Table 9-16: Summary of Noise Measurements at Monitoring Position ST4			
	01:53	41	39
02/07/2021	12:52	46	43
	15:22	44	42
	16:20	50	42

9.7.9 The noise climate at ST5 was similar to that at ST4, with the loudest industrial noise contributions coming buildings located to the north of New Nangor Road. During the night-time, it was noted that contributions from Digital Realty's Data Center were more audible.

Table 9-17: Summary of Noise Measurements at Monitoring Position ST5			
Date of measurement	**Time**	**$L_{Aeq,15mins}$ dB**	**$L_{A90,15mins}$ dB**
23/06/2021	23:22	49	39
24/06/2021	00:31	39	37
	01:35	39	36
02/07/2021	12:32	41	39
	15:01	41	37
	16:01	46	41

9.7.10 The noise climate at ST6 in the daytime was dominated by road traffic noise, vehicles accessing the 'Junior Genius' creche, and children playing in the nearby gardens. During the night-time, no local vehicle movements were noted except for the measurement at 01:13 when an articulated lorry passed the measurement position. Otherwise, plant noise from the Google Data Center dominated the noise climate during the night-time.

Table 9-18: Summary of Noise Measurements at Monitoring Position ST6			
Date of measurement	**Time**	**$L_{Aeq,15mins}$ dB**	**$L_{A90,15mins}$ dB**
24/06/2021	00:06	34	33
	01:13	50	32
	02:15	36	33
02/07/2021	11:59	64	43
	14:38	64	39
	17:44	65	39

9.7.11 A summary of the weather conditions during the survey period is provided below (as measured at monitoring position LT2):

Table 9-19: Summary of Weather Conditions During Monitoring Period				
Average Wind Direction	**Average Wind Speed (m/s)**	**Average Ambient Temperature (°C)**	**Average Pressure (bar)**	**Average Precipitation (mm)**
South-East (SE)	1.3	14.1	1009.6	0.0

Future Baseline

9.7.12 The future baseline includes the operation of the July 2022 DUB-1 permitted development and so therefore, background noise levels may be slightly higher than the background noise levels used for setting plant noise limits in this assessment.

9.7.13 The rating noise levels for the July 2022 DUB-1 permitted development were equal to the representative background noise levels, as a worst case (for NSR 4) for scenario 1 of the proposed development. The predicted rating noise levels for all other NSR locations were below the representative background noise levels in scenario 1 as described in Table 9-2.

9.7.14 The rating noise levels for the July 2022 DUB-1 permitted development were less than the representative background noise levels for all NSRs for scenario 2 of the proposed development, as described in Table 9-2.

9.7.15 The predicted emergency operation noise levels met the limiting criterion.

DUB-1 Future Baseline Equipment

9.7.16 The following section outlines the equipment that will operate for the DUB-1 campus to form the future baseline, as included in the EIAR for the July 2022 DUB-1 permitted development.

Generator Buildings (Multifuel Generation Plant) associated with the July 2022 DUB-1 permitted development

DUB-1 Exhaust Stacks

9.7.17 A total of 11 Wartsilla 20V34SG engines would operate in the two generator halls. The sound power per engine exhaust is shown below:

Table 9-20: Wartsilla 20V34SG engine noise								
Total (dBA)	Sound Power Level L_{WA} (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
119.8	88.0	103.0	110.0	113.0	114.0	111.0	114.0	-

9.7.18 Each exhaust stack would include silencers to reduce the engine noise by 45dB.

DUB-1 Internal reverberant noise level

9.7.19 The internal reverberant noise level from within the engine halls is based on 5no. Wartsilla 20V34SG engines running in each generator hall.

Table 9-21: Internal reverberant noise level in generator halls used in the assessment								
Total (dBA)	Internal reverberant noise level (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
105.8	74.1	89.1	96.1	99.1	100.1	97.1	100.1	-

DUB-1 Building Envelope Construction

9.7.20 The building design allows for the following building envelope construction:

- 0.7mm standing seam steel outer
- 160mm Rockwool 100kg/m³ (1 x 60mm + 1 x 100mm)
- 5mm Tecsound (10kg/m²)
- 1.2mm profiled steel liner

9.7.21 The estimated performance of this construction is as follows:

Table 9-22: Generator building envelope construction octave band transmission loss used in the assessment									
• Transmission loss of	Approx R_w (dB)	Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k

Table 9-22: Generator building envelope construction octave band transmission loss used in the assessment									
	building envelope (dB)	50	20	28	37	49	55	58	64	-

DUB-1 Noise from Air Inlets/Exhausts

9.7.22 The noise level from each air inlet/exhaust would be limited to 65 dBA at 1m from the external louvre/duct. This has been calibrated within the model using the spectrum for the internal reverberant noise level, corrected to 65 dBA at 1 m.

DUB-1 Remote radiators

9.7.23 The air-cooled radiators associated with the MFGP would be selected to be 'ultra-ultra-low noise'. The A-weighted sound power level $L_{w,A}$ for one 3-fan cooling radiator is shown below. It is assumed that this data is applied evenly over the radiator per fan for the model.

Table 9-23: Remote radiator fan noise used in the assessment								
Total (dBA)	A-weighted Sound Power Level $L_{w,A}$ (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
88	92.2	93.1	88.6	85.2	83.0	77.8	73.0	65.1

DUB-1 Barriers/Screens

DUB-1 Substation compound

9.7.24 The proposed substation compound would include a min. 3m high brick blast wall to its full perimeter.

DUB-1 External Plant Installations

DUB-1 Rooftop Chillers per data hall

9.7.25 12no. Airedale TurboChill V chillers would operate per roof of each data hall. The sound power per chiller is as follows:

Table 9-24: Sound power L_w (dB) as a function of frequency (Hz) per chiller								
Total (dBA)	Sound power L_w (dB) at Octave Band Centre Frequency (Hz) per chiller							
	63	125	250	500	1k	2k	4k	8k
99.2	72.0	87.7	98.6	96.5	93.2	90.7	89.4	86.6

9.7.26 Each chiller would include an acoustic package with attenuated inlet and discharge, providing the following minimum insertion losses:

Table 9-25: Chiller acoustic package octave band insertion loss used in the assessment							
Insertion loss (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
4.0	8.0	13.0	22.0	24.0	21.0	18.0	14.0

DUB-1 Step-up Substation

9.7.27 3no. transformers would be located in the external substation compound. A sound power of 106 dB L_w has been assumed per transformer in the model.

DUB-1 Emergency generators

9.7.28 36 no. KD3300-F emergency generators would be included (13no. per hall). These would be housed in containers and include silencers to attenuate noise levels to 85dBA at 1m. The following sound levels have been used in the model:

DATA:
Generator set: KD3300-F
Engine: KD83V16-5BFS @ 1500RPM
Radiator Cooling airflow: 46m³/s @ 300Pa.
Absorbed fan Power: 70kW
Combustion airflow: 3.262m³/s
Overall Noise : 85dB(A)@1m

NOISE DATA FOR PROPOSED GENERATOR SET, CANOPY designed to achieve 85dB(A)@1m around the perimeter under standard test conditions Free Field .									
FREQUENCY (Hz)	Octave band Centres (dB).								OVERALL dB(A)
	63	125	250	500	1000	2000	4000	8000	
UNSILENCED ENGINE NOISE L_W	119.4	126.3	125.6	118.7	117.7	116.9	114.6	114.7	..
UNSILENCED Radiator fan L_W (Calculated)	119	123	124	125	125	125	123	121	130
CANOPY PREDICTED L_P @1m	64.1	74.3	78.2	75.9	69.9	56.9	56.9	52.8	81.6
INLET ATTN PREDICTED L_P @1m	99.3	96.3	80.7	67.3	58.2	55.2	60.2	74	82.2
DISCHARGE PREDICTED L_P @1m	102.6	97.1	80.8	62.8	56.7	56.1	54.0	72.8	83.1
UNSILENCED EXHAUST NOISE L_W SDMO Data	129.9	142.9	135.2	129.3	125.4	123.8	125.6	124.2	..
PREDICTED EXHAUST L_P@1m	99.0	95.0	87.0	69.0	60.0	54.0	56.0	59.0	83.0

NOTES: Grey areas above denote source data stated in L_W Sound Power levels.
White areas above denote calculated data, stated in L_P Sound Pressure levels at 1m from the unit.

Calculations for noise within the unit is carried out using both the engine and radiator fan as noise sources to ensure "Beaming" from fan Pure Tones is prevented in the discharge attenuator.

Figure 9-5: Emergency Generator Sound Levels

9.8 Assessment of Effects

Embedded Mitigation

9.8.1 The assessment of effects has taken account of the following embedded mitigation.

Demolition and Construction

9.8.2 Standard best practice controls and measures, as detailed below, would be adopted onsite to ensure that noise management forms an integral part of the contractor's scope of works.

Construction Environmental Management Plan

9.8.3 A Construction Environmental Management Plan (CEMP) would be prepared that defines construction mitigation measures to be adopted to minimise noise and vibration emissions at surrounding sensitive

receptors. This would be updated as the project progresses to incorporate specific measures for all phases of the construction works where noise and vibration may give rise to disturbance.

9.8.4 The CEMP would include the following Best Available Techniques (BAT):

- Use of plant conforming with relevant Irish standards, directives or recommendations on noise or vibration.
- Works would only be carried out within agreed working hours. Restricted working hours (including Monday-Friday: 07:00-19:00, Saturday: 08:00-13:00, and no working on Sundays or Bank Holidays). Planning of working hours to take account of the effects of noise and vibration upon persons in areas surrounding site operations and upon persons working onsite.
- Construction plant would be maintained in good condition with regards to minimising noise output and workers exposed to harmful noise and vibration.
- All drivers to site, including deliveries, would drive vehicles in a considerate manner in accordance with the specified speed limits with any failure to comply addressed as per infringements of the contractor's Project Health and Safety Plan.
- Construction plant would be operated and maintained appropriately, having regard to the manufacturer's written recommendations and maintenance programmes.
- Starting-up plant and vehicles sequentially rather than all together. Plant, equipment and site vehicles would be switched off when not in use.
- Construction traffic would only use the designated routes as per the construction traffic management plan as outlined in Chapter 5: Construction Description.
- The transport of construction materials, spoil and personnel would be programmed and routed to reduce the risk of increased noise and vibration impacts.
- Adoption of quiet working methods, using plant with lower noise emissions, where reasonably practicable.
- Use of silenced and well-maintained plant conforming with the relevant Irish directives relating to noise and vibration. Vehicle and mechanical plant used for the purpose of the works would be fitted with effective exhaust silencers and/or mufflers, maintained in good working order and operated in such a manner as to minimise noise emissions.
- Construction plant and activities would be positioned to minimise noise at sensitive locations.
- Equipment that breaks concrete by munching or similar, rather than by percussion, would be used as far as is practicable.
- Mufflers would be used on pneumatic tools.
- Avoiding breaking out hard surfaces using percussive techniques, where reasonably practicable. Where practicable, rotary drills actuated by hydraulic or electrical power would be used for excavating hard materials.
- Adoption of working methods that minimise vibration generation, where reasonably practicable;
- Locating plant away from noise and vibration sensitive receptors, where feasible;
- Use of site hoarding, assumed 2.4m high, and acoustic screening for static items of plant and work areas, where feasible;
- Avoiding unnecessary revving of engines and switch off equipment, when not required;
- Keeping internal haul routes well maintained and avoid steep gradients;
- Use of rubber linings for chutes and dumpers to reduce impact noise;
- Minimisation of drop height of materials;
- Carrying out regular inspections of noise mitigation measures to ensure integrity is maintained at all times;
- Providing briefings for all site-based personnel so that noise and vibration issues are understood, and mitigation measures are adhered to;
- Management of plant movement to take account of surrounding NSRs, as far as is reasonably practicable; and
- Carrying out compliance monitoring of onsite noise and vibration levels to ensure that the agreed limits are being adhered to.

9.8.5 An appropriate community awareness campaign would be undertaken to provide information to people residing in properties in the vicinity of the construction works, to reduce the likelihood of negative impacts on the public which could result in complaints. The level of engagement would vary depending upon the expected effects experienced by individual receptors due to the construction works.

9.8.6 It is envisaged that the public awareness campaign would provide local residents with the following items of information:

- The nature of the works being undertaken;
- The expected duration of the works;
- The contractor's working hours;
- Mitigation measures that have been adopted to minimise noise and vibration, as detailed in the CEMP; and
- Contact details in the event of a noise disturbance.

9.8.7 If work is required to extend into periods beyond the agreed hours, separate authorisation would be secured with SDCC via the CEMP or other agreement process.

9.8.8 Best Available Techniques (BAT) as defined in Section 7 of the Protection of the Environment Act would be implemented as part of the working methodology as detailed in the CEMP. This would serve to minimise the noise and vibration effects at receptors in the vicinity of the construction works. The reduction in noise levels provided through the implementation of BAT varies depending on the nature of the works; however, values in excess of 5 dB can be expected through a combination of appropriate measures and the use of site hoardings for noise screening.

Demolition and Construction Effects

Demolition and Construction Noise

9.8.9 Reference should be made to Appendix 9.2 for details of the construction noise calculation that has been used to inform this summary.

9.8.10 Table 9-26 presents the mitigated noise levels (dBA) at various distances from the construction activities taking place at the site. A +3 dB building façade correction factor has been applied in accordance with BS 5528:2009+A1 2014.

Table 9-26: Construction noise assessment results, dB L_{Aeq} (façade levels)

Activity	NSR1 (Offices)	NSR2 (Nangor Lea)	NSR3 (Baldonnel Rd)	NSR4 (Baldonnel Rd)	NSR5 (Baldonnel Rd)
Min. separating distance[1]	75/120m	155/200m	690/770m	535/690m	680/830m
Enabling Works	60	53	41	43	41
Demolition	55	52	41	42	42
Substructure	58	53	41	42	41
Superstructure	50	46	34	35	33
Internal Fit-out	47	42	31	32	30
External Works	58	52	39	41	39

[1]Distance to boundary for Enabling and External Works / distance to building footprint, at the closest point

9.8.11 The noise levels at the identified NSRs are not predicted to exceed the threshold criteria as demonstrated by the above table.

9.8.12 On the basis of the predicted mitigated noise levels and distances to NSRs, the demolition and construction works are predicted to give rise to noise levels that would constitute:

- a **direct, temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), not-significant in terms of EIA; and
- **direct, temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), not-significant in terms of EIA.

Demolition and Construction Traffic Noise

9.8.13 The management of demolition and construction vehicle movements would form an integral part of the CEMP as outlined above.

9.8.14 The assessment has calculated a maximum number of trips per hour to not exceed the construction noise limit (65 dB $L_{Aeq,T}$).

9.8.15 Based on a (83 dBA at 10m) 44t lorry travelling at 34 kph, the peak permissible number of HGV vehicle movements passing a NSR at 20m (the shortest distance been the NSR and the road centreline) has been assessed as 16 per hour, or 8 return journeys per hour. On this basis the predicted demolition and construction traffic noise level would be calculated as 65 dB $L_{Aeq,1hour}$. This would constitute:

- a **Direct, Temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), Not-significant in terms of EIA; and
- **direct, temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), Not-significant in terms of EIA.

Demolition and Construction Vibration

9.8.16 With reference to Table 9-7, the assessed receptors are at distances greater than which vibration may be perceptible.

9.8.17 Receptor NSR1 is deemed to be at 75 m from the site boundary/proposed works, at the closest point. No works that would take place at the site boundary are expected to generate sufficient levels of vibration to be perceivable at receptor NSR1. All other receptors are of much greater distance from the site boundary/proposed works.

9.8.18 Demolition and construction vibration constitutes:

- a **direct, temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), Not-significant in terms of EIA; and
- direct temporary **Slight, Negative** and **Not Significant** (low magnitude) effects for receptors NSR2-5 (high sensitivity), Not-significant in terms of EIA.

Operation Effects

9.8.19 This section of the chapter outlines:

- Noise emission limits applicable to the operation of the proposed development and the July 2022 DUB-1 permitted development;
- The equipment that will be required for the operation of the proposed development;
- The predicted operational noise levels for:
  - Scenario 1: worst-case operation of the proposed development, with the impact of the proposed development assessed as a contribution to noise generated by the campus as whole, including the July 2022 DUB-1 permitted development;
  - Operational Scenario 2: best-case operation of the proposed development, with the impact of the proposed development assessed as a contribution to noise generated by the campus as a whole, including the July 2022 DUB-1 permitted development; and
  - Scenario 3: emergency operation of the proposed development, with the impact of the proposed development assessed as a contribution to noise generated by the campus as whole, including the July 2022 DUB-1 permitted development.

9.8.20 The results are compared to the future baseline noise levels with the July 2022 DUB-1 permitted development operational.

9.8.21 The effects are described against the noise emission limits and the contribution of the proposed development to the future baseline noise levels with the July 2022 DUB-1 permitted development operational.

Building Services Plant

Noise Emission Limits

9.8.22 The specifications for fixed plant installations serving the proposed development have been based on the following noise limits, which have been set in accordance with BS 4142:2014+A 2019 and local requirements.

9.8.23 Limits are set at 1 m from the window of the nearest NSRs and include a façade reflection.

Table 9-27: Noise Emissions Limits for New Building Services Plant

NSR reference	Time Period	Representative Background Noise Level $L_{A90,15min}$ (dB)	Rating Noise Limit $L_{Ar,Tr}$ (dB)	Emergency Noise Limit $L_{Aeq,1hr}$ (dB)
1-2	Daytime (07:00-19:00)	46	≤56	55
	Evening (19:00-23:00)	44	≤44	55
	Night-time (23:00-07:00)	42	≤42	55
3-5	Daytime (07:00-19:00)	42	≤52	55
	Evening (19:00-23:00)	40	≤40	55
	Night-time (23:00-07:00)	38	≤38	55

9.8.24 The proposed development would run 24 hours a day, 7 days a week. Therefore, the assessment has considered the noise emission limits during night-time only (for normal operation).

9.8.25 The limits for NSRs 1 and 2 have been taken from the unattended noise survey results of LT1. The limits for NSRs 3-5 have been taken from the unattended noise survey results of LT2.

9.8.26 The limits set in Table 9-27 are based on the representative background noise levels measured during the baseline noise survey and are equal to the limits set for the assessment of the July 2022 DUB-1 permitted development.

9.8.27 The future baseline would include the operation of the July 2022 DUB-1 permitted development and so therefore, background noise levels may be slightly higher than the background noise levels used for setting plant noise limits.

9.8.28 The rating noise levels for the July 2022 DUB-1 permitted development were equal to the representative background noise levels, as a worst case (for NSR 4) for scenario 1 of the proposed development. The predicted rating noise levels for all other NSR locations were below the representative background noise levels in scenario 1.

