited for the proposed waste recovery facility at Calary Quarry. It presents data on the prevailing climatic conditions at the application site and assesses the potential impact of the quarry development on the local climate.
- 7.3 The key objectives of this study are to:
- Assess the prevailing climatic conditions of the proposed development area on a local and regional level.
 - Determine the impact, if any, of the development on the local micro-climate and regional macro-climate.
 - Determine any interaction between other aspects of the proposed development and the climate of the area.
- 7.4 The data used in preparing this report was supplied by MET Éireann. The closest synoptic weather monitoring station to Calary Quarry is located at Baldonnell (Casement) Aerodrome at Baldonnell (Position: 53°18'06"N; 06°27'06"W) approximately 38 km north-west of the planning application area, refer to Figure 7-1 for Site Location and Weather Monitoring Station Locations. Data from the nearest weather monitoring station, at Casement Aerodrome was used.

RECEIVING ENVIRONMENT

Regional Context

- 7.5 Ireland has a typical maritime climate, with relatively mild and moist winters and cool, cloudy summers. The prevailing winds are south-westerly in direction. The climate is influenced by warm maritime air associated with the Gulf Stream which has the effect of moderating the climate, and results in high average annual humidity across the country. The area of least precipitation is along the eastern seaboard of the country, in the rain shadow of the Leinster uplands.

Temperature

- 7.6 The moderating influence of the Atlantic Ocean is felt throughout Ireland. The annual mean temperature for different areas in Ireland varies between mountainous regions, lowlands and the coast. Mean daily maximum temperatures are typically between 7.6 to 19.7°C and mean daily minimum temperatures are typically between 1.7 to 10.7°C for the Wicklow area.

7.7 The east of Ireland, which is sheltered from Atlantic frontal systems, is sunnier than the west. The sunniest months are May and June. The mean daily duration recording of sunshine for the Wicklow area is 3.64 hours of sunshine. December is the duller month, with 1.42 hours of mean daily duration of sunshine. May is the sunniest month, with 5.65 hours of mean daily duration of sunshine, explained largely by its long days and finer weather.

Wind Climate

7.8 Results from the synoptic meteorological station at Baldonnel (Casement) Aerodrome, located approx. 38 km north-west of the development over the period 2003-2012, indicate that the main wind direction is from a south-westerly direction, with an annual incidence of 47% for winds between 200°-260° degrees (refer to Table 7-1). The lowest frequency is for winds blowing from the North quadrant (305-010 degrees) and these occur for about 2.5% of the time.

7.9 The annual average wind speed is 8 knots (4.1m/s) and low wind speed conditions (<3 knots or <1.5m/s) occur for about 15% of the year. Calm conditions occur for less than 3% of the time. Wind speeds over 11 knots (5.7m/s) arise around 35% of the year, with wind speeds over 21 knots (10.8m/s) arising around 3% of the time.

7.10 A windrose for the wind data recorded at Baldonnel (Casement) Aerodrome station is presented in Figure 7-2 for the period 2003-2012 inclusive.

Table 7-1
Frequency of Wind Direction and Wind Speed for Hourly Observations at Baldonnel (Casement) Aerodrome (2003-2012)

Direction	Percentage Occurrence of Wind Speeds (knots)						All
	<3	04-06	07-10	11-16	17-21	>21	
350-10	1	0.9	0.6	0	0	0	2.5
20-40	0.9	0.8	1	0.1	0	0	2.8
50-70	1.6	1.9	1.9	0.6	0	0	6
80-100	1.6	2.2	2	1.1	0	0	6.9
110-130	0.9	0.9	1.2	0.6	0	0	3.6
140-160	1	0.9	1.2	0.2	0	0	3.3
170-190	1.3	1.7	1.6	2.1	0.6	0.3	7.6
200-220	1.4	2.8	5.9	8.6	3.8	1.6	24.1
230-250	1.7	3.4	6.7	7.4	2.8	0.7	22.7
260-280	1.6	2.5	3.5	2.9	0.9	0.1	11.5
290-310	1	1	1.4	0.5	0	0	3.9
320-340	0.8	0.9	0.8	0	0	0	2.5
Calms	2.6						
Total	14.8	19.9	27.8	24.1	8.1	2.7	97.4¹

¹ Data is gathered to two decimal places and reported by MET Eireann to one decimal place. As a result, wind speeds less than 0.05 but greater than 0 are not reported which results in a total of less than 100% in Table 7-1 above.