9.8.29 The rating noise levels for the July 2022 DUB-1 permitted development were less than the representative background noise levels for all NSRs for scenario 2 of the proposed development.

9.8.30 It is not possible to accurately calculate the future baseline noise levels by combining the typical measured background noise levels with the predicted specific noise levels from the operation of the July 2022 DUB-1 permitted development. Therefore, it has been deemed appropriate to compare the rating noise levels of the proposed development, with the contribution of the July 2022 DUB-1 permitted development, to the representative background noise levels as measured during the baseline noise survey, as the findings of the July 2022 DUB-1 permitted development assessment found that the DUB-1 operation was not expected to significantly affect the background noise levels at the NSRs.

9.8.31 Therefore, the noise impact of the proposed development has been assessed against the background noise levels without the contribution of the July 2022 DUB-1 permitted development and has been compared to the predicted rating noise levels with the July 2022 DUB-1 permitted development in operation, to calculate the difference between the rating noise levels of the proposed development and the July 2022 DUB-1 permitted development.

Proposed Development Equipment

9.8.32 With reference to the DUB-1 Future Baseline Equipment section above, the proposed development would comprise the following equipment:

- 14 no. Airedale TurboChill V chillers with acoustically attenuated inlets and discharge (or equivalent); and
- 13 no. KD3300-F emergency generators, silenced to 85dBA at 1m (or equivalent).

Modelled Sound Levels – Normal Operations

9.8.33 Noise levels have been predicted using the computer noise propagation model, the proposed building constructions, proposed screens and barriers and proposed fixed plant installations, inclusive of any embedded mitigation measures as outlined in this assessment.

9.8.34 Extracts of the noise model for scenarios 1 and 2 are shown in Figure 9-6 and Figure 9-7, respectively. The noise contour plots in each scenario include the contribution from the DUB-1 campus as the future baseline noise levels.

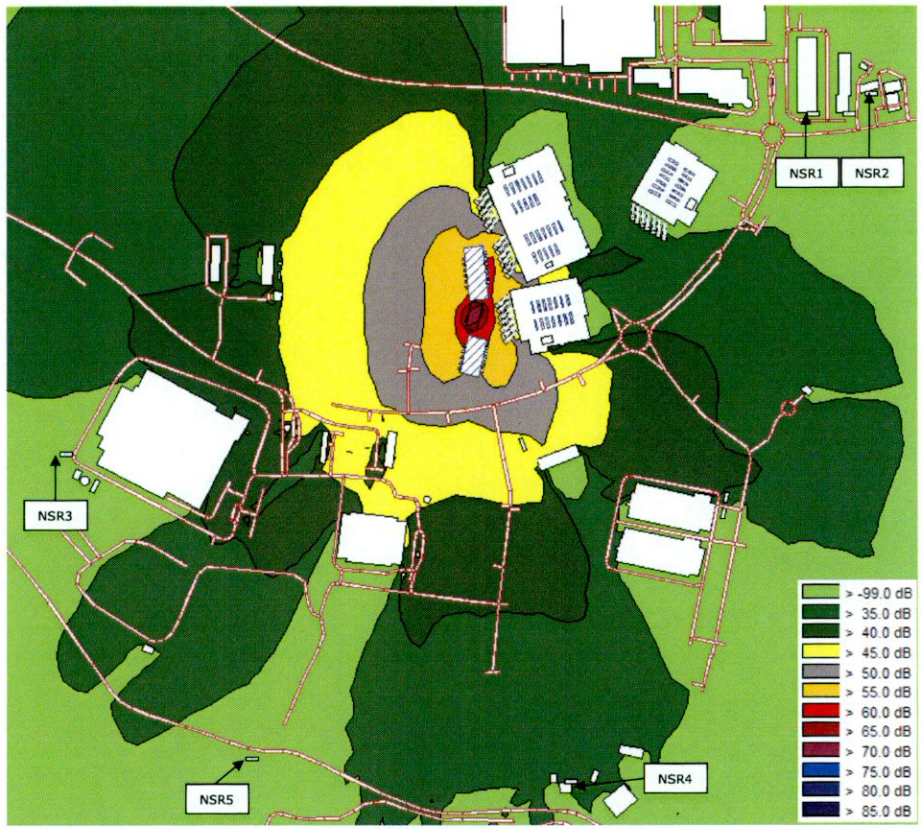


Figure 9-6: Scenario 1 worst-case noise emissions at 4.0 m above ground level

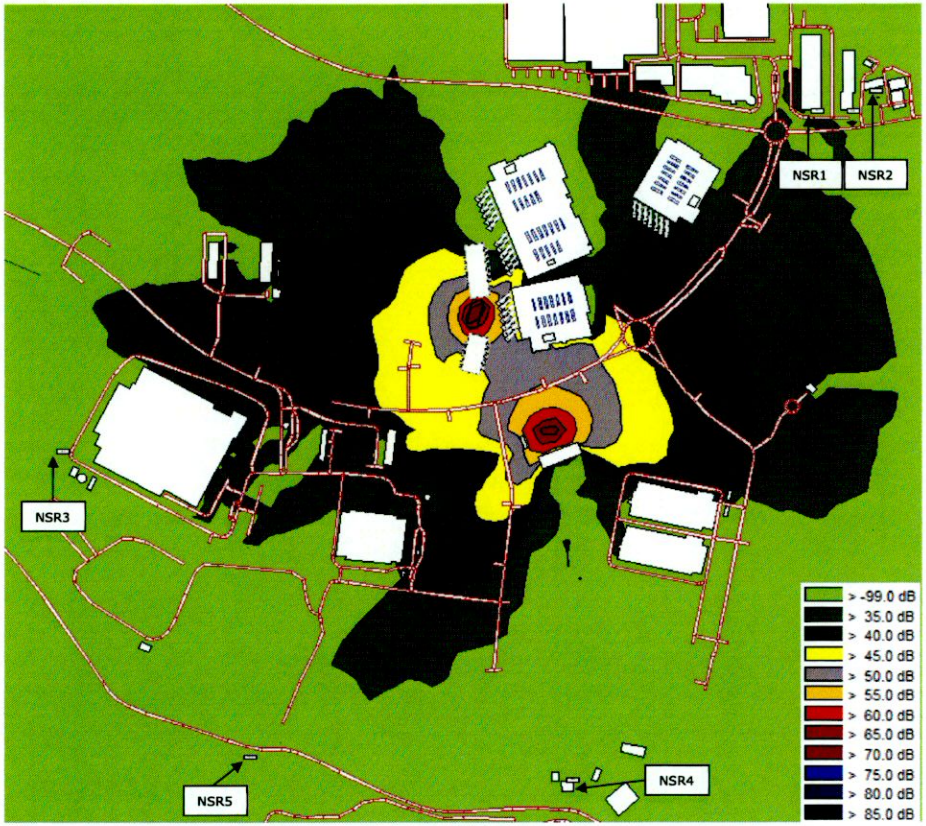


Figure 9-7: Scenario 2 best-case noise emissions at 4.0 m above ground level

9.8.35 Table 9-28 details the noise emissions from the July 2022 DUB-1 permitted development, without the proposed development operational.

Table 9-28: July 2022 DUB-1 permitted development predicted normal operational building services noise at NSR at 1m from the façade with façade reflection

NSR reference	Rating Noise Limit $L_{Ar,Tr}$ (dB)	Predicted Rating Noise Level $L_{Ar,Tr}$ (dB)		
		Scenario 1	Scenario 2	Scenario 3 (Emergency)
1	42	37	37	49
2	42	29	33	43
3	38	32	26	44
4	38	38	28	50
5	38	32	32	44

9.8.36 The predicted noise levels at each NSR location for the proposed development operating in addition to the July 2022 DUB-1 permitted development campus are detailed in Table 9-29.

Table 9-29: Proposed development (in addition to July 2022 DUB-1 permitted development) predicted normal operational building services noise at NSR at 1m from the façade with façade reflection

NSR reference	Rating Noise Limit $L_{Ar,Tr}$ (dB)	Predicted Rating Noise Level $L_{Ar,Tr}$ (dB)		
		Scenario 1	Scenario 2	Scenario 3 (Emergency)
1	42	36	37	51
2	42	28	33	45
3	38	32	26	45
4	38	38	28	52
5	38	32	32	44

9.8.37 The difference in predicted rating levels between the proposed development and July 2022 DUB-1 permitted development are detailed in Table 9-30.

Table 9-30: Predicted rating noise level difference between the proposed development and the July 2022 DUB-1 permitted development

NSR reference	Predicted Rating Noise Level Difference (dB) Proposed Development – July 2022 DUB-1 permitted development		
	Scenario 1	Scenario 2	Scenario 3 (Emergency)
1	-1	0	2
2	-1	0	2
3	0	0	1
4	0	0	2
5	0	0	0

9.8.38 The predicted noise rating levels for Scenario 1 (worst-case typical operation) meet the required limits and do not cause an increase in the predicted noise levels from DUB-1. This constitutes a direct **long-term to permanent Slight, Negative** (low magnitude) effect which is **Not Significant** in terms of EIA for all NSRs (medium-high receptor sensitivity).

9.8.39 The predicted noise rating levels for Scenario 2 (best-case typical operation) meet the required limits and do not cause an increase in the predicted noise levels from DUB-1. This constitutes a direct **long-term to permanent Slight, Negative** (low magnitude) effect which is **Not Significant** in terms of EIA for all NSRs (medium-high receptor sensitivity).

Modelled Sound Levels – Emergency Condition

9.8.40 An extract of the noise model showing the calculated noise levels during the emergency scenario is shown in Figure 9-8. The noise contour plot includes the contribution from the DUB-1 campus as the future baseline noise levels.

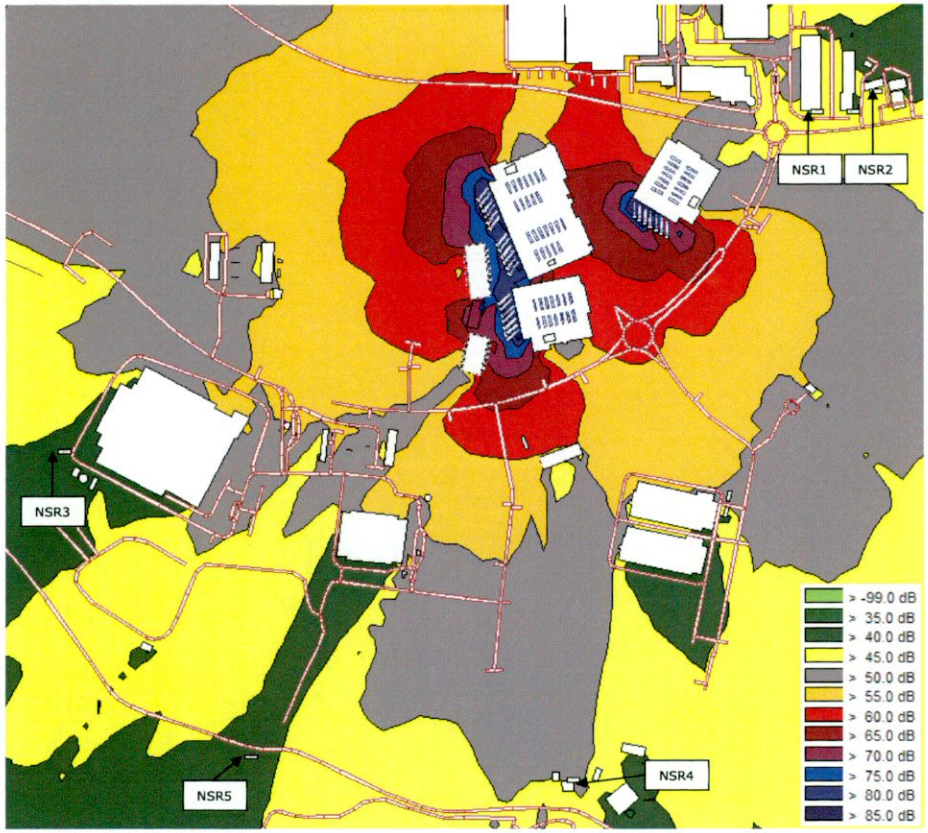


Figure 9-8: Scenario 3 emergency noise emissions at 4.0m above ground level

9.8.41 With reference to Scenario 3 (emergency operation) of Table 9-30, the predicted noise rating levels meet the required limits and are predicted to cause an increase over the predicted noise levels from DUB-1, of up to 2 dB. This constitutes a direct temporary brief **Slight**, **Negative** (low magnitude) effect which is **Not Significant** in terms of EIA for all NSRs (medium-high receptor sensitivity).

9.9 Additional Mitigation

Demolition and Construction Stage

9.9.1 No significant effects are identified therefore no additional mitigation is proposed.

9.9.2 The CEMP would include provision for monitoring to see that construction phase noise levels do not exceed thresholds above which significant effects may occur. Any complaints would be recorded and addressed with additional mitigation considered as appropriate.

Operation Stage

9.9.3 No significant effects are identified therefore no additional mitigation is proposed.

9.9.4 It is expected that compliance with the adopted criteria for plant noise emissions can be achieved through use of a suitably worded planning condition.

9.9.5 Noise and vibration monitoring has not been proposed during the operational phase of the proposed development.

9.10 Enhancement Measures

9.10.1 No enhancement measures are proposed in respect of noise and vibration.

9.11 Assessment of Residual Effects

Demolition and Construction Residual Effects

9.11.1 As no additional mitigation would be required, the residual demolition and construction effects remain as reported in the assessment of effects section.

- Demolition and Construction Noise
  - a **temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), (Not-significant in terms of EIA); and
  - a **temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), (Not-significant in terms of EIA).
- Demolition and Construction Traffic
  - a **temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), (Not-significant in terms of EIA); and
  - a **temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), (Not-significant in terms of EIA).
- Demolition and Construction Vibration
  - a **temporary, Not Significant, Negative** (low magnitude) effect for NSR1 (medium sensitivity), (Not-significant in terms of EIA); and
  - **temporary, Slight, Negative** (low magnitude) effects for receptors NSR2-5 (high sensitivity), (Not-significant in terms of EIA).

Operation Residual Effects

9.11.2 As no additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section.

- Scenario 1 (worst-case operation of the proposed development)
  - a **long-term to permanent Slight**, **Negative** (low magnitude) effect (Not-significant in terms of EIA) for all NSRs (medium-high receptor sensitivity).
- Scenario 2 (best-case operation of the proposed development)
  - a **long-term to permanent Slight**, **Negative** (low magnitude) effect (Not-significant in terms of EIA) (medium-high receptor sensitivity) for all NSRs.
- Scenario 3 (emergency operation of the proposed development)

- brief to temporary **Slight, Negative** (low magnitude) effect (Not-significant in terms of EIA)(medium-high receptor sensitivity) for all NSRs.

Summary of Residual Effects

9.11.3 Table 9-31 provides a summary of the outcomes of the noise and vibration assessment of the proposed development. Where **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 9-31: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Demolition and Construction								
NSR1	Demolition and Construction Noise	None required	Not significant	-	L	D	IR	T
NSR2-5	Demolition and Construction Noise	None required	Slight	-	L	D	IR	T
NSR1	Demolition and Construction Traffic Noise	None required	Not significant	-	L	D	IR	T
NSR2-5	Demolition and Construction Traffic Noise	None required	Slight	-	L	D	IR	T
NSR1	Demolition and Construction Vibration	None required	Not significant	-	L	D	IR	T
NSR2-5	Demolition and Construction Vibration	None required	Slight	-	L	D	IR	T
Operation								
All NSRs	Scenario 1 (worst-case)	None required	Slight	-	L	D	IR	Lt to P
All NSRs	Scenario 2 (best-case)	None required	Slight	-	L	D	IR	Lt to P
All NSRs	Scenario 3 (emergency)	None required	Slight	-	L	D	IR	B to T

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

9.12 Cumulative Effects

Intra-Project Effects

9.12.1 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

9.12.2 Table 9-32 provides a summary of the likely inter-project cumulative effects resulting from the proposed development and the cumulative developments.

Table 9-32: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
1. Microsoft - Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 [SD20A/0283]	No	Demolition and construction phases do not overlap and therefore no effects considered likely	No	Site emissions calculated to be up to 38 dB $L_{Ar,Tr}$ at the NSRs and Microsoft site has been designed to 45 dB $L_{Ar,Tr}$ emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
2. UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the UBC site from the identified receptors it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Site, and therefore are not considered significant.	No	Site emissions calculated to be up to 38 dB $L_{Ar,Tr}$ at the NSRs receptors and UBC Properties site has been designed to 45 dB $L_{Ar,Tr}$ emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
3. UBC Properties - Grange Castle South Business Park, Dublin 22 [An Bord Pleanála Reference – 308585]	No		No	Site emissions calculated to be up to 38 dB $L_{Ar,Tr}$ at the NSRs and UBC Properties site has been designed to 45 dB $L_{Ar,Tr}$ emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
4. Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	No	Already constructed	No	Operational noise included within the baseline characterisation for the site.
5. Cyrus One - Grange Castle Business Park,	No	Already constructed	No	Operational noise included within the baseline characterisation for the site.

Table 9-32: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Clondalkin, Dublin 22 [SD18A/0134]				
6. Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0295]	No	Already constructed	No	Operational noise included within the baseline characterisation for the site.
7. Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 [An Bord Pleanála Ref - 309146]	No	Demolition and construction phases do not overlap and therefore no effects considered likely	No	Site emissions calculated to be up to 38 dB $L_{Ar,Tr}$ at the NSRs and Cyrus site has been designed to 45 dB $L_{Ar,Tr}$ emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
8. Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the Centrica site from the identified receptors it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Site, and therefore are not considered significant	No	Site emissions calculated to be up to 38 dBA at the NSRs and Centrica site has been designed to 45 dBA emissions limit. Worst-case 1 dB cumulative level expected which is not significant.
9. Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0186]	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the Site from the identified receptors it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Equinix Site, and	No	Site emissions calculated to be up to 38dB $L_{Ar,Tr}$ at the NSRs and Equinix site has been designed to 45dB $L_{Ar,Tr}$ emissions limit. Worst-case 1dB cumulative level expected which is not significant.

Table 9-32: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
		therefore are not considered significant		
10. Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD22A/0156]	No	Details of the proposed construction phase are not known. If constructed at the same time as the proposed development, there is potential for cumulative effects to occur. However, the construction assessment for the proposed development has shown that significant effects are not likely as predicted construction noise levels are below the relevant construction noise threshold. The Equinix site is of greater distance from the assessed receptors. Therefore, construction noise levels would be attenuated due to distance to the nearest receptors. Significant effects are not expected.	No	The proposed development noise emissions are not expected to exceed the criteria. Therefore, if the cumulative scheme is designed to the same criteria, there is potential for background noise levels to increase slightly but would not be deemed to be significant.
11. Digital Netherlands VIII B.V - Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0217]	No	The predicted construction noise levels from the Digital Netherlands site are compliant with the construction noise thresholds. If constructed simultaneously with the proposed development, there is potential for cumulative effects to occur although effects would not be expected to be significant. The predicted construction noise levels in assessment INXN DUB15/16 dated 29/07/2021 would dominate at the nearest	No	The levels from the Digital Netherlands site are predicted to be 41 dBA and 55 dBA during typical and emergency operation, respectively, at NSR4 (NSR1 of assessment INXN DUB15/16 dated 29/07/2021). The cumulative scheme is predicted to have a greater impact on NSR4, as the site is closer to the receptor location. The cumulative levels could increase by 2dB for Scenario 1 of this assessment, 0 dB for Scenario 2 and 2 dB for

Table 9-32: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
		receptor for the proposed development assessment (NSR4) due to the distance between the receptor location and the Digital Netherlands site.		Scenario 3, which are not considered significant.
12. Vantage Data Centers Dub 11 Limited - Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22 [An Bord Pleanála Ref - 312793]	No	The predicted construction noise levels as far below the relevant construction noise thresholds. Significant effects are not expected to occur.	No	Predicted noise emissions from the site are below the predicted noise emissions for the proposed development and are compliant with the limiting noise criteria. The noise emissions from this scheme have been considered in Scenario 2 of the assessments contained in this chapter. Significant effects are not expected.

Demolition and Construction Cumulative Effects

9.12.3 Whilst construction noise levels could increase for the NSRs if cumulative schemes are constructed simultaneously with the proposed development, it is not expected that the construction noise thresholds would be exceeded. Therefore, effects would be expected to be direct temporary Not Significant/Slight (low magnitude), **Negative** effects for the identified receptors (medium-high receptor sensitivity). Effects would not be **Not Significant** in terms of EIA.

Operation Cumulative Effects

9.12.4 On the basis of the above table, the background noise levels are likely to increase as a result of the committed developments shown. The baseline characterisation undertaken for the site would have therefore been undertaken when background levels were lower and, as such, the noise emissions limits set out in this assessment are likely to be significantly below future baseline noise levels. Therefore, effects would be expected to be direct long-term to permanent Not Significant/Slight (low magnitude), **Negative** effects for the identified receptors (medium-high receptor sensitivity). Effects would not be **Not Significant** in terms of EIA.

9.12.5 In the event of a power failure from the national grid, cumulative impacts would be expected from emergency plant from each development. This would be expected to result in a direct brief to temporary **Slight, Negative** (low magnitude) effect (Not-significant in terms of EIA) (medium-high receptor sensitivity) for all NSRs.

9.13 Summary of Assessment

Background

9.13.1 This chapter has detailed the potential noise and vibration effects due to the construction and operation stages of the proposed development. The assessment of has considered the relevant national and local guidance and regulations.

9.13.2 Attended and unattended noise monitoring surveys were undertaken to establish the existing noise climate across the site. The existing baseline noise climate is generally dominated by road traffic noise and noise from fixed plant installations associated with other industrial activity in the nearby vicinity (data centers). The results of the noise surveys have been used to assess construction, and operation effects attributable to the site.

Demolition and Construction Effects

9.13.3 The assessment of noise and vibration during the demolition and construction phase was undertaken in accordance with BS 5228:2009+A1:2014, using representative data for the various phases of the works. The assessment has considered the following phases of construction:

- Demolition;
- Enabling Works;
- Substructure;
- Superstructure;
- Internal Fit-out; and
- External works.

9.13.4 An assessment of demolition and construction traffic noise has also been undertaken to calculate the number of HGV movements permissible per hour, along with consideration of the distance at which perceptible levels of vibration may occur from construction activities.

9.13.5 With the adoption of a CEMP and BAT implemented as part of the demolition and construction stage embedded mitigation, it is considered that the noise and vibration impacts can be controlled sufficiently to achieve acceptable levels at the surrounding sensitive receptors.

9.13.6 Overall, it is considered that the demolition of the existing residential buildings and construction of the proposed development would result in direct temporary Not Significant/Slight (low magnitude), Negative effects for the identified receptors (medium-high receptor sensitivity), and as such **would not give rise to Significant Effects** in terms of EIA.

Operation Effects

9.13.7 The proposed development would be designed to achieve the noise emission limits as stipulated by SDCC, which requires that the rating noise level does not exceed the representative background noise level, set in accordance with the principles of BS 4142:2014+A1 2019. The effects of noise emissions from proposed fixed items of plant have been considered for worst-case and best-case scenarios, along with consideration of emergency conditions in the event of the proposed development losing grid power. On the basis of the proposed design, noise emissions are predicted to meet the prescribed limits at the nearest noise sensitive receptors.

9.13.8 Overall, it is considered that the operation stage would result in a direct permanent long-term Slight, Negative effect (low magnitude), and as such **would not give rise to Significant Effects** on noise and vibration in terms of EIA (medium-high receptor sensitivity). During emergency conditions, there would be direct brief temporary Slight, Negative effect (low magnitude) that **would not give rise to Significant Effects** in terms of EIA (medium-high receptor sensitivity).

Cumulative Effects

9.13.9 The proposed development has the potential to result in cumulative effects when considered in combination with other committed developments. However, the proposed development has been designed to lower noise emissions levels than other committed developments. As such it is expected that the future baseline noise levels would be higher, irrespective of whether this development went ahead. As such, cumulative effects are **not considered significant** (low magnitude) in terms of EIA (medium-high receptor sensitivity).

10 WATER RESOURCES AND FLOOD RISK

10.1 Introduction

10.1.1 This chapter of the EIAR reports on the likely significant water resources and flood risk effects to arise from the demolition and construction stage and the operation stage of the proposed development.

10.1.2 The chapter describes the water resources and flood risk policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely water resources and flood risk effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

10.1.3 This chapter is supported by the following technical appendices in EIAR Volume 3:

- Technical Appendix 10.1: Kilgallen and Partners Consulting Engineers, Report on Site-Specific Flood Risk Assessment, DUB13-RP-00-C002-V0-PL-PIN, Issue PR1
- Technical Appendix 10.2: Pinnacle Consulting Engineers, Engineering Planning Report, DUB13-RP-00-C001-V0-WS3-PIN (includes drainage proposals)
- Technical Appendix 10.3: Pinnacle Consulting Engineers, Foul and Surface Water Drainage Layout, Drawing No. 201

10.1.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - Water Framework Directive (WFD) (2000/60/EC)1;
  - Environmental Quality Standards (EQS) Directive (2008/105/EC)[2] (as amended)[3];
  - Priority Substances Directive (2008/105/EC)[4];
  - Directive 2014/52/EU. The assessment of the effects of certain public and private projects on the environment[5]
- National Legislation and Policy:
  - Planning and Development Act, 2000, Updated to 16 July 2021[6];
  - The Planning System and Flood Risk Management, Guidelines for Planning Authorities[7]
  - Department of Housing, Local Government and Heritage's Guidelines for Planning Authorities and An Board Pleanála on carrying out Environmental Impact Assessment (2018)[8].
  - Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (National Roads Authority (NRA), 2009)[9];
  - Government of Ireland Climate Action Plan (2021)[10];
- Regional and Local Policy:
  - South Dublin City Council (2005) Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council[11];
  - Greater Dublin Regional Code of Practice for Drainage Works: Version Draft 6.0[12];
- Guidance and Industry Standards:
  - Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites (Eastern Regional Fisheries Board (ERFB)[13];
  - Inland Fisheries Ireland, 2016, Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters[14]
  - Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors[15];
  - Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements[16]

10.2 Assessment Scope

Technical Scope

10.2.1 Chapter 2: EIA Process and Methodology explains the assessment methodology used throughout this EIAR. The assessment in this chapter qualitative, and the evaluation of significance and effects is based on professional judgement.

10.2.2 This assessment has taken account of applicable legislation, guidance and policy.

10.2.3 The technical scope of the assessment has considered the following:

- Contamination of controlled waters (surface water and/or groundwater) arising from demolition and construction works and associated drainage;
- Regular discharge of surface water, during operational use, and the associated effects on the water quality of the downstream receiving waterbodies;
- Tidal or fluvial flood risk, both in terms of impacts to the proposed development and changes to flood risk in the study areas or to downstream receptors as a result of the proposed development;
- Changes to the surface water runoff regime and associated downstream flood risks;
- Changes to local hydrogeology; and
- Demand of the local potable water network and on foul drainage infrastructure.

[1] European Union, 2000. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Document 32000L0060.
[2] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[3] European Union, 2013. Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy Text with EEA relevance. Document 32013L0039.
[4] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[5] European Union, 2014. Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.
[6] Government of Ireland, 2000. Planning and Development Act, Updated to 16 July 2021
[7] Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW), 2009. The Planning System and Flood Risk Management, Guidelines for Planning Authorities.
[8] Government of Ireland, 2019. Guidelines for Planning Authorities and An Bord Pleanala om carrying out Environmental Impact Assessment 2018 (last updated 19 December 2019)
[9] National Roads Authority (NRA), 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. NRA.
[10] Government of Ireland. Climate Action Plan (2021). Available at https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/ [Accessed 24/11/2021].
[11] Drainage Dublin, 2005. Greater Dublin Strategic Drainage Study Final Strategy Report
[12] Wicklow County Council, South Dublin County Council, Meath County Council, Kildare County Council, Fingal County Council, Dún Laoghaire- Rathdown County Council & Dublin City Council. Greater Dublin Regional Code of Practice V6.0
[13] Eastern Regional Fisheries Board, Fisheries Protection Guidelines. Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites
[14] Inland Fisheries Ireland, 2016, Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters
[15] CIRIA, 2001. Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, CIRIA 532, 2001
[16] Institute of Geologists of Ireland, Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements

Spatial Scope

10.2.4 The study area has been defined based on professional judgment and comprises a 1 km radius from the site boundary as it is considered unlikely that effects would extend beyond this extent. However, surface water and groundwater quality are typically assessed at a river catchment level. Therefore, the potential for impacts on downstream water quality has been considered at a river catchment level in addition to the 1 km radius.

Temporal Scope

10.2.5 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be temporary (<1 year) and from the operational stage which would be expected to be long-term (15-60 years) to permanent (>60 years) in nature.

10.3 Baseline Characterisation Method

Desk Study

10.3.1 In order to establish the existing baseline (discipline) conditions in the study area, relevant data was reviewed and assessed. The data sets and associated sources can be summarised as follows:

- Kilgallen and Partners Consulting Engineers, Report on Site-Specific Flood Risk Assessment, DUB13-RP-00-C002-V0-PL-PIN, Issue PR1 (Technical Appendix 10.1)
- Technical Appendix 10.2: Pinnacle Consulting Engineers, Engineering Planning Report, DUB13-RP-00-C001-V0-WS3-PIN (Technical Appendix 10.2)
- Pinnacle Consulting Engineers, Foul and Surface Water Drainage Layout, Drawing No. 201 (Technical Appendix 10.3)
- Environmental Protection Agency (EPA) Online Environmental Mapping and Spatial Data[17] ;
- Office of Public Works (OPW) flood mapping data[18] (www.floodmaps.ie);
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports; and
- Strategic Flood Risk Assessment (SFRA) for South Dublin County Council[19] .

Field Study

10.3.2 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

10.4 Assessment Method

Methodology

Demolition and Construction Stage

10.4.1 The identification of likely significant effects during the demolition and construction stage was based on a review of the presence of potential receptors, a qualitative assessment of the sensitivity of the receptors, the identification of potential impact pathways and an assessment of the magnitude of the potential impacts.

10.4.2 The assessment of potential impacts and likely effects has, therefore, comprised the following approach:

- Identification and establishment of the sensitivity of water resource receptors on the basis of their use, proximity to the site, existing quality or resource value;
- Consideration of potential source-pathway-receptor' linkages;
- Evaluation of the magnitude of potential impacts to water quality and hydrology as a result of the introduction of the demolition and enabling works;
- Consideration of embedded mitigation measures integral to the proposed development;
- Classification of the significance of likely effects;
- Identification of additional mitigation measures to eliminate or reduce adverse effects, where considered necessary; and
- Re-assessment to conclude the significance of residual effects.

Operation Stage

10.4.3 The demolition and construction stage methodologies have been applied to the identification of potential significant effects during the operation stage. The assessment has also been informed by the Flood Risk Assessment and Foul and Surface Water Drainage Layout (see Technical Appendices 10.1 and 10.2), which have been undertaken to assess in more detail the flood risk and to inform the design of the proposed development, and associated mitigation strategies, in order to minimise any increase in flood risk to both on-site and off-site receptors and to the proposed development itself.

Cumulative Stage

10.4.4 The potential for cumulative impacts to arise from the combined effects of several existing or proposed developments in combination with the proposed development, on water resources and flood risk have been considered in the assessment.

10.5 Assessment Criteria

10.5.1 The assessment of significance of effect with regards to Water Resources and Flood Risk is based on professional judgement of the sensitivity of the receptor and the magnitude of effect.

10.5.2 The general criteria used to assess if an effect is significant or not, is set out in Chapter 2, further details are provided herein. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement

Receptor Sensitivity/Value Criteria

10.5.3 The sensitivity of receptors has been classified as low, medium or high in accordance with the criteria set out in Table 10-1.

Table 10-1: Receptor Sensitivity Criteria

Sensitivity	Criteria
Low	Feature of low quality and rarity, with potential for substitution or tolerant of some change: • Surface water quality classified by EPA as A3 waters or seriously polluted • Heavily engineered or artificially modified watercourses • No surface water abstractions for public or private water supplies

[17] The EPA Geoportal website (available at https://gis.epa.ie)

[18] OPWs national flood information portal, providing location specific access to flood risk and flood management information (available at https://www.floodinfo.ie/)

[19] RPS, 2016. Strategic Flood Risk Assessment for South Dublin County Council Development Plan 2016-2022

Table 10-1: Receptor Sensitivity Criteria	
Sensitivity	**Criteria**
	GSI groundwater vulnerability "Low" to "Medium" classification and "Poor" aquifer importance.
Medium	Feature of medium quality and rarity, with some potential for replacement and reasonably tolerant of some change: • Surface water quality classified by EPA as A2. • Salmonid species may be present in the watercourse which may be locally important for fisheries. • Abstractions for private water supplies. GSI groundwater vulnerability "High" classification and "Locally" important aquifer.
High	Feature of high quality and rarity, or with limited potential for replacement and highly sensitive to some change, e.g. • Receptor is of high environmental importance or of national or international value i.e. NHA or SAC. • Surface water quality classified by EPA as A1 and salmonid spawning grounds present. • Abstractions for public drinking water supply. GSI groundwater vulnerability "Extreme" classification and "Regionally" important aquifer

Impact Magnitude Criteria

10.5.4 The magnitude of impact has been classified as low, medium, or high, in accordance with the criteria set out in Table 10-2.

Table 10- 2: Impact Magnitude Criteria	
Magnitude of Impact	**Criteria**
Negligible	No perceptible alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.
Low	Small alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.
Medium	Medium alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.
High	Large alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.

Scale of Effect Criteria

10.5.5 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 10-3.

Table 10- 3: Scale of Effect Criteria			
Magnitude	**Sensitivity of Receptors**		
	Low	**Medium**	**High**
Negligible	Imperceptible	Imperceptible	Imperceptible/Not Significant
Low	Imperceptible	Imperceptible/Not Significant	Slight/Moderate
Medium	Imperceptible/Not Significant	Moderate	Moderate/Significant
High	Slight/Moderate	Moderate/Significant	Very Significant/Profound

10.5.6 Based on Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports[20] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

Nature of Effect Criteria

10.5.7 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

10.6 Assumptions and Limitations

10.6.1 The assessment has relied on data included within the Flood Risk Assessment (Technical Appendix 10.1) as well as publicly available data reported via the EPA online Environmental Mapping and Spatial Data Service and the OPW online Flood Mapping. It has been assumed that these datasets were correct at the time of reference.

10.7 Baseline Conditions

Existing Baseline

Existing Site

10.7.1 The site is predominantly greenfield and is understood to have historically been in agricultural use with a single residential property present in the northwest of the site and outbuildings and an area of hardstanding in the southeast of the site.

Existing Surface Water Features

10.7.2 The Baldonnel Stream crosses under Falcon Avenue and flows through the south of the site, entering the site in the southeast before meandering north-west and then leaving the site. Approximately 190 m downstream (west) it enters a short 0.6 m culvert, and approximately 300 m downstream it discharges to a long twin-pipe culvert. A visual assessment of the channel of the stream and the culverts reported in the FRA suggests that the twin-pipe culverts have a lower hydraulic capacity than the open channel sections. The Baldonnel Stream ultimately discharges to the River Griffeen and then to the River Liffey.

10.7.3 There are several small lakes and ponds in a golf course 200 m south-east.

[20] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

Surface Water Quality

10.7.4 The site is situated within the Liffey and Dublin Bay WFD Catchment, and the Liffy Sub-Catchment. Presently, the EPA classifies the Liffy sub-catchment as having a 'good' ecological status or potential and a 'Good' chemical surface water status.

10.7.5 The closest EPA monitoring stations are:

- Baldonnel Stream (RS09B090400) 400 m west of the site, downstream of Bolands Garage; and
- Griffeen (RS09G010200), located approximately 1.2 km west of the site.

10.7.6 The latest EPA biological assessment of surface water from the latter location indicated a score of Q3 (poor) in 1991. The main pressure preventing the achievement of 'Good Status' for the River Liffey WMU (Water Management Unit) identified by the EPA is diffuse agricultural pollution. As part of the River Basin Management Plan 2009-2015, the water quality of the Griffeen Lower was assessed. The overall water quality status obtained for the Griffeen Lower was 'Bad' which was due to its fish status and overall chemical status which each obtained a 'Bad' classification.

Existing Surface Water Drainage

10.7.7 There is not considered to be any existing engineered surface water drainage assets within the site, and none was identified in the FRA. There is an open ditch running along a portion of the western boundary that connects to the Baldonnel Stream.OPW and CFRAM Flood Mapping

10.7.8 The OPW online Flood Mapping service[21] which includes mapping prepared as part of the CFRAM programme does not indicate any records of historic flooding at the site. The closest instance of historic flooding is more than 1 km west and is not hydrologically connected to the site.