Precipitation (Rainfall)

- 7.11 During the period 2003-2012, annual rates of precipitation were between 624mm and 986mm per annum at the Baldonnel (Casement) Aerodrome station, with winter months receiving the heaviest amounts, refer to Table 7-2.
- 7.12 The weather station is located approximately 38 km north-west of Calary Quarry, and for the purpose of this chapter, is considered to have a rainfall pattern similar to that which occurs at the application site. The mean of the Met Eireann records indicate that average annual rainfall around the application site is approximately 779.6mm / year (refer to Table 7-2). Long-term monthly records indicate monthly mean precipitation rates range from 40.4 mm to 98.0 mm.

Table 7-2
Annual Average Precipitation Baldonnel (Casement) Aerodrome (mm)
2003-2012

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2003	53.5	24.8	31.7	29.5	99.9	56.8	47.4	11.2	38.4	123.5	54.3	63.8	634.8
2004	94.4	18.4	48.5	44.4	26.4	50.7	48.2	113.9	55.3	177.4	43.8	51.1	772.5
2005	75.2	48.4	15.2	47.4	54.7	27.5	77.6	32.1	50.2	83.5	50.6	61.9	624.3
2006	17.9	45	53.2	27.8	75.4	19.7	13.5	66.2	73.6	87.4	89.3	107.5	676.5
2007	72.7	58	46	5.4	39.1	137.3	151.6	107.5	40.7	16.9	74.6	67.5	811.3
2008	110.6	18.9	98.8	33.4	37.1	70.2	102	172.2	121.6	114.2	53.8	53.2	986.0
2009	59.6	57.4	24.9	74.1	53.2	72.8	111	67.9	28.8	88.8	184.2	101.2	923.9
2010	45.4	36.6	59.3	32.7	41.6	48.5	81.7	43.5	102.7	37.7	120	66.2	715.9
2011	33.8	76.5	15	30	51.5	65.1	53.3	51.6	74.2	165.9	54.6	53.2	724.7
2012	63.2	19.8	27.5	94.7	64	178.5	102.7	74.9	88.7	85.1	79.8	46.8	925.7
Average	62.6	40.4	42.0	41.9	54.3	72.1	78.9	74.1	67.4	98.0	80.5	67.2	779.6

IMPACT ASSESSMENT

Direct / Indirect Impacts

- 7.13 The proposed development of an inert waste recovery facility at Calary Quarry is not of sufficient size or scale to have any direct or indirect impacts on existing regional or local climatic conditions. Conversely, the proposed development will not be affected to any significant degree by the prevailing weather conditions of the area.

Interaction with Other Impacts

- 7.14 The effect of climatic conditions (e.g. rainfall, wind etc.) on other impacts of the development (e.g. dust deposition, surface water etc.), are dealt with in the relevant chapters of this EIS, in Chapter 6 Hydrology and Hydrogeology and Chapter 8, Air Quality.

MITIGATION MEASURES

- 7.15 There is no requirement to carry out mitigation measures or monitoring within, or in the vicinity of the development, in relation to climate.