10.7.9 The majority of the site is shown in the mapping to be outside of the 'Low' fluvial flooding probability and is, therefore not predicted to be at risk of flooding during fluvial events with a 1 in 1,000 Annual Exceedance Probability (AEP). Only areas of the site directly adjacent to the Baldonnel Stream are indicated in the OPW mapping to be within an area of 'Low' fluvial flooding probability. A Low fluvial flooding probability designation represents the "*modelled extent of land that might be flooded by rivers in a very extreme flood event*". Low Probability flood events are indicated by the OPW to have a 1 in a 1000 AEP; i.e. they have a 0.1% chance of being exceeded in any year. The area of the site in the Low fluvial flood risk extent is very limited (<10 m from the stream).

10.7.10 The entire site is shown to be outside of the area of Medium fluvial flood probability (areas indicated by the OPW to have a 1 in a 100 AEP; i.e. land that could have a 1% chance of being flooded in any year).

10.7.11 The OPW mapping shows the 'Present Day' scenario (referred to as the Current Scenario in the Maps and Plans) which "were generated using methodologies based on historic flood data, without taking account of potential changes due to climate change". Flood level data is not provided by the OPW for the site.

10.7.12 The National Indicative Fluvial Mapping available in the OPW mapping indicates no potential flooding within the site.

SFRA Flood Mapping

10.7.13 Alternative mapping prepared as part of the SFRA for South Dublin County Council (SFRA Flood Zone Mapping Sheet 4) indicates the Baldonnel Stream channel through the site could be affected by the 0.1% AEP and 1.0% AEP flood events.

Hydraulic Modelling

10.7.14 A hydrological model was prepared as part of the FRA (Technical Appendix 10.1) to simulate flow patterns during the 1% and 0.1% (1 in 100 and 1 in 1,000) annual exceedance probability (AEP) rainfall events. Peak flood flows were estimated using statistical methods for ungauged small catchments and the responses of the catchment to these flows was modelled using the River and Flood Analysis module of the industry standard package Infrastructure Ultimate Design Suite produced by Autodesk. The hydrological modelling within this module is itself based on the HEC-RAS modelling software produced by the US Army Corps of Engineers peak flood flows were estimated using statistical methods for ungauged small catchments. The site was found to be not affected by either 1% or 0.1% AEP flood risk zones.

Flood Defences and Structures

10.7.15 The Baldonnel Stream flows through two parallel 0.6 m internal diameter culverts downstream of the western boundary of the site. There are further culverted sections downstream of this between the site and the River Griffeen.

Groundwater

10.7.1 As set out in Chapter 12: Ground Conditions, there are three main bedrock aquifer classifications in Ireland (regionally important, locally important and poor aquifers) and the bedrock aquifers underlying the site (Dinantian Limestones) are classified as Locally Important; i.e. an aquifer which is moderately productive only in local zones. It is also reported in Chapter 12: Ground Conditions that, during a 2022 ground investigation, groundwater strikes were recorded as either seepages or slow ingress. In the case of trial pits, groundwater was recorded between 1.80 m below ground level and 2.0 m below ground level. The groundwater strikes are typically associated with recorded stratum of grey sandy clayey angular gravel of possible weathered rock; and within stiff gravelly clay. In case of the boreholes, groundwater was recorded between 1.50 m and 1.90 m. The groundwater strikes are typically associated with recorded stratum of stiff to very stiff sandy silty and gravelly clay of glacial till deposits. Groundwater is likely to be in continuity with the Baldonnel stream which runs through the centre of the site and given this the groundwater flow direction is likely to be towards the north.

10.7.2 The WFD Groundwater Body underlying the site is the Dublin GWB (EU GWB Code: IE_EA_G_008), which currently has 'good' status and has a GWB risk score of 'not at risk' (2010-2015 WFD status). The GSI classifies the aquifer vulnerability underlying the site to be high (H), with the subsoils being of low permeability.

10.7.3 The site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA. There are no wells or springs within 1 km of the site and the closest being approximately 3 km southeast. There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or adjacent the site.

Future Baseline

10.7.4 Per the methodology set out in Chapter 2: EIA Process and Methodology, effects of the proposed development are to be assessed against a future baseline comprising the implementation of the July 2022 consented DUB-1 development. This development proposes improvements to the Baldonnel stream floodplain, as well as maintenance regime for all drainage features within the site and for regular inspection of drainage features immediately upstream and downstream of the site as part of the Site-Specific Flood Risk Mitigation Plan. The only other additional changes to the future baseline with regard to water resources and flood risk are associated with climate change. The FRA and surface water drainage strategy (which is included within the Engineering Planning Report) are provided in Technical

[21] OPW online flood mapping (available at https://www.floodinfo.ie/map/floodmaps)

Appendices 10.1 and 10.2 respectively and take account of potential for increased fluvial flood risk and increased rainfall rates associated with climate change.

Sensitive Receptors

10.7.5 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 10-4.

Table 10- 4: Summary of Sensitive Receptors

Receptor	Sensitivity
Surface Water Features Baldonnel Stream	Medium Baldonnel stream is heavily altered. Although the stream is classified as being of moderate WFD status, it is also given a biological assessment score of 'poor' downstream of the site.
Flood Risk (on-site or downstream terrestrial receptors within the catchment)	High The flood risk status of a site or receptor is considered to be of high sensitivity due to the potential implications of a flood event.
Groundwater	Medium The Dublin GWB underlying the site is of 'good status' and has a GWB risk score of 'not at risk', however the site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA.

10.7.6 Direct impacts on groundwater quality are scoped out of the subsequent assessment. Although groundworks and installation of foundations during the demolition and construction phase of the proposed development would involve an interaction with the on-site soils and water environment, the potential impacts are considered separately within Chapter 12: Ground Conditions. It is noted that demolition and construction works are to be undertaken in compliance with a CEMP which would be established and maintained by the contractors during the demolition and construction stage which will cover all potentially polluting activities and emergency response procedures. Chapter 12: Ground Conditions does not assess the potential for the proposed development to affect local recharge to the underlying aquifer. However, as the overall area of aquifer is large relative to the site area, the potential reduction in local recharge is considered in to have no potential for significant change in the natural hydrogeological regime and is therefore not considered further. However, the potential for localised disruption of groundwater is considered.

10.8 Assessment of Effects

Demolition and Construction Effects

10.8.1 The following effects on water resources and the water environment could arise during the demolition and construction stage of the proposed development:

- Contamination of Surface Water as a result of silt-laden runoff across the demolition and construction site and from stockpiles, polluting substances (e.g. fuels and chemicals) from accidental spillages and other wastes during general demolition and construction activity;
- Change in Surface Water Quality and Hydrodynamic Status (as a result of the proposed works/enhancements in the Baldonnel Stream floodplain);
- Disruption of Groundwater during construction excavations;
- Changes to Fluvial Flood Risk; and
- Water Supply and Foul Drainage During Construction.

Contamination of Surface Water

10.8.2 There are a range of embedded mitigation measures that are incorporated within the Proposed Development in order to reduce the potential for effects on the surface water environment. A project-specific Construction and Environmental Management Plan (CEMP) would be established and maintained by the contractors during the demolition and construction stage which would cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures. The measures identified in this section and in Chapter 12, and those provided in Chapter 5: Demolition and Construction, would be included in the CEMP.

10.8.3 Subsoil would be excavated to facilitate the proposed development. Such works would be carefully planned to ensure as much material is left in situ as possible. Reuse of on-site excavated soil and capping with hardstand will minimise any increase in aquifer vulnerability. Construction works will require local removal of soil cover where levelling of the site is required and its use for re-instatement elsewhere on the site. It is envisaged that any soil excavated will be retained on-site and reused as fill material or landscaping. Excavation works will be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil.

10.8.4 Stockpiles have the potential to cause negative impacts on and water quality through increased potential for sediment release to watercourses. The effects of soil stripping and stockpiling would be mitigated against through the implementation of an appropriate earthworks handling protocol during construction within the CEMP. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body.

10.8.5 The following procedures will be included in the CEMP in order to prevent any spillages of fuels to the Baldonnel Stream, or groundwater, and to prevent any resulting water quality impacts:

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures would be taken:
- Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;
- Pumps or valves would be fitted with a lock and would be secured when not in use;
- All bowsers to carry a spill kit;
- Operatives must have spill response training; and
- Drip trays used on any required mobile fuel units.
- In the case of drummed fuel or other potentially polluting substances which may be used during the demolition and construction stage the following procedures will be adopted:
- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they would be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

10.8.6 The aforementioned list of measures is non-exhaustive and would be included in the CEMP.

10.8.7 Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthworks operations will be carried out with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management, as set out in the CEMP, will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation.

10.8.8 Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any off-site impacts. All runoff will be prevented from directly entering into any water courses or drainage ditches.

10.8.9 Should any discharge of demolition or construction related water be required, discharge would be to foul sewer. Pre-treatment and silt reduction measures on-site would include a combination of silt fencing, settlement measures (e.g. silt traps, 20 m buffer zone between machinery and watercourses, off-site refuelling of machinery) and use of hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits.

10.8.10 Considering the embedded mitigation that would be specified within the CEMP, which in turn would be secured by means of an appropriately worded planning condition the effects would be of a low magnitude. Although the Baldonnel Stream passes through the south of the site, and is considered to be of Medium sensitivity, the likely effect would be only **Temporary, Imperceptible/Not Significant, Negative** (**Not Significant** in terms of EIA) and no further mitigation beyond that to be set out in the CEMP is necessary.

Change in Surface Water Quality and Hydrodynamic Status as a Result of Proposed Works in the Baldonnel Stream Floodplain

10.8.11 In order to reduce the potential effects of the proposed construction works in the floodplain on surface water quality and hydrodynamic status, mitigation is embedded within the design and within construction methodologies. It is proposed that the works would be carried out in line with the Irish Fisheries Guidelines on Protection of Fisheries During Construction Works and Adjacent to Waters, with appropriate protection measures to channel during construction works.

10.8.12 As described in the FRA, where the Baldonnel Stream crosses under the Falcon Avenue upstream of the site, this is through a twin-pipe culvert, each pipe 1400mm diameter. The proposed road crossing within the site is 20m downstream from the existing Falcon culvert. The initial designs considered within the FRA propose a box culvert to convey the Stream under the proposed crossing. The internal dimensions of the box culvert would be 1.4m in height and 3.5m in width such that it would have a significantly greater hydraulic capacity than that of the existing Falcon Avenue culvert.

10.8.13 Therefore, over the short term, improvements to the landscaping in the floodplain would be expected to result in a beneficial impact of low magnitude on the Baldonnel Stream (medium sensitivity) which equates to a **Temporary**, **Imperceptible/Not Significant**, **positive** effect i.e. **Not significant** in terms of EIA.

Effects on Groundwater during Construction Excavations

10.8.14 As set out previously, a ground investigation at the site encountered groundwater generally between 1.5m and 2.0m blow existing ground level. This groundwater is likely to be in continuity with the Baldonnel stream which runs through the south of the site. Given this, the groundwater flow direction is likely to be towards the south. Excavations could result in short-term changes to groundwater patterns. However, this is unlikely to lead to a significant change to hydrogeological conditions beyond the site boundary.

10.8.15 The proposed development would involve groundworks. This would therefore have an interaction with the on-site soils and water environment. Correct management of the excavations would be set out in the CEMP and would seek to minimise inflow of shallow/perched groundwater into any excavation. It is anticipated that water arising from excavations would be disposed of to the local sewer network if uncontaminated and following the removal of silt via settlement ponds or alternative sediment control measures.

10.8.16 Whilst the excavations and associated dewatering could result in a localised draw down of groundwater levels, given the scale of works relative to the total contributing catchment to the Baldonnel Stream, it is unlikely that the works would have a significant effect on overall groundwater contribution to the watercourse.

10.8.17 Therefore, it is assessed that the potential impact of the proposed development on groundwater flows (medium sensitivity) would be of negligible magnitude and the effect **Temporary, Imperceptible and Negative, i.e Not Significant** in terms of EIA.

Effects on Fluvial Flood Risk

10.8.18 The FRA assessed the site as not being affected by 1% or 0.1% AEP events. Changes to ground level as part of the proposed development would therefore not displace floodplain storage associated with fluvial flood risk.

10.8.19 The design of the proposed road crossing box culvert of the Baldonnel Stream would ensure that the hydrological capacity of the culvert is greater than that of the upstream culvert so that there is no restriction on flows and therefore, no effect on fluvial flood risk.

10.8.20 Therefore, the floodplain capacity of Baldonnel Stream would be unimpacted at all stages during construction such that the proposed works would result in low magnitude changes to the watercourse's floodplain capacity which would have low sensitivity on site, which equates to a **Temporary**, **Imperceptible** and **Neutral** effect i.e. **Not Significant** in terms of EIA.

Water Supply and Foul Drainage Capacity During Construction

10.8.21 As set out in Chapter 15: Material Assets, welfare facilities portable toilets would be required for the construction compound and workers. A temporary connection to the foul water drainage network may also be required to accommodate the site welfare facilities during construction. It will need to be confirmed that the network has sufficient available capacity for the wastewater discharges for the short-term demolition and construction stage. An alternative but less desirable option would be to collect and transport waste off-site.

10.8.22 Accordingly, foul drainage effects on the public sewerage network during the demolition and construction stage are considered to be **Temporary**, **Imperceptible** and **Neutral** i.e. **Not significant in terms of EIA**.

10.8.23 A temporary connection to the public mains water supply would be established for the construction phase. The water demand by site occupants during the construction phase will likely not be significant enough to affect existing pressures in the area. Effects associated with water supply during the demolition and construction stage are considered to be **Temporary**, **Imperceptible** and **Neutral** i.e. **Not Significant** in terms of EIA.

Operation Effects

10.8.24 The following potential impacts on water resources and flood risk could arise during the operation stage of the proposed development:

- Increased flood risk from the Baldonnel Stream;
- Surface Water Flood Risk: Increased surface water runoff volumes leading to flood risks off-site;
- Disruption of Groundwater: Potential to alter local groundwater flow paths and levels;
- Water Demand: Increase in water demand from the site to supply the new occupants of the proposed development; and
- Foul Sewer Capacity: Increase in discharge volumes of effluent to foul sewer.

Increased Flood Risk from the Baldonnel Stream

10.8.25 As set out previously, the site is not affected by either the 0.1% AEP and 1.0% AEP flood events. The proposed development and operation of the development are unlikely to change this fact unless there is blockage of the proposed crossing resulting in a backing up of the watercourse during a flood event.

10.8.26 As described previously, the Baldonnel Stream crosses under the Falcon Avenue through a twin-pipe culvert (each pipe 1400 mm diameter). The proposed road crossing is 20 m downstream from the Falcon Avenue culvert. A box culvert 1.4m in height and 3.5m in width is currently proposed under the crossing, which is a greater hydraulic capacity than the Park Road culvert. As noted in the FRA, to meet the requirements of the Office of Public Works (OPW) for granting Section 50 approval under the Arterial Drainage Act, culverts are typically required to have a minimum 300mm clearance between the 1% AEP water level and the soffit of the culvert. Because the box culvert will have 650mm clearance between the 1% AEP water level and the soffit level, it would meet and exceed OPW requirements.

10.8.27 As set out previously, a box culvert is proposed at the crossing. The design approach (which is not yet finalised) would need to ensures that the hydrological capacity of the culvert is greater than that of the upstream culvert so that there is no restriction on flows

10.8.28 In light of the existing upstream culvert, flood risk upstream of this location would be unaffected. Flood risk immediately upstream of the proposed box culvert would remain unaffected based on the assumption there is a sufficient hydrological capacity. With the positive impact of improvement to the Baldonnel stream in the form of wetland features and incorporated SuDS, overall, this would be considered a low magnitude impact on a high sensitivity receptor, and is a **long-term Positive, Slight/Moderate** impact and **Not Significant** in terms of EIA.

Surface Water Flood Risk

10.8.29 The FRA assessed that the site is not at risk of pluvial flood risk. Therefore, if unmitigated, the introduction of impermeable surfaces to the site would inhibit surface water infiltration and increase the discharge of surface water runoff compared to baseline levels.

10.8.30 Included in Technical Appendices 10.2 and 10.3, Pinnacle Consulting Engineers has produced a drainage design in compliance with the Greater Dublin Regional Code of Practice for Drainage Works and in accordance with the Irish Water Code of Practice. Additionally, the surface water drainage system for the proposed development is to comply with the Greater Dublin Strategic Drainage Study (GDSDS). Full compliance with GDSDS ensures the drainage system will have sufficient capacity to accommodate rainfall events up to 1% AEP (also taking int account the effects of climate change) without causing pluvial flood risk within the development and without leading to an increase in pluvial flood risk elsewhere.

10.8.31 The drainage strategy includes two attenuation ponds and a permeable paving sub-base to provide the required surface water attenuation, taking int account allowances for climate change. One pond will discharge to the Baldonnel Stream and the other attenuation pond and the permeable paving sub0base will discharge to the existing surface water sewer network. The outflow from the proposed development will be restricted by way of a Hydrobrake facility and will limit the total discharge to 2.8l/s, which is the calculated QBAR greenfield run-off rate.

10.8.32 With the implementation of the drainage strategy in compliance with the GDSDS, pluvial flood risk to the site would not be introduced and it is not expected that the proposed development would negatively impact on flood risk for downstream receptors and neighbouring sites. The proposed surface water management, which would include an allowance for climate change, would result in a positive impact of low magnitude on the flood risk status (High sensitivity) which equates to a **long-term Sight/Moderate, Positive** effect that is **Not significant** in terms of EIA.

Disruption of Groundwater: Potential to Alter Local Groundwater Flow Paths and Levels

10.8.33 No cuts greater than 1m are proposed based on the Pinnacle Consulting Engineers cut and fill information (sheet no. C126) with the exception of the retention ponds. Therefore, with ground levels not expected to decrease to elevations where groundwater is known to be present (1.5-2m below existing baseline ground level), groundwater flood risk at site is not expected increase. It is expected that foundations would require moderate scale excavations. However, it is also expected that the method of foundations would take account of the ground conditions and environmental considerations such that any long-term effects on groundwater flows (medium sensitivity) are therefore likely to be of low magnitude and the effect **long-term, Imperceptible/Not Significant, Negative** i.e. **Not Significant** in terms of EIA.

Water Demand and Foul Sewer Capacity

10.8.34 It is intended to serve the potable demand of the proposed development via connection off a 150mm diameter network water mains, as required. A Pre-Connection Enquiry application has been submitted to Irish Water in respect of the water supply and a response is still awaited at the time of writing. Assuming the applicant receives confirmation from Irish Water for potable and foul water, effects on water supply during the operation stage are considered to be **Permanent, Imperceptible** and **Neutral** i.e. **Not Significant**.

10.8.35 All foul connections and foul sewers are to comply with the requirements of the Irish Water specifications. The permanent foul connection to the wider network in Profile Park would be undertaken in consultation with Irish Water to ensure there is no impact on the network when the connection is made. Accordingly, foul drainage effects on the public sewerage network during the operation stage are considered to be **long term, Imperceptible** and **Neutral** i.e. **Not Significant** in terms of EIA.

10.9 Additional Mitigation

10.9.1 As explained in the FRA, all developments include an element of residual flood risk that must be addressed during their operational life. To address this residual risk, it is recommended that a Site-Specific Flood Risk Mitigation Plan be prepared implemented, in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities. This would apply throughout the operational life of the proposed development and include a maintenance regime for all drainage features within the site in addition to regular inspection of drainage features immediately upstream and downstream.

10.9.2 It was revealed in a CCTV survey that a culvert downstream had significant blockages that greatly reduce its capacity. The condition and size of the culvert downstream of the blockages is unknown and there is potential of the stream surcharging to the site in the event of a collapse. It is therefore recommended that an overflow be constructed which would allow discharge to the stream immediately downstream of Nangor Road. This overflow could discharge to existing surface water drainage in the Nangor Road subject to available capacity.

10.10 Enhancement Measures

10.10.1 No enhancement measures are proposed.

10.11 Assessment of Residual Effects

Demolition and Construction Residual Effects

10.11.1 As no additional mitigation would be required, the residual construction effects remain as reported in the assessment of effects section:

- The likely effect of contamination of surface water is likely to be only **Temporary** and **Imperceptible/Not Significant, Negative** (**Not Significant** in terms of EIA) and no further mitigation beyond that to be set out in the CEMP is deemed necessary;
- Over the short term, improvements to the watercourse and associated landscaping would be expected to result in a beneficial impact of low magnitude on the Baldonnel Stream (medium sensitivity) which equates to a **Temporary, Imperceptible/Not Significant, Positive** effect (**Not Significant** in terms of EIA) on surface water quality and hydrodynamic status of the Baldonnel. Stream.

- The potential impact of the proposed development on groundwater flows (medium sensitivity) would be of negligible magnitude and the effect **Temporary, Imperceptible, Negative** i.e. **Not Significant** in terms of EIA.
- The floodplain capacity would be unchanged during construction such that the proposed works in the floodplain would result in no impact to the already low flood risk status (High sensitivity) which equates to a **Temporary Imperceptible, Neutral** effect i.e. **Not Significant** in terms of EIA; and
- Effects on the public sewerage and potable water supply networks during the demolition and construction stage are considered to be **Temporary**, **Imperceptible** and **Neutral** i.e. **Not Significant** in terms of EIA.

Operation Residual Effects

10.11.2 The FRA (Technical Appendix 10.1) mentions all developments would involve some element of residual flood risk. The Baldonnel Stream is culverted downstream of the site and there are presently blockages that reduce the capacity of the culvert. The condition of the culvert downstream of the blockages is unknown and there may be a potential for the stream to surcharge in the event of the culvert being compromised although backing up of such flood waters would not be expected to reach the site due to the distance upstream.

10.11.3 To mitigate this risk, the FRA for the July 2022 DUB-1 consented development, considered part of the future baseline, recommended that consideration be given to the construction of an overflow which would allow such excess flows to bypass the culvert.

10.11.4 The July 2022 DUB-1 consented development Site-Specific Flood Risk Mitigation Plan included a maintenance regime for all drainage features within the site and for regular inspection of drainage features immediately upstream and downstream of the site. Procedures have also been put in place for temporary measures to divert waters from the stream around the downstream culverts in the event that inspections identify defects in the culvert or if waters are observed to be surcharging upstream of the culvert. Such that flood risk could be managed until remedial works to repair the culvert could be implemented. The proposed development would also benefit from these measures.

10.11.5 The Site-Specific Flood Risk Mitigation Plan and associated maintenance regime for the proposed development would ensure that the long-term residual operation effects would remain as reported in the assessment of effects section:

- The proposed landscaping improvements and SuDS would result in some long-term improvements to the Baldonnel Stream such that there would be a beneficial impact of low magnitude on the flood risk status (High sensitivity) which equates to a **long-term, Slight/Moderate, Positive** effect which would be **Not Significant** in terms of EIA.
- The proposed surface water management, which would include an allowance for climate change, would result in a positive impact of low magnitude on the flood risk status (High sensitivity) which equates to a **Long-term, Slight/Moderate, Positive** effect which would be **Not Significant** in terms of EIA.
- Any long-term effects on groundwater flows (medium sensitivity) would be likely to be of negligible magnitude and the effect **long-term, Imperceptible/Not Significant, Negative** i.e. **Not Significant** in terms of EIA; and
- It is understood that there is adequate capacity within the existing foul drainage and water main network to supply the proposed development. As such, effects during the operation stage are considered to be **long-term, Imperceptible** and **Neutra**l i.e. **Not Significant** in terms of EIA.

Summary of Residual Effects

Table 10-5 provides a summary of the outcomes of the Water Resources and Flood Risk assessment of the proposed development. Where **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 10-5: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Demolition and Construction								
Surface Water Receptors	Potential contamination as a result of silt-laden runoff across the demolition and construction site and potential for contaminants to be introduced to surface water by construction activities through leakages/spillages	None Required	Imperceptible/Not Significant	-	L	D	R	T
Surface Water Receptors	Direct impacts on surface water quality and hydrodynamic status as a result of construction works	None Required	Imperceptible/Not Significant	+	L	D	R	T
Groundwater Supply	Disruption of Groundwater during Construction Excavations	None Required	Imperceptible	-	L	D	R	T
Fluvial Flood Risk	Flood risk from the Baldonnel Stream	None Required	Imperceptible	+/-	U	D	R	T
Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Construction	None Required	Imperceptible	+/-	U	D	R	T
Operation								
Fluvial Flood Risk	Flood risk from the Baldonnel Stream	Site-Specific Flood Risk Mitigation Plan and associated maintenance regime	Slight/Moderate	+	L	D	IR	LT
Surface Water Flood Risk	Changes to flood risk as a result of changes to the surface water runoff regime of the site	None Required	Slight/Moderate	+	L	D	IR	LT

Table 10-5: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Groundwater	Potential to alter local groundwater flow paths and levels	None Required	Imperceptible/Not Significant	-	L	D	IR	LT
Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Operation	None Required	Imperceptible	+/-	L	D	IR	LT

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

10.12 Cumulative Effects

Intra-Project Effects

10.12.1 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

10.12.2 Consent would not be granted for any development that would increase flood risks off-site. Additionally, consent would not be granted to any surface water discharge from a proposed development if it would increase downstream flood risk. Discharge to sewer or to a fluvial watercourse would need to be restricted so that it provides betterment in terms of downstream capacity, taking account of predicted climate change. Because the proposed development would discharge at greenfield rates, there would be no detrimental impact on downstream flood risk. It is therefore reasonable to assume that any other development would similarly need to decrease flood risk and reduce pressures on downstream sewer or watercourse capacity such that any cumulative impact during the operation stage would be beneficial.

10.12.3 It is reasonable to assume that other schemes would similarly be required to demonstrate suitable surface water runoff management measures during construction in accordance with national and local policy, and that discharges of surface water would be subject to suitable treatment such that there would be no cumulative significant effects on downstream water quality during demolition and construction or operation. It would be expected to deliver improvements in respect of contamination, groundwater disruption, water demand and sewer capacity.

10.12.4 In light of this, it is unlikely that there would be any significant negative inter-project cumulative effects on flood risk or surface water quality resulting from the proposed development.

10.13 Summary of Assessment

Background

10.13.1 This chapter has assessed the potential water resources and flood risk effects arising from the demolition and construction and operation phases of the proposed development. The assessment of demolition and construction and operation stages has been undertaken taking into account the national and local guidance and regulations where applicable.

10.13.2 The site consists of undeveloped greenfield and one residential property. It is understood to have historically been agricultural in use. There is no evidence of existing drainage at the site other than an open ditch which runs along a portion of the western boundary, and the single property is assumed to have connections to septic tank. The FRA states that there is no evidence of standing groundwater. The Baldonnel Stream flows through the south of the site, entering in the southeast and flowing west. It flows under Falcon Avenue through a twin-pipe culvert upstream of the site and eventually enters a twin-pipe culvert further downstream beyond the site. A visual assessment of the channel of the stream and the culverts reported in the FRA suggests that the culverts will have a lower hydraulic capacity than the channel within the site so the restriction in flow caused by the upstream culvert (outside of the site demise) would reduce flood risk at the site, as confirmed in OPW mapping and hydraulic modelling.

10.13.3 The areas of the site which are in very close proximity to Baldonnel Stream are shown in the OPW mapping to have a 'Low' fluvial flooding probability, but this is not applicable to most of the site. Low Probability flood events are indicated by the OPW to have a 1 in a 1000 Annual Exceedance Probability (AEP); i.e. they have a 0.1% chance of being exceeded in any year. The site is shown to be entirely outside of the area of Medium fluvial flood probability (indicated by the OPW to have a 1 in a 100 AEP; i.e. they have a 1% chance of being exceeded in any year).

10.13.4 A hydrological model was prepared as part of the FRA (Technical Appendix 10.1) to simulate flow patterns during the 1% and 0.1% (1 in 100 and 1 in 1,000) annual exceedance probability (AEP) rainfall events. The site was found to be not affected by either 1% or 0.1% AEP flood events.

10.13.5 The bedrock aquifer underlying the site (Dinantian Limestones) is classified as 'Locally Important'; i.e. an aquifer which is moderately productive only in local zones. The site is not situated in a Groundwater Drinking Water Protection Area or Groundwater SPA. There are no wells or springs within 1 km of the site and the closest is approximately 3 km southeast and east of the site. There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or adjacent the site.

Demolition and Construction Effects

10.13.6 During demolition and construction, there is the potential for the following impacts on water resources and flood risk:

- Disruption or contamination of groundwater during construction excavations;
- Contamination of surface water as a result of silt-laden runoff across the demolition and construction site and from stockpiles, polluting substances (e.g. fuels and chemicals), accidental spillages and other wastes during general demolition and construction activity;
- Changes to surface water quality and hydrodynamic status as a result of the proposed works in the Baldonnel Stream floodplain;

10.13.7 Overall, when considering the embedded mitigation through the CEMP and the design of the proposed crossing of the stream, it is considered that the demolition and construction of the proposed development would **not give rise to significant effects** on water resources and flood risk.

Operation Effects

10.13.8 During operation, there is the potential for the following impacts on water resources and flood risk:

- Residual flood risk from the Baldonnel Stream due to culvert blockage;
- Increased surface water runoff volumes leading to increased surface water flood risks on-site and off-site;
- Some disruption to groundwater from small alterations to local groundwater flow paths and levels;
- Increase in water demand from the site to supply the new occupants of the proposed development; and
- Increase in discharge volumes of foul water effluent to foul sewer.

10.13.9 The proposed development includes a drainage strategy designed to mitigate any increase in surface water discharge and limit it to greenfield rates through attenuation methods including a new pond with a native wetland margin. This would result in no increase in pluvial flood risk. A Site-Specific Flood Risk Mitigation Plan would be prepared to set out measures required to maintain proposed surface water drainage and flood risk mitigation measures, and to indicate proposed response to flood incidents. This management of residual flood risk considered in the operation stage of development would result in a Slight Positive effect on flood risk at the site and for downstream receptors, and as such would be expected to give rise to Slight to Moderate Positive effects.

10.13.10 Improved landscaping and habitat setting of the Baldonnel Stream floodplain would also be expected to result in long term slight positive changes in terms of surface water quality and hydrodynamic status. As such, no significant effects are expected. Additionally, any long-term changes to groundwater flow paths, as well as to water supply and foul water assets, are expected to be **not significant**.

Cumulative Effects

10.13.11 Consent would not be granted for any development that might increase off-site flood risks. Consent would also not be granted to any surface water discharge from a proposed development if it would lead to increased downstream flood risk. For this reason, the overall scale of water resources and flood risk cumulative effects would be no greater than that of the proposed development in isolation. Therefore, it is **unlikely that there would be any significant negative cumulative effects** on flood risk or surface water quality.

11 ECOLOGY/BIODIVERSITY

11.1 Introduction

11.1.1 This chapter of the EIAR reports on the likely significant ecological effects to arise from the demolition and construction stage, and the operation stage of the proposed development.

11.1.2 The chapter describes the ecological policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely ecological effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

11.1.3 This chapter is supported by the following technical appendices in EIAR Volume 3:

- Appendix 8.1: Ecological Impact Assessment;
- Appendix 8.2: Appropriate Assessment Screening;
- Appendix 8.3: Biodiversity Management Plan.

11.1.4 The assessment has been informed by the following legislation, policies, and published guidance:

International Legislation:

- EU Habitats Directive 92/43/EEC[1];
- The Birds Directive 2009/147/EC[2];
- Environmental Liability Directive 2004/35/EC[3]; and
- Bern Convention[4].

National Legislation and Policy:

- The Wildlife Act 1976 (as amended)[5];
- EC (Birds and Natural Habitats) Regulations 2011 (amended 2015)[6];
- Flora Protection Order 2015[7];
- The EC (Water Policy) Regulations 2003[8]; and,
- The National Development Plan 2021-2030[9].

Local Policy:

- South Dublin Development Plan 2022–2028[10].

National guidance and industry standards:

- BS 42020:2013 Biodiversity[11]
- CIEEM Guidelines:
- Ecological Impact Assessment[12]
- Ecological Report Writing[13].

11.1.5 Further details are provided in EIAR Volume 3: Technical Appendix 8.1.

11.2 Assessment Scope

Technical Scope

11.2.1 The technical scope of the assessment has considered the following:

- Disturbance/injury/death of a protected species, both during the demolition and construction stage and the operation stage (including lighting impacts and effects on bats);
- Disturbance of breeding birds;
- Direct loss of habitats;
- Reduction in local biodiversity;
- Damage to local ecology through pollution;
- Chemical or physical pollution of aquatic habitats and consequent effects on designated sites;
- Accidental trapping of mammals in excavations;
- Habitat fragmentation and loss of ecological connectivity / commuting pathways for wild and protected species;
- Loss or damage of habitats as a result of dust and other air- or water-borne pollution; and
- Potentially consequent population-level effects of these impacts on wild species and groups including bats, badger, otter, birds, herptiles, invertebrates and flora.

11.2.2 The following have been considered in terms of embedded mitigation:

- Standard practice pollution prevention measures (see Chapter 5: Demolition and Construction Environmental Management);
- Preparation and implementation of a Site Waste Management Plan (SWMP);
- Environmental monitoring during the demolition and construction stage, to be specified in a Construction Environmental Management Plan (CEMP) as outlined in Chapter 5 Demolition and Construction Environmental Management;
- Cowling of lighting, plus reduction of light levels to 1 lux where possible Setting of noise and vibration limits, with associated monitoring during the Demolition and Construction stage (see Chapter 5: Demolition and Construction Environmental Management).

Spatial Scope

11.2.3 The study area for international/European statutory designations has been determined by means of reference to published guidance (Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities[14]), and covers an area of 15 km from the site boundary. The study area for national

[1] Council Directive 92/43/EEC of 21 May 1992 on The Conservation of Natural Habitats and of Wild Fauna and Flora.
[2] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the Conservation of Wild Birds.
[3] Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on Environmental Liability with Regard to The Prevention and Remedying of Environmental Damage.
[4] The Council of Europe's Convention on the Conservation of European Wildlife and Natural Habitats, 1979. Bern.
[5] Government of Ireland. The Wildlife Act 1976 (as amended). Available from: http://www.irishstatutebook.ie/eli/1976/act/39/enacted/en/html#zza39y1976
[6] Government of Ireland. S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).
[7] Government of Ireland. S.I. No. 356/2015 - Flora (Protection) Order, 2015.
[8] Government of Ireland. S.I. No. 722/2003 - European Communities (Water Policy) Regulations 2003.
[9] Government of Ireland, 2021. National Development Plan 2021-2030 (last updated 4 October 2021) [online]. Available at: https://www.gov.ie/en/publication/774e2-national-development-plan-2021-2030/ [Accessed on 23/08/2022].
[10] South Dublin County Council. South Dublin Development Plan 2022-2016. Dublin. South Dublin County Council
[11] British Standards Institution, 2013. BS 42020:2013 Biodiversity. Code of practice for planning and development. London. BSI
[12] Chartered Institute of Ecology and Environmental Management, 2019. Guidelines for the Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Winchester. CIEEM
[13] Chartered Institute of Ecology and Environmental Management, 2017. Guidelines on Ecological Report Writing. Winchester. CIEEM
[14] Environment, Heritage and Local Government, 2009. Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities. Available at www.npws.ie

statutory designations follows standard professional practice as accepted in a number of similar planning applications. This covers an area of 5 km from the site boundary. The study area for protected and priority species has been derived by reference to CIEEM Guidelines for Preliminary Ecological Appraisal[15] and consideration of their ecological characteristics, and covers an area of 2 km from the site boundary. The study area for the Fossitt habitat survey has been determined with reference to CIEEM Guidelines for Preliminary Ecological Appraisal[16]. All of the above also consider the scale and nature of the proposed development.

11.2.4 Sensitive receptors in the study area include;

- Rye Water Valley/Carton Special Area of Conservation (SAC; 5.88 km north-west of the site),
- Glenasmole Valley SAC (8.05 km south-east of the site),
- Wicklow Mountains SAC (9.76 km south-east),
- Red Bog, Kildare SAC (14.44 km south-west),
- South Dublin Bay SAC (15.21 km east),
- North Dublin Bay SAC (17.90 km north-east),
- Wicklow Mountains Special Protection Area (SPA; 12.88 km south-east),
- South Dublin Bay and River Tolka SPA (14.81 km east),
- North Bull Island SPA (19.71k m east),
- Grand Canal proposed Natural Heritage Area (pNHA; 1.39 km north) and
- Liffey Valley pNHA (4.57 km north).

Temporal Scope

11.2.5 The assessment has considered impacts arising during the demolition and construction stage, which would be expected to be temporary(less than a year) in nature, and from the operation stage which would be expected to be long-term (15 to 60 years) to permanent in nature (i.e. more than 60 years).

11.3 Baseline Characterisation Method

Desk Study

11.3.1 In order to establish the existing baseline (discipline) conditions in the study area, relevant data was reviewed and assessed. The data sets and associated sources can be summarised as follows:

- National Biodiversity Data Centre (NBDC); and
- National Parks and Wildlife Service (NPWS).

11.3.2 Further details are provided in EIAR Volume 3: Technical Appendix 8.1.

Field Study

11.3.3 A Fossitt habitat survey was undertaken on 20 July 2022 by Eiméar Rose Cunningham. This encompassed all lands within the red line boundary and up to 50 m outside, where access allowed.