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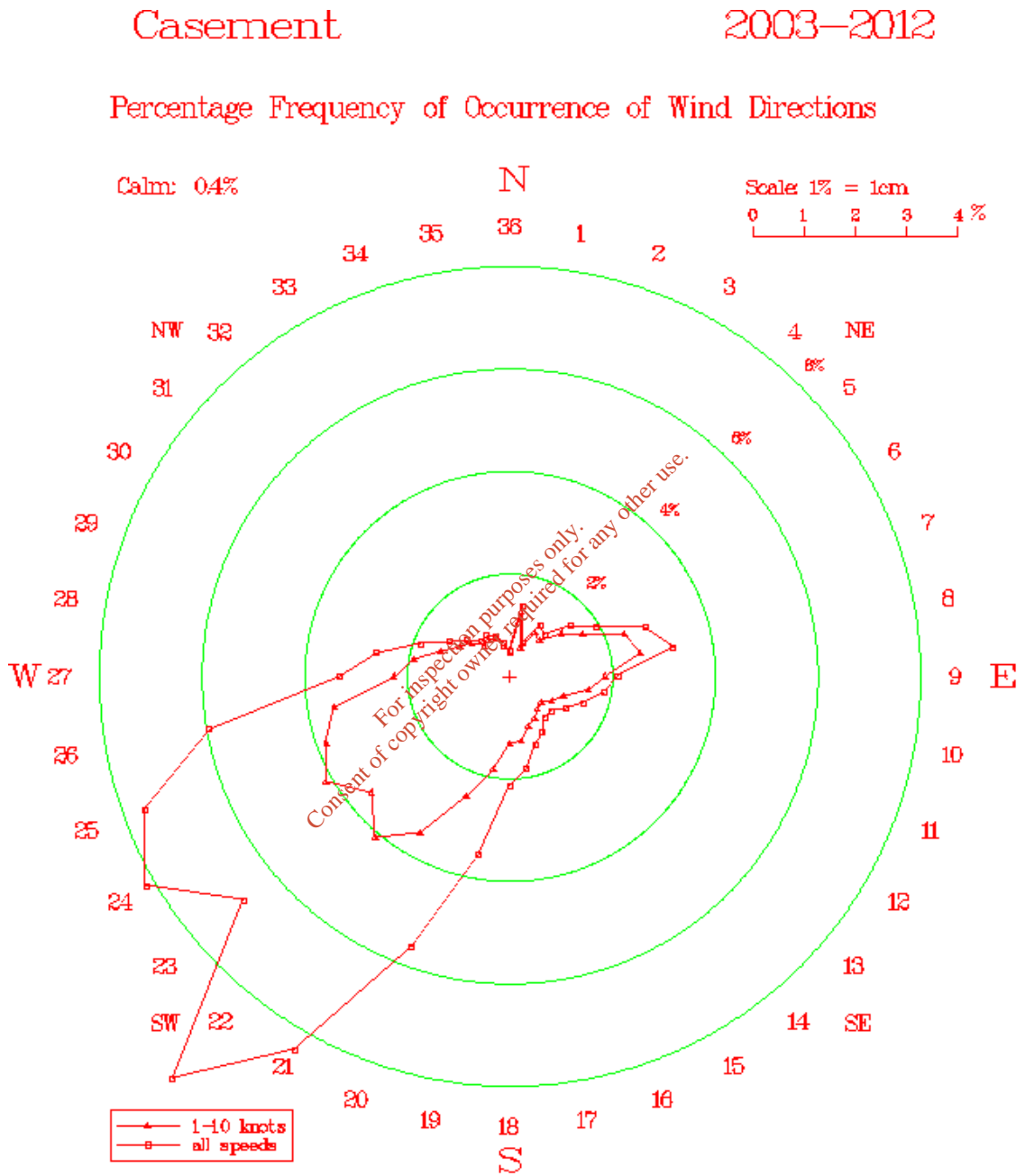
FIGURES

Figure 7-1
Meteorological Station Location

Figure 7-2
Windrose (Baldonnel (Casement) Aerodrome Met Station 2003-2012)

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FIGURE 7-2
Windrose (Baldonnel (Casement) Aerodrome Met Station 2003-2012



Percentage Frequency of Occurrence of Wind Speeds + less than 0.1

0	1-3	4-6	7-10	11-16	17-21	22-27	28-33	34-40	41-47	over 48 knots	%
0.4	14.2	20.0	27.1	25.3	9.3	3.1	0.5	+	+	0.0	

mean wind speed: 9.6 knots
 anemometer height: 12m

standard deviation: 5.8 knots

Met Eireann, Glasnevin Hill, Dublin 9.