11.3.4 Bat activity surveys were completed in August 2022. Two dusk emergence surveys; one of the shed in the south-west and one of the house in the north-west of the site were undertaken by Eiméar Rose Cunningham, Dylan Donoghue and Dara Dunlop on the 3 August and the 30 August 2022. All bat surveys were designed based on Bat Conservation Trust guidance[16].

11.3.5 Further details are provided in EIAR Volume 3: Technical Appendix 8.1.

[15] CIEEM, 2017. Guidelines for Preliminary Ecological Appraisal. Available at www.cieem.net

11.4 Assessment Method

Methodology

Demolition and Construction Stage

11.4.1 The evaluation of ecological receptors is based upon CIEEM guidelines , which suggests that the value or potential value of an ecological resource or feature (for example a habitat type, species or ecosystems) should be determined within a geographical context (e.g. rare at a local level).

11.4.2 At the demolition and construction stage, the impact assessment process involves:

- Identifying and characterising impacts and their effects, giving regard to embedded mitigation;
- Incorporating measures to avoid and mitigate negative impacts and effects;
- Assessing the significance of any residual effects after additional mitigation;
- Identifying appropriate compensation measures to offset significant residual effects; and
- Identifying opportunities for ecological enhancement.

11.4.3 Potential impacts and effects have been assessed in accord with the following proposals for the demolition and construction stage:

11.4.4 Treelines and hedgerows at the boundaries of the site would be retained and enhanced where possible. Additional planting of trees and shrubs would occur within the riparian strip alongside the stream channel, with native shrubs adding shelter and food sources for a variety of different species. Trees and shrubs planted would be managed in line with the Biodiversity Management Plan (BMP) (see Technical Appendix 8.3) and the landscape proposals.

11.4.5 Planting on the banks of the Baldonnel stream would include aquatic species such as yellow iris and fool's watercress.

11.4.6 Areas of wet wildflower meadow would be created in the north-west of the site. This area would also act as an attenuation pond, in periods of heavier flow. Species in this area have been selected in order to thrive in a wetter area and create habitat for wetland species, particularly invertebrates.

11.4.7 All habitats on site would be managed sensitively, to promote biodiversity. Further detailed are outlined in the BMP (Technical Appendix 11.3).

Operation Stage

11.4.8 Assessment methods used for the operation stage follow the same process as demolition and construction stage with only slight variation.

11.4.9 Impact assessment during the operation stage emphasises the potential for disturbance of wild and protected species, including through lighting impacts on bats, rather than the wider range of potential impacts during the demolition and construction stage.

Cumulative Stage

11.4.10 The potential for cumulative impacts to arise from the combined effects of a number of existing or proposed developments in combination with the proposed development on ecology has been considered as set out in Chapter 2: EIA Process and Methodology.

11.5 Assessment Criteria

11.5.1 The assessment of significance of effect with regards to Ecology is based on professional judgement of the sensitivity of the receptor and the magnitude of effect.

[16] Collins, J. (ed.), 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines. 3rd edition. London. The Bat Conservation Trust

11.5.2 The general criteria used to assess if an effect is significant or not, is set out in Chapter 2: EIA Methodology, further details are provided herein. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement

Receptor Sensitivity/Value Criteria

11.5.3 The sensitivity of receptors has been classified as low, medium or high in accordance with the criteria set out in Table 11-1.

Table 11-1: Receptor Sensitivity Criteria

Sensitivity	Criteria
International	An internationally designated site (e.g. SAC, SPA, Ramsar site). Site meeting criteria for international designations or qualifying species of a SAC where there is connectivity. Species present in internationally important numbers (>1% of biogeographic populations).
National	A nationally designated site (NHA, pNHA), or sites meeting the criteria for national designation or qualifying species where there is connectivity. Species present in nationally important numbers (>1% Irish population).
Regional	Species present in regionally important numbers (>1% of regional population). Areas of valuable habitat falling below criteria for selection as an NHA (e.g. areas of ancient woodland larger than 0.25 ha).
Local	Areas of ancient woodland smaller than 0.25 ha. Areas of habitat or species considered to appreciably enrich the ecological resource within the local context, e.g. species-rich flushes or hedgerows. Baldonnel Stream.
Negligible	Usually widespread and common habitats and species. Features falling below local value are not normally considered in detail in the assessment process.

Impact Magnitude Criteria

11.5.4 The magnitude of impact has been classified as low, medium, or high, in accordance with the criteria set out in Table 11-2.

Table 11-2: Impact Magnitude Criteria

Magnitude of Impact	Criteria
Negligible	Minimal impact on a very small scale; effects not dissimilar to those expected within a 'do nothing' scenario.
Low	Would lead to a not significant effect upon the feature or its viability. For example, less than 10% habitat loss, damage or gain.
Medium	Would lead to a slight to moderate effect on the feature or its viability. For example, between 10 - 20% habitat loss, damage or gain.
High	Would lead to a significant effect on the feature or its viability. For example, more than 20% habitat loss, damage or gain.
Very High	Would cause the loss of the majority of a feature (>80%) or would be sufficient to damage a feature enough to affect its viability immediately. For positive effects, would e.g. create over 80% habitat gain.

Scale of Effect Criteria

11.5.5 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 11-3.

Table 11-3: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors				
	Negligible	Local	Regional	National	International
Negligible	Imperceptible	Imperceptible	Imperceptible / Not Significant	Imperceptible / Not Significant	Imperceptible / Not Significant
Low	Imperceptible	Imperceptible	Not Significant / Slight	Moderate	Moderate
Medium	Imperceptible	Not Significant	Moderate	Significant	Significant
High	Imperceptible	Slight	Significant	Significant	Very Significant / Profound
Very High	Imperceptible	Slight	Significant	Very Significant / Profound	Very Significant / Profound

11.5.6 In line with CIEEM guidance, the duration of effects should be defined in relation to the lifespan of each organism in question. The criteria used to determine duration of effects under this approach is provided in Table 11-4.

Table 11-4: Effect Duration Criteria

Magnitude	Criteria
Momentary	Effects lasting from seconds to minutes.
Short-term	Up to (but not including) 5 years; for short-lived species, a single season or part of a season.
Medium-term	From 5 years up to (but not including) 15 years; for short-lived species, a single generation.
Long-term	From 15 years up to (and including) 30 years; for short-lived species such as invertebrates, multiple generations.
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken here as 30+ years), except where there is likely to be substantial improvement after this period in which case the category Long-term may be more appropriate.

Table 11-4: Effect Duration Criteria	
Reversible	Effects that can be undone, for example through remediation or restoration.

11.5.7 Based on Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports[17] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

Nature of Effect Criteria

11.5.8 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

11.6 Assumptions and Limitations

11.6.1 The assessment has relied on data provided by NBDC and NPWS. It has been assumed that these data sets have been reported correctly.

11.6.2 At the time of the Fossitt survey, access was only permitted within the landownership boundary. The areas of land which formed the Ecological Study Area (ESA) which were not within the landownership boundary were viewed from field boundaries, with the use of binoculars, where needed. Areas that could not be assessed have not been mapped in the habitat map (Please see Figure 8-1 below). It is considered that the limited access to areas of land directly adjacent to the Proposed Development boundary has not unduly impacted upon the findings of the habitat or species scoping surveys.

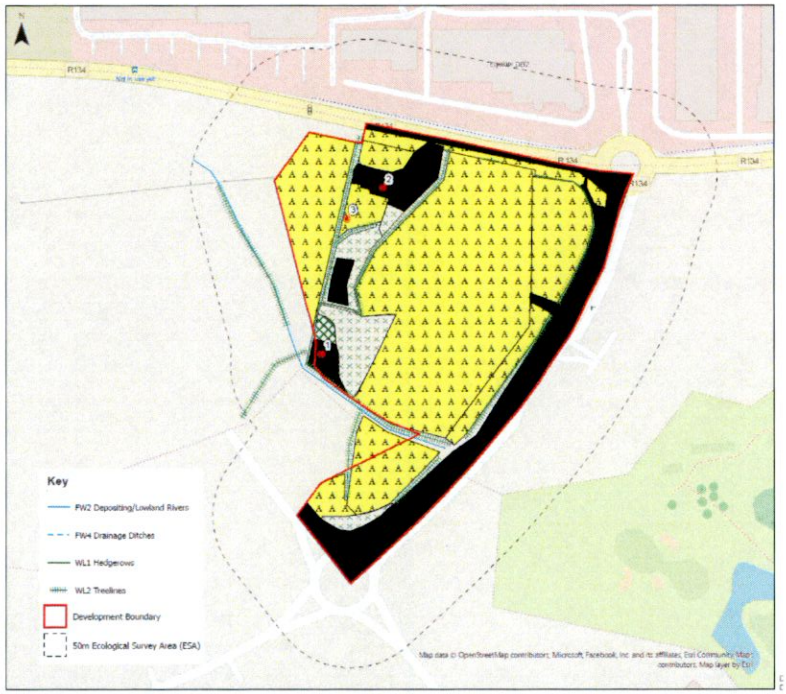


Figure 11-1: Ecological Study Area

11.6.3 Results of the survey undertaken are representative of the time that surveying was undertaken.

11.6.4 The absence of specific species records returned during the data search does not necessarily indicate absence of a species or habitat from an area, but rather that these have not been recorded or are perhaps under-recorded within the search area.

11.6.5 A Fossitt habitat survey does not aim to produce a full botanical or faunal species list or provide a full protected species survey, but enables competent ecologists to ascertain an understanding of the ecology of the site in order to:

- Identify broadly the nature conservation value of a site and preliminary assess the significance of any potential impacts on habitat/species recorded; and/or
- Confirm the need and extent of any additional specific ecological surveys that are required to identify the true nature conservation value of a site.

[17] Environmental Protection Agency, 2022. Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

11.7 Baseline Conditions

Existing Baseline

Desk Study

11.7.1 The data search conducted via the NBDC identified the presence of 5 bat species/groups, hedgehog, badger, otter, pine martin, four invasive mammals (grey squirrel, rabbit, greater white-toothed shrew and American mink), 25 bird species and four invasive plant species within 2 km of the site. Six SACs, four SPAs and two pNHAs were identified within the relevant national and international search areas. Further details are presented in EIAR Volume 3: Technical Appendix 11-1.

Fossitt Habitat Survey

11.7.2 A Fossitt habitat survey was undertaken on the 20 of July 2022 by Eiméar Rose Cunningham. This encompassed all lands within the red line boundary and up to 50 m outside, where access allowed.

11.7.3 Survey work was carried out in accordance with Fossitt habitat survey guidance[18]. Habitats were mapped electronically in the field in order to produce a habitat map (Figure 2, Appendix A of Appendix 8.1).

11.7.4 The following habitat types were identified within the site:

- Buildings and artificial surfaces (BL3);
- Recolonising bare ground (ED3);
- Depositing/lowland rivers (FW2);
- Amenity grassland (improved) (GA2);
- Scrub (WS1);
- Hedgerows (WL1) and
- Treelines (WL2).

Species Scoping Survey

11.7.5 A species scoping survey was carried out to identify the presence of protected species, or the potential of the site to support protected species. The aim of the survey was to provide an overview of the site and to determine whether any further survey work was required.

11.7.6 No additional protected species surveys were undertaken at this time.

11.7.7 Table 11-5 below outlines the relevant habitat and field signs that indicate the potential presence of protected or notable species within the ESA.

Table 11-5: Indicative Habitats and Field Signs of Protected Species

Taxon	Indicative Habitat(s)	Field Signs (In Addition to Sightings)
Bats	Roosts – trees, buildings, bridges, caves, etc. Foraging areas – e.g. parkland, water bodies, streams, wetlands, woodland edges and hedgerow. Commuting routes – linear features (e.g.) hedgerows, water courses, tree lines).	In or on potential roost sites: droppings stuck to walls, urine spotting in roof spaces, oil from fur staining round roost entrances, feeding remains (e.g. moth wings under a feeding perch).
Badger Meles meles	Found in most rural and many urban habitats.	Excavations and tracks: sett entrances, latrines, hairs, well-worn paths, prints, scratch marks on trees.
Otter Lutra lutra	Watercourses.	Holts (or dens), prints, spraints (droppings), slide marks into watercourses, feeding signs (e.g. fish bones).
Birds	Trees, scrub, hedgerow, field margins, grassland, buildings.	Nests, droppings below nest sites (especially in buildings of trees), tree holes.
Common lizard Zootoca vivipara	Rough grassland, log and rubble piles.	Sloughed skins.

Weather Conditions

11.7.8 Table 11-6 describes the weather conditions at the time of survey giving air temperature (°C), wind speed (Beaufort force), cloud cover (percentage) and precipitation.

Table 11-6: Indicative Habitats and Field Signs of Protected Species

Survey Date	Temperature (°C)	Wind (Beaufort)	Cloud Cover (%)	Precipitation
20/07/2022	17-19°C	3	60	None
03/08/2022	15-17°C	2	50	None
31/08/2022	14-16°C	1	20	None

Additional Surveys

11.7.9 Bat emergence surveys were carried out on each of the buildings proposed to be demolished. The emergence surveys did not reveal any bats emerging from or entering the house or shed. A total of 141 bat passes were recorded during the emergence survey of the shed, and 14 bat passes were recorded during the emergence survey of the house. The overall picture suggested is one of low numbers of commuting/foraging bat, primarily around the south of the site near the shed.

11.7.10 An assessment of benthic macroinvertebrates was completed on the section of the Baldonnel stream as part of the July 2022 DUB-1 permitted development. No notable species were identified during this stream assessment. The dominant species were freshwater shrimp (*Gammarus* sp.) and stone clingers (*Baetidae* sp.). Macroinvertebrate biodiversity was considered to be low.

11.7.11 Receptors identified through undertaking surveys and a desk study are as follows:

- Nine internationally designated sites (SACs and SPAs) – International sensitivity;
- Two pNHAs – National sensitivity;
- Baldonnel stream – Local sensitivity;
- Other habitats – Negligible to Local sensitivity;
- Bats – Negligible to Local sensitivity;
- Badger – Negligible sensitivity;
- Otter (population not connected to European sites) – Negligible sensitivity;
- Hedgehog – Negligible sensitivity;
- Other mammals – Negligible sensitivity;
- Birds – Negligible to Local to sensitivity;

[18] Fossitt, J.A., 2000. A Guide to Habitats in Ireland.

- Herptiles (amphibians and reptiles) – Negligible sensitivity;
- Terrestrial and aquatic invertebrates – Negligible sensitivity; and
- Flora – Negligible sensitivity.

Future Baseline

11.7.12 At the year of completion, biodiversity enhancement measures as proposed under the July 2022 DUB-1 permitted development would be implemented. The existing groundcover of this area (currently primarily improved agricultural grassland) will be replaced by a mix of wet grassland, wildflower meads and native woodland. Existing hedgerows will be enhanced, and new hedgerow created. Therefore, the future baseline of terrestrial habitats will be an improvement upon the existing baseline.

11.7.13 There will be riparian planting along the banks of the Baldonnell stream, providing food and shelter for aquatic species, which will in turn support species such as birds and bats. Herptile hibernaculum, and bird and bat boxes will be present within the site, providing shelter for local species, improving the biodiversity of the current site.

Sensitive Receptors

11.7.14 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 11-7.

Table 11-7: Summary of Sensitive Receptors

Receptor	Sensitivity
South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA	International
Proposed Natural Heritage Areas (Grand Canal pNHA and Liffey Valley pNHA)	National
Baldonnel stream	Local
Other habitats on site	Negligible to Local
Bats	Negligible to Local
Birds	Negligible to Local
Badger	Negligible to Local

11.7.15 Based on the baseline characterisation, the following receptors have been scoped out of the subsequent assessment:

- Rye Water Valley/Carton SAC: this international site has no connectivity with the site; (see EIAR Volume 3: Technical Appendix 8.2);
- Glenasmole Valley SAC: this international site has no connectivity with the site;
- Wicklow Mountains SAC: this international site has no connectivity with the site;
- Red Bog, Kildare SAC: this international site has no connectivity with the site;
- Wicklow Mountains SPA: this international site has no connectivity with the site; (see EIAR Volume 3: Technical Appendix 8.2);
- Otter: negligible sensitivity;
- Hedgehog: negligible sensitivity (common and widespread in Ireland);
- Other mammals: negligible sensitivity;
- Herptiles: negligible sensitivity;
- Terrestrial and aquatic invertebrates: negligible sensitivity;
- Flora: negligible sensitivity; and
- Invasive species: no invasive species identified within the site boundary or in the immediate vicinity.

11.7.16 Please note that EIAR Volume 3: Technical Appendix 8.1 considers impacts and effects for the species/groups scoped out above. This highlights that there would be long-term positive effects for a number of species and groups. It also ensures legal responsibilities towards protected species are met.

11.8 Assessment of Effects

Demolition and Construction Effects

Designated Sites of the South Dublin Bay

11.8.1 Due to a lack of suitable habitat within the site, it is considered highly unlikely that any species associated with Natura 2000 sites would be present on site.

11.8.2 There is hydrological connectivity between the site and the South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA. All of this connectivity is roughly 28 km downstream via the Baldonnell stream which flows adjacent to the western site boundary and along the southern boundary within the Site and feeds into the River Liffey. However, embedded avoidance measures (including the following of all relevant pollution prevention guidelines to prevent pollutants including hydrocarbons and silt entering the watercourse (Chapter 10: Water Resources and Flood Risk)) reduces the likelihood of negative impact. Given this and the distances and dilution factors involved (negligible), predicted effects on designated sites of the South Dublin Bay (International) during demolition and construction would be **short-term Imperceptible/Not Significant** and **Negative** in nature and **Not Significant** in terms of EIA.

Proposed Natural Heritage Areas (Grand Canal pNHA and Liffey Valley pNHA)

11.8.3 Both the Grand Canal pNHA and Liffey Valley pNHA are hydrologically connected to the site via the Baldonnell stream. As outlined above, embedded avoidance measures (including the following of all relevant pollution prevention guidelines to prevent pollutants including hydrocarbons and silt entering the watercourse (Chapter 10: Water Resources and Flood Risk)) reduces the likelihood of negative impact. Given this and the distances and dilution factors involved (negligible), predicted effects on designated sites of the Grand Canal and Liffey Valley pNHA (National) during demolition and construction would be **Short-Term, Imperceptible/Not Significant** and **Negative** in nature and **Not Significant** in terms of EIA.

Baldonnel Stream

11.8.4 Potential impacts arising during the demolition and construction phase include indirect loss or damage of the Baldonnel stream as a result of dust and other air- or water-borne pollution and the construction of the proposed culvert beneath the internal road which crosses the Baldonnel Stream. As the demolition and construction stage would adhere to all relevant legislation and best practice construction and pollution prevention methods, this is expected to cause only negligible impact upon the locally sensitive Baldonnel stream. Effects would be **Short-Term, Imperceptible and Negative** in nature and **Not Significant** in terms of EIA.

Terrestrial Habitats

11.8.5 The proposed development would also require the removal of trees (local) and amenity grassland habitat (negligible). These habitats are abundant in the surrounding area, and it is considered that the small amount of habitat loss would be of low magnitude. Effects would be **Short-Term Imperceptible and Negative** in nature and **Not Significant** in terms of EIA. Effects for the demolition and construction

stage are not considered permanent for habitats or species owing to enhancements that would be implemented during the operation stage.

Bats

11.8.6 Demolition within the current site includes the demolition of one former residential property and one outbuilding. Both these buildings have been surveyed for the presence or likely absence of roosting bats (local). No bats roosts were identified. The majority of the site is comprised of amenity grassland; this habitat offers sub-optimal foraging habitat for bat species due to the limited number of prey species present. In total, 162 m of hedgerow (or 62% of the total surveyed hedges) would need to be removed to facilitate the construction of the proposed development. The loss of these habitats under the proposed development footprint would not lead to a significant reduction in foraging habitat for local bats. Hedgerows and treelines provide suitable habitat for foraging and commuting bats. The proposal involved the removal of 72 trees located in the treeline adjacent to the residential property. Treeline removal proposed would not lead to a significant reduction in foraging habitat for local bats, given the abundance of similar habitat in the surrounding landscape, and the poor quality of this habitat on site. This is because the site is currently subjected to high amounts of artificial light from neighbouring similar developments and streetlighting. The increased amount of artificial light has the potential to reduce the suitability of this habitat to commuting and foraging bats. Low levels of bat activity were recorded (low). **Short-Term, Imperceptible, Negative** effects on bats are predicted during the demolition and construction stage which are **Not Significant** in terms of EIA.

Badger

11.8.7 Habitats on site are suitable to support badger (local), however no badger setts, or evidence of badger was identified on site during the site surveys. Given that badgers are a highly mobile species and new setts may be built prior to demolition and construction, there is the potential for the disturbance of badger during the demolition and construction phase of the proposed development. During the demolition and construction phase, the proposed development can cause undue stress in a number of ways. Installation of security fencing or hoarding can disrupt badger paths and cut off foraging areas within a clan's territory. Excavations can destroy badger setts, and any excavations lefts overnight can trap badgers. The magnitude of impact on badgers during the demolition and construction stage is anticipated to be low. **Short-Term Imperceptible, Negative** effects on badger are predicted during the demolition and construction stage which are **Not Significant** in terms of EIA.

Birds

11.8.8 Main impacts on bird species from developments include direct loss or deterioration of habitats, and indirect habitat loss as a result of displacement by disturbance. Swallows were observed flying in and out of potential nesting sites within the garage of the residential home and in the shed at the south-west of the site (local sensitivity).

11.8.9 In the absence of mitigation, there is potential for loss of breeding attempts in and adjacent to the site if demolition and construction works are undertaken between the months of April – October. The effect may continue beyond a single bird generation, but is expected to be sufficiently small for the local population to recover relatively soon. The magnitude of impact for the commoner species during the demolition and construction stage is anticipated to be low, but for birds of conservation concern the impact could be medium. However, due to the Local sensitivity of the site's bird assemblage, overall effects during this stage would be **Short-Term, Imperceptible to Not significant, Negative** and **Not Significant** in terms of EIA.

Operation Effects

11.8.10 Designated Sites of the South Dublin Bay

11.8.11 Possible longer-term effects of the proposed development on the South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA (International sensitivity) could arise. This would be via the indirect loss of habitat due to water-borne pollutants entering the stream on and adjacent to the site. However, with embedded pollution prevention/mitigation measures included in the proposed development design, it is unlikely that any waterbird or wetland bird would be affected by the proposed development via habitat loss. Potential long-term imperceptible/not significant, negative effects would be anticipated from pollution.

11.8.12 However, these are not considered likely to be permanent owing to the proposed stream enhancements for the proposed development and the implemented stream enhancements as part of the July 2022 DUB-1 permitted development. The proposed stream enhancement measures would be considered likely to improve the Baldonnel Stream ecologically over time, mitigating any negative effects downstream. **Permanent, Imperceptible Neutral** effects would therefore be expected overall which are **Not Significant** in terms of EIA.

Baldonnel Stream

11.8.13 The landscape masterplan by KFLA Architects includes the planting of a wetland wildflower mix, wildflower meadow mix, berms and woodland on site. Substantial enhancements are proposed for the Baldonnel stream (local sensitivity), and would be in place for the entire operation stage. These measures are outlined in Appendix 8.3: Biodiversity Management Plan. These are expected to be high (over 20%) (high magnitude), leading to a **Permanent, Slight Positive** ecological effect which is **Not Significant** in terms of EIA.

Terrestrial Habitats

11.8.14 Gains would be forecast to be below 10% in terrestrial habitat terms (negligible sensitivity). This is because the majority of the site would be occupied by the proposed buildings. The operation stage would therefore be expected to lead to a **Permanent, Imperceptible, Positive** effect on other habitats which are **Not Significant** in terms of EIA.

Bats

11.8.15 To retain dark zones for commuting bats, lighting would be cowled in order to direct artificial light from retained hedgerows which are currently used by bats (local) to commute and forage. The lighting plan would be consistent with the adjacent July 2022 DUB-1 permitted development.

11.8.16 The landscape masterplan and BMP (EIAR Volume 3: Technical Appendix 11.3) also include the planting of native tree, shrub, and wildflower species. These would attract insects and provide foraging opportunities for bats, enhancing the situation over the current agricultural context. The magnitude of impact on bats during operational stage is anticipated to be low.Overall effects would be **Permanent, Imperceptible, Positive** for bats which are **Not Significant** in terms of EIA.

Badgers

11.8.17 Habitats on site suitable for supporting badger (local sensitivity), would be subject to a slight raise in disturbance (of negligible to low magnitude) during the operation stage. However, the creation of invertebrate-rich habitats would provide suitable foraging habitats for this species throughout the lifetime of the development (low magnitude). The overall magnitude of impact on badgers during the operational stage is anticipated to be low. **Permanent, Imperceptible, Positive** effects on badger are predicted during the operational stage, which are **Not Significant** in terms of EIA.

Birds

11.8.18 During the operation stage disturbance may be raised slightly, but the creation of invertebrate-rich habitats would provide a suitable food source for many bird species (local) throughout this stage. The magnitude of impact on birds during the operational stage is anticipated to be low. This is considered likely to result in a **Permanent, Imperceptible, Positive** impact on this Local to Negligible sensitivity receptor which is **Not Significant** in terms of EIA.

11.8.19 Further details of all impacts and enhancements predicted during the operation stage can be found in EIAR Volume 3: Technical Appendices 11.1 and 11.3.

11.9 Additional Mitigation

Demolition and Construction Stage

11.9.1 No significant effects are predicted, and consequently no additional mitigation is required in terms of EIA. Please note that EIAR Volume 3: Technical Appendix 8.1 refers to mitigation to meet legal obligations for Negligible-/ Local to Negligible-sensitivity receptors.

Operation Stage

11.9.2 No significant effects are predicted. Consequently, no additional mitigation is required in terms of EIA.

11.10 Enhancement Measures

11.10.1 Enhancements to the Baldonnel stream, terrestrial habitats and (as a consequence) protected species are proposed. These have already been described in part above under a consideration of effects during the operation stage. Full details of enhancements are given in EIAR Volume 3: Technical Appendix 8.3.

11.11 Assessment of Residual Effects

Demolition and Construction Residual Effects

11.11.1 As no additional mitigation would be required, the residual demolition and construction effects remain as reported in the assessment of effects section.

Operation Residual Effects

11.11.2 As no additional mitigation would be required, the residual demolition and construction effects remain as reported in the assessment of effects section.

Summary of Residual Effects

11.11.3 Table 11-8 provides a summary of the outcomes of the Ecology assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

Table 11-8: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Demolition and Construction								
South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the	Pollution	None required	Imperceptible/Not Significant	-	L	I	IR	St
North Bull Island SPA								
Grand Canal pNHA and Liffey Valley pNHA	Pollution	None required	Imperceptible/Not Significant	-	L	D	IR	St
Baldonnel stream	Pollution	None required	Imperceptible	-	L	D	IR	St
Terrestrial habitats	Habitat loss	None required	Imperceptible	-	L	D	R/IR	St
Terrestrial habitats	Pollution	None required	Imperceptible	-	L	I	R	St
Bats	Commuting and foraging habitat loss	None required	Imperceptible	-	L	D	R	St
Badger	Disturbance / destruction of setts	Pre-construction badger survey	Imperceptible	-	L	D	R	St
	Accidental trapping within excavations	All excavations should be securely covered, or a suitable means of escape provided at the end of each working day.						
Birds	Disturbance / destruction of nest	Pre-construction breeding bird survey (Only if works are undertaken between March and August) No demolition of buildings within the swallow summer breeding season April – October. Pre-demolition check of building for nesting birds.	Imperceptible to Not-significant	-	L	D	IR	St
	Habitat loss as a result of displacement by disturbance	None required						
Operation								
South Dublin Bay and River Tolka SPA	Pollution Ecological enhancement	None required	Imperceptible	+/-	L	I	IR	P

Table 11-8: Summary of Residual Effects

Grand Canal pNHA and Liffey Valley pNHA	Pollution Ecological enhancement	None required	Imperceptible to Not-significant	+/-	L	I	IR	P
Baldonnel stream	Ecological enhancement	None required	Slight	+	L	D	R	P
Terrestrial habitats	Ecological enhancement	None required	Imperceptible	+	L	D	R	P
Bats	Disturbance through lighting	None required	Imperceptible	+	L	D	R	P
Badger	Foraging habitat enhancement	None required	Imperceptible	+	L	D	R	P
Birds	Foraging habitat enhancement	None required	Imperceptible	+	L	D	R	P

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

11.12 Cumulative Effects

Intra-Project Effects

11.12.1 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

11.12.2 Table 8.9 provides a summary of the likely inter-project cumulative effects resulting from the proposed development and the cumulative developments.

Table 11-8: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
SD20A/0283 Microsoft - Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 SD20A/0121 UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22	No	All effects during Demolition and Construction stage of proposed development are imperceptible or not significant	No	All effects during Operation stage of proposed development are imperceptible, not significant and/or positive – therefore no negative cumulative effects

Table 11-8: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
VA06S.308585 UBC Properties - Grange Castle South Business Park, Dublin 22 SD17A/0377 Digital Reality Trust - Profile Park, Baldonnell, Dublin 22, D22 TY06 SD18A/0134 Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 SD20A/0295 (amendment to SD18A/0134) Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 VA06S.309146 Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22. SD21A/0167 Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 SD21A/0186 Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 SD21A/0217 Digital Netherlands VIII B.V ABP Ref: VA06S.312793 Vantage Data Centers Dub 11 Limited				

Table 11-8: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22.				

Demolition and Construction Cumulative Effects

11.12.3 It has been concluded that, with embedded mitigation measures included in the proposed development, it is likely that there would be no significant cumulative effects on designated sites or any other ecological feature in combination with any other development during these stages.

Operation Cumulative Effects

11.12.4 It has been concluded that, with embedded mitigation measures included in the proposed development, it is likely that there would be no significant negative cumulative effects on designated sites or any other ecological feature in combination with any other development during the operation stage.

11.13 Summary of Assessment

Background

11.13.1 This chapter has detailed the potential ecology effects due to the construction and operation development stages of the proposed development. The assessment of demolition, construction and operation stages has been undertaken taking into account the relevant national and local guidance and regulations.

11.13.2 The desk-based assessment identified six Special Areas of Conservation (SACs) and three Special Protection Areas (SPA) within 15km of the site boundary. Within 5km of the site boundary there are two proposed Natural Heritage Areas (pNHAs). The site has a hydrological connection with South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA via the Baldonnel stream and the River Liffey.

11.13.3 Seven habitat types were identified within the site during a Fossitt habitat survey undertaken in July 2022. The main habitat types recorded within the site is Amenity Grassland (GA2). The lands directly under and adjacent to the proposed development are considered to be of low ecological value.

11.13.4 Bat surveys did not reveal any bats emerging from or entering the house or shed. Low levels of commuting/foraging bat use of the site by three common Irish species were recorded overall.

Demolition and Construction Effects

11.13.5 During demolition and construction works, there may be disturbance of protected species or breeding birds, loss of habitats, habitat damage though air- or water-borne pollutants, accidental trapping of mammals in excavations, and habitat fragmentation and loss of commuting routes for wild mammals. These have the potential to lead to effects on protected species populations and one internationally designated site. However, considering the importance and sensitivity of these designated sites, habitats and species, and embedded mitigation measures designed into the proposed development, these effects are considered to be short-term, **Imperceptible** and **Not Significant** in terms of EIA.

11.13.6 Overall, it is considered that demolition and construction of the proposed development would result in a negative but **Imperceptible** effect on ecology and identified receptors. As such, it would **not give rise to Significant Effects** on ecology in terms of EIA.

Operation Effects

11.13.7 During the operation stage, pollution to aquatic habitats and disturbance of bats through lighting are expected. However, the residual effects would be expected to be imperceptible for the local bat population, and imperceptible and neutral for badgers and for the designated sites of the Dublin Bay.

11.13.8 The proposed landscape masterplan includes a range of landscape enhancements including those to the Baldonnel Stream, the planting of a wetland wildflower mix, wildflower meadow mix, berms and woodland on site. Substantial enhancements are proposed for the wildlife and the stream, leading to positive effects for habitat interest and for species groups including birds and those associated with the stream.

11.13.9 Overall, it is considered that the operation stage would result in a permanent **Slight, Positive** effect on ecology and identified receptors. It would therefore **not give rise to Significant Effects** on ecology in terms of EIA.

Cumulative Effects

11.13.10 No significant effects are predicted on ecology as a result of the proposed development alone in either the demolition and construction or the operation stage so there is **no potential for cumulative effects**

11.13.11

12 GROUND CONDITIONS

12.1 Introduction

12.1.1 This chapter of the EIAR reports on the likely significant ground condition effects to arise from the demolition and construction stage and the operation stage of the proposed development.

12.1.2 The chapter describes the ground condition policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely ground condition effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

12.1.3 This chapter is supported by the following technical appendices in EIAR Volume 3:

- Technical Appendix 12.1: IGSL Ltd, 2022. Data Center Project 3 Profile Park – Ground Investigation Report Factual; and
- Technical Appendix 12.2: Ramboll UK Limited, 2022. Vantage Data Centers DUB13, Dublin. Contaminated Land Interpretative Report.

12.1.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - Water Framework Directive (WFD) (2000/60/EC)1;
  - Environmental Quality Standards (EQS) Directive (2008/105/EC)2 (as amended)3;
  - Priority Substances Directive (2008/105/EC)4;
- National Legislation and Policy:
  - European Communities Environmental Objectives (Groundwater) Regulations 20105;
  - Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements' (Institute of Geologists of Ireland (IGI), 2013)6;
  - Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (National Roads Authority (NRA), 2009)7;
  - Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (Environmental Protection Agency (EPA), 2013)8; and
  - Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites (EPA, 2007)9.

12.1.5 For human health assessments from impacts to soil, there are no statutory thresholds in Ireland for the assessment of soil contamination. For human health, the EPA recommends the use of Generic Assessment Criteria (GAC), based on the UK Environment Agency Contaminated Land Exposure Assessment (CLEA) model, either produced by the UKEA itself (known as Soil Guideline Values (SGV)) or values generated using the CLEA model by reputable third-party organisations. Where GAC have not been published or if practitioners do not use human health GAC publications, values should be generated by appropriately qualified and experienced professionals using the CLEA model for consistency with the EPA approach.

12.1.6 The 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' indicates that values for screening of the impact on groundwater may come from several sources, including the European Communities Environmental Objectives (Groundwater) Regulations 2010, the EPA's Groundwater Threshold Values (GTV), the EPA's Interim Guideline Values (IGV) or relevant Environmental Quality Standards (EQS). The latter guidelines are used when considering a surface water receptor.

12.1.7 There are no provisions to create a contaminated land database in the Republic of Ireland (RoI) and since contaminated land regulations have not yet been enforced. It is unlikely that there is a dedicated contaminated land officer at South Dublin County Council (SDCC), however, most counties have an Environmental Department responsible for waste management; environmental enforcement; litter control; pollution control; environment education and awareness; and water quality.

12.2 Assessment Scope

12.2.1 There is no statutory definition of 'contaminated land' in the RoI, and in contrast to the UK, there is no framework within which the regulatory agencies are required to undertake an assessment of contaminated sites or create a register of contaminated land. Furthermore, there are currently no Irish standards in relation to the clean up or rehabilitation of contaminated land.

12.2.2 The 'Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites' (2007) established a risk based approach for soil and groundwater assessment and remediation in line with the UK Environment Agency's document 'Model Procedures for the Management of Land Contamination: Contaminated Land Report No. 11 (CLR 11) – Note CLR 11' (2004) , now replaced in the UK by 'Contaminated Land Risk Management' (2020) guidance. In 2013, the EPA published 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (e.g. large scale industrial activities, large petrol storage facilities, waste sites).

12.2.3 As there is no published or formalised technical guidance relating to the assessment of ground contamination (including controlled waters) effects, professional judgement, experience and best practice methods have therefore been drawn upon to assess the significance of the potential ground contamination (including controlled waters) effects of the proposed development. The assessment has taken account of all applicable legislation, guidance and policy as previously outlined.

Technical Scope

12.2.4 The potential pollutant linkages and contamination impacts for both the demolition and construction stage and the operation stage of the proposed development have been assessed.

[1] European Union, 2000. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Document 32000L0060.
[2] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[3] European Union, 2013. Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy Text with EEA relevance. Document 32013L0039.
[4] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[5] Government of Ireland, 2010. European Communities Environmental Objectives (Groundwater) Regulations 2010. S.I. No. 9 of 2010.
[6] Institute of Geologists of Ireland (IGI), 2013. Guidelines for the preparation of the Soils, Geology and Hydrogeology chapters of an Environmental Impact Assessment Report (EIARs). Published 30 April 2013. IGI.
[7] National Roads Authority (NRA), 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. NRA.
[8] Environmental Protection Agency (EPA), 2013. Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. EPA.
[9] EPA, 2007. Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites. EPA.

12.2.5 The technical scope of the assessment includes the potential for existing contamination to be present within the soil and shallow groundwater on the site and the risks to human health and the water environment waters associated with the potential presence and mobilisation of existing contamination.

12.2.6 Accordingly, the following potential pollutant linkages, which have the potential to present an unacceptable risk, have been considered:

- Exposure of construction workers to contaminated soil;
- Generation of dust and potentially contaminated dusts, including asbestos;
- Exposure of construction workers to ground gases;
- Exposure of construction workers to contaminated groundwater (if present);
- Mobilisation of contamination in surface water and groundwater through excavations and foundation works, including those for the underground fuel storage tanks;
- Mobilisation of site materials and pollutants during rainfall events;
- Changes in ground level as a result of earthworks and cut and fill activities may increase vulnerability of the underlying bedrock aquifer;
- Contaminants introduced by construction activities through leakages/spillages; and
- Loss of agricultural land.

12.2.7 During the operation stage there would be no interaction between the proposed development and deep groundwater beneath the site. As such, deep groundwater has not been assessed for the operation stage.

Spatial Scope

12.2.8 The study area is defined as that within a radius of up to 2 kilometres (km) from the site boundary. The study area has been used to identify potential historical land uses which may have contributed to contamination issues associated within the site; as well as potentially sensitive land uses in the wider surrounding area that could be impacted if existing contaminants were mobilised as a result of the proposed development.

Temporal Scope

12.2.9 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be temporary (less than a year) in nature; and from the operation stage which would be expected to be long term (15 to 60 years) to permanent (> 60years) in nature.

12.3 Baseline Characterisation Method

Desk Study

12.3.1 In order to establish baseline geology and soil conditions in the study area, relevant data was reviewed and assessed. Data was also obtained from the following sources:

- Geological Society of Ireland (GSI)[10] - online Public Viewer mapping , which includes Geohazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping;
- Teagasc soil and subsoil database[11];
- EPA website mapping and database information[12]; and
- National Parks and Wildlife Services (NPWS) – Protected Site Register[13].

Field Study

12.3.2 An intrusive ground investigation was undertaken between July and August 2022 by IGSL to characterise the ground of the site. The factual results of this investigation are reported within Appendix 12.1 of EIAR Volume 3.

12.3.3 Interpretation of the IGSL data is provided in Appendix 12.2 of EIAR Volume 3.

12.4 Assessment Method

Methodology

Demolition and Construction Stage

12.4.1 The identification of likely significant effects during the demolition and construction stage was based on a review of the presence of potential receptors, a qualitative assessment of the sensitivity of the receptors, the identification of potential impact pathways and an assessment of the magnitude of the potential impacts.

12.4.2 The assessment of potential impacts and likely effects has, therefore, comprised the following approach:

- Identification and establishment of the sensitivity of receptors on the basis of their use, proximity to the site, existing quality or resource value;
- Consideration of potential source-pathway-receptor linkages;
- Evaluation of the magnitude of potential impacts from potential contamination as a result of the introduction of the proposed development;
- Consideration of embedded mitigation measures integral to the proposed development;
- Classification of the significance of likely effects;
- Identification of additional mitigation measures to eliminate or reduce residual effects, where considered necessary; and
- Re-assessment to conclude the likely significance of residual effects.

Operation Stage

12.4.3 The demolition and construction stage methodology has been applied to the identification of likely significant effects during the operational stage.

Cumulative Stage

12.4.4 With respect to potential inter-cumulative effects, the assessment reviews the potential effects on geology and soils of the cumulative development (through review of project details for potential effects on geology of their sites and locality) and discusses whether and how any likely effects of the proposed development may interact with them, resulting in a cumulative effect.

12.5 Assessment Criteria

12.5.1 The criteria used to assess if an effect is significant or not in terms of EIA, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the

[10] Geological Survey Ireland, 2021. Data and Maps [online]. Available at: https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx (Accessed on 15/09/2022).
[11] Teagasc, 2017. County Soils Maps [online]. Available at: https://www.teagasc.ie/crops/soil--soil-fertility/county-soil-maps/
[12] Environment Protection Agency, 2021. Maps [online]. Available at: https://gis.epa.ie/EPAMaps/
[13] National Parks and Wildlife Service, 2020. Information [online]. Available at: https://www.gov.ie/en/organisation-information/09575-national-parks-and-wildlife-service/

duration of the effect, the geographical extent of the effect and the application of professional judgement.

12.5.2 Although there is no framework or Irish standards in relation to the assessment of risks associated with contamination, often the UK framework is adopted. This framework allows for the categorisation of risks and is undertaken in terms of consequence (i.e., severity of risk) and probability (i.e., likelihood of the risk being realised), which are combined to produce an overall classification of the risk of harm occurring. Whilst this classification is not directly translatable into the EIA process, the principles and land use scenarios from the framework have been used to allocate criteria that can be used in EIA.

12.5.3 The human health criteria, set out in Tables 12-1 and 12-2, have been based on that principle for the assessment of risks associated with contaminated land. Criteria for surface and groundwater have been based on a variety of sources including Water Framework Directive (WFD) Protected Area designations, GSI and EPA aquifer classifications.

Receptor Sensitivity/Value Criteria

12.5.4 The sensitivity of receptors has been classified as low, medium or high in accordance with the criteria set out in Table 12-1.

Table 12-1: Receptor Sensitivity/Importance Criteria

Sensitivity	Criteria (Examples)
Low	Human health: low sensitivity land use such as commercial or industrial.
	Surface water: • Has no or minimal ecosystem present; • Does not form or supply water to a designated site; • Provides low/no amenity value; • Is not used as a commercial or private water supply; • Is substitutable in short-term; and • Does not form part of a designated fishery.
	Groundwater: • Poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu). • Is classified as having low aquifer vulnerability; • Does not supply baseflow to local rivers; • Resource is such that there is some potential for substitution; • Is classified by the EPA as not being at risk; • Is not located within a groundwater source protection area (SPA); • Is not used as a commercial or private water supply; • Does not supply a groundwater dependent terrestrial ecosystem (GWTE); • No hazardous substances recorded within the aquifer; and • Is not threatened by, or sensitive to, saline intrusion.
Medium	Human health: medium sensitivity land use such as public open space.
	Surface water: • Has an ecosystem that has low sensitivity to water quality or quantity changes; • Provides amenity value on a local basis; • Is used as a water supply for industrial, commercial or agricultural purposes; • May be substitutable in the long-term; and • Is or forms part of a cyprinid fishery.
	Groundwater: • Is a locally important aquifer. These are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). • Is classified as having low or intermediate aquifer vulnerability; • Contributes some baseflow to local rivers; • May be substitutable in the long-term; • Is classified by the GSI as probably not being at risk; • Is located within a groundwater SPA (source catchment area); • Provides water for agricultural or industrial use with limited connection to surface water; • Supplies a GWTE that has species that are not protected or listed. They are abundant/common and not critical for GWDTE functions; • Shows a downward trend in hazardous substances; • Is potentially at risk from or sensitive to saline intrusion; and • Is extracted such that extraction could potentially put water balance at risk.
High	• Human health: high sensitivity land use such as schools or residential without private gardens.
	Surface water: • Has an ecosystem that has moderate sensitivity to water quality or quantity changes; • Supports protected aquatic flora and fauna of national importance; • Is or supplies water to nationally designated sites (e.g. National Park or Nature Reserve); • Is regularly used for recreation (where water immersion sports are practiced regularly) and commercial navigation, important on a local or regional basis; • Is used as a local water supply for potable water supply purposes; • Is not substitutable in the short- or long-term; • Is or forms part of a salmonid fishery; and • Is a designated Shellfish water.
	Groundwater: • Is a regionally important aquifer. These are subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). • Regionally important aquifer with high vulnerability; • Contributes some baseflow to regionally important rivers; • Is not substitutable in the short- or long-term; • Is classified by the GSI as being probably at risk; • Is located within a groundwater SPA (outer catchment); • Provides water for a private water supply or locally important industrial, commercial or agricultural purposes; • Provides locally important resource or supports aquatic ecosystems; • Shows a stable pattern of hazardous substances; • Quality is sensitive to or likely to be threatened by saline intrusion; and • Is extracted such that extraction is putting water at risk.
Very High	Human health: very high sensitivity land use such as allotments or residential with private gardens.

Table 12-1: Receptor Sensitivity/Importance Criteria	
Sensitivity	**Criteria (Examples)**
	Surface water: • Has an ecosystem that has high sensitivity to water quality or quantity changes; • Supports nationally or internationally protected species or supplies a site that has these characteristics; • Is or supplies water to internationally designated sites (e.g. Ramsar sites); • Is a major commercially significant navigational or recreational water body (where water immersion sports are practiced regularly); • Is used as a regional water supply for potable water supply purposes; • Is not substitutable in the short- or long-term; and • Is or forms part of a salmonid fishery.
	Groundwater: • Is a regionally important aquifer. These are subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). • Regionally important aquifer with high vulnerability; • Provides significant baseflow to rivers; • Is not substitutable in the short- or long-term; • Is classified by the GSI as being at risk; • Is located within a groundwater SPA (inner catchment); • Provides water for a public water supply or regionally important industrial, commercial or agricultural purposes; • Supports aquatic ecosystems incorporating protected species; • Shows an upward trend in hazardous substances; • Is subject to saline intrusion causing damage to quality of the groundwater; and • Is extracted such that extraction is putting water balance at severe risk.

Impact Magnitude Criteria

12.5.5 The magnitude of impact has been classified as low, medium, or high, in accordance with the criteria set out in Table 12-2.

Table 12.2: Impact Magnitude Criteria	
Magnitude of Impact	**Criteria**
Low	Human health: • Contaminant concentrations substantially below relevant screening criteria as detailed in Appendix 12.2 of EIAR Volume 3; • Resulting exposure to contamination is unlikely to represent significant harm or significant potential of significant harm (SPOSH) to receptors; and • No requirement for specific control measures to reduce risks to human health and/or make land suitable for intended use.
	Surface water: • Small alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters (refer to Chapter 10: Water Resources and Flood Risk).
	Groundwater: • Water quality/quantity within screening levels and unlikely to affect most sensitive receptors; • Localised changes in groundwater levels or quality but no appreciable change in wider groundwater regime; and • Short-term changes that would recover in the short- to medium-term.
	Buildings: • Damage to buildings or property easily repairable as part of normal maintenance routines.
Medium	Human health: • Contaminant concentrations are below relevant screening criteria as detailed in Appendix 12.3 of EIAR Volume 3; • Significant contamination is unlikely with a low risk to human health; and • Best practice measures can be required to minimise risk to human health.
	Surface water: • Medium alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters (refer to Chapter 10: Water Resources and Flood Risk).
	Groundwater: • Non-compliance with water quality/quantity standards on a short-term basis; • Localised changes in groundwater levels or quality with small-scale measurable changes in wider groundwater regime but no significant impact on local private water supplies; and • Change in water body but not enough to change its WFD status.
	Buildings: • Damage to buildings or property requiring investment in excess of normal maintenance routines.
High	Human health: • Contamination levels exceed background levels and relevant screening criteria as detailed in Appendix 12.3 of EIAR Volume 3 with potential for significant harm to human health; and • Control/remediation measures are required to reduce risks to human health and/or make land suitable for intended use.
	Surface water: • Large alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters (refer to Chapter 10: Water Resources and Flood Risk).
	Groundwater: • Non-compliance with water quality/quantity standards on a long-term basis; • Measurable changes in groundwater levels or quality in wider groundwater regime with significant impact on local private or public water supplies; and • Changes in quantity or quality that result in a reduction in WFD status.
	Buildings: • Significant or material damage to buildings or property.

Scale of Effect Criteria

12.5.6 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 12-3.

Table 12-3: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors			
	Low	Medium	High	Very High
Low	Imperceptible	Imperceptible/Not Significant	Slight/Moderate	Moderate
Medium	Imperceptible/Not Significant	Moderate	Moderate/Significant	Significant/Very Significant
High	Slight/Moderate	Moderate/Significant	Very Significant/Profound	Profound

12.5.7 Based on Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports[14] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

Nature of Effect Criteria

12.5.8 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

12.6 Assumptions and Limitations

12.6.1 The assessment relied on data which was provided within public domain. It has been assumed that the data within the report is correct and up-to date.

12.6.2 The field data comprising soil quality was collected for the site by IGSL. It has been assumed that the data sets within the IGSL report have been reported correctly.

12.6.3 In absence to groundwater data for the site, groundwater data for the adjacent development (DUB-1) immediately west of the site has been used.

12.7 Baseline Conditions

Existing Baseline

Current and Historical Use

12.7.1 The site currently consists of mostly relatively flat agricultural land, with the land surrounding the site comprising a mixture of agricultural, commercial and industrial uses. A residential property is situated in the north-west of the site, and outbuildings are present in the south-west of the site. There is a raised embankment along the eastern boundary.

12.7.2 The site is situated within Profile Park area, with various data centre developments within the vicinity of the site. The site is bound by New Nangor Road in the north, and Falcon Avenue (access road) along the south-eastern site perimeter. The nearest residential area is located approximately 730 m north-east of the site, comprising of terraced houses with gardens.

12.7.3 Historically, the site was occupied by undeveloped fields, likely used for agriculture. By 1958, single residential dwelling had been developed in the north-west of the site, and by 1968 multiple outbuildings had been developed in the west and south-west. A single (gravel) track was noted in 1991 running from the north of the site to the outbuildings in the south-west. The track was overgrown with vegetation by 2018. The residential property and the outbuildings currently remain on site.

Geology

12.7.4 According to the Geological Society of Ireland, the site is anticipated to be underlain by (in sequence) Quaternary Glacial Till Deposits, and the Lucan Formation which comprises dark grey to black limestone and shale (also known as Dinantian (Upper Impure) Limestone or Calp Limestone). It is also anticipated that topsoil and Made Ground will be present within the site.

12.7.5 The following ground investigation conditions were identified in the site-specific ground investigation undertaken by IGSL in 2022. The ground investigation comprised 10 trial pits, and 6 cable percussive holes which were followed-on with a rotary core rig. The boreholes and the trial pits were spread across the site, within readily accessible areas. Figure 12-1 illustrates the borehole and trial pit locations.

Figure 12-1 Site Investigation Borehole / Trial Pit Location Plan (extracted from IGSL 2022 Report)

12.7.6 The ground investigation has revealed the ground conditions at the site to typically comprise:

- TOPSOIL across the site, apart from the gravel track in the south-west of the site;
- Glacial Till of firm grey sandy gravelly CLAY / SILT with occasional cobbles;
- Glacial Till of stiff to very stiff dark brown sandy silty gravelly CLAY with occasional cobbles;

[14] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

- Variably weathered rockhead recovered as dark grey sandy clayey angular GRAVEL within the trial pits; and
- Bedrock consisting of dark grey and black LIMESTONE with thin horizons of fissile SHALE or MUDSTONE.

12.7.7 Published GSI mapping indicates faults to be present to the south and north-west of the site but not within the site boundary.

12.7.8 The GSI Public Viewer was reviewed to identify sites of geological heritage for the site and surrounding area. There are no recorded geological heritage sites on the site and there is no evidence of any geological heritage site which could be considered suitable for protection from the proposed development. Likewise, there are no identified geological heritage sites in the SDCC Development Plan 2016-2022 associated with the site.

Hydrogeology

12.7.9 The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well yield (m^3/d; cubic meters per day), specific capacity ($m^3/d/m$; cubic meters per day per m depth) and groundwater throughput (mm^3/d; cubic millimeters per day). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division comprises regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

12.7.10 The bedrock aquifers underlying the site according to the GSI National Draft Bedrock Aquifer Map (see earlier reference to GSI – online Public Viewer mapping) are classified as Dinantian Limestones (Calp). The GSI has classified this aquifer as Locally Important (Ll), i.e., an aquifer which is moderately productive only in local zones.

12.7.11 During the IGSL 2022 ground investigation, the groundwater strikes were recorded as either seepages or slow ingress in TP06 to TP10, and in RC/BH-01, RC/BH-03 and RC/BH-06. In the case of trial pits, groundwater was recorded between 1.80 m below ground level (in TP07 and TP09) and 2.0 m below ground level (in TP06, TP08 and TP10). The groundwater strikes are typically associated with recorded stratum of grey sandy clayey angular gravel of possible weathered rock (in TP07 to TP09); and within the stiff gravelly clay in TP10. In case of the boreholes, groundwater was recorded between 1.50 m (in RC/BH-03) and 1.90 m (in RC/BH-06). The groundwater strikes are typically associated with recorded stratum of stiff to very stiff sandy silty and gravelly clay of glacial till deposits.

12.7.12 The groundwater is likely to be in continuity with the Baldonnel Stream which runs through the southern portion of the site, flowing from east to west. Given this, the groundwater flow direction is likely to be towards the stream.

12.7.13 There is no evidence of springs or karstification in this area according to the GSI Karst database[10].

Groundwater Quality Status and Groundwater Bodies

12.7.14 With reference to the WFD, the Groundwater Body (GWB) underlying the site is the Dublin GWB (EU GWB Code: IE_EA_G_008), which under WFD is of 'good status'. The risk score is currently under review, however, in previous cycle the GWB risk score was marked as 'not at risk' (2013-2018 WFD status).

12.7.15 The GSI currently classifies the aquifer vulnerability underlying the site to be high (H) with the subsoils being of low permeability.

12.7.16 The site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA and there are no wells or springs within 1km of the site, with the closest being approximately 3km south-east and east of the site.

12.7.17 There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or immediately adjacent to the site.

Hydrology

12.7.18 The site is situated within the sub-catchment of the Griffeen River and Baldonnel Stream which are tributaries of the River Liffey. The Baldonnel Stream runs approximately east to west through the south of the site.

Surface Water Quality Status and Surface Water Bodies

12.7.19 The review of WFD waterbody status (2013-2018) indicates that the Baldonnel Stream is classified as having 'moderate status'. The nearest EPA monitoring stations are at Baldonnel Stream (RS09B090300 and RS09B090400) located approximately 430 m south and 660 m west of the site, respectively; and at Griffeen (RS09G010200), located approximately 2.1 km west of the site. The latest EPA biological assessment of surface water from Griffeen monitoring location indicated a score of Q3 (poor) in 1991.

Ground Gases (including Radon)

12.7.20 According to the Radon Risk Map (EPA, Environmental Protection Agency), 'about 1 in 20 homes in the area is likely to have high radon levels'.

Mining and Quarrying

12.7.21 According to the GSI there are no active quarries located in the immediate vicinity of the site with the nearest quarry being located approximately 3.1 km south-east at Belgard Quarry. EPA mapping indicates there are no mines on or near the site.

Geomorphology and Designated Sites

12.7.22 No designated geological or geomorphological areas or sites are present on-site or adjacent to the site. As such, the proposed development is not considered to adversely impact on such receptors. The closest geological heritage site is the Belgard Quarry, located 3.1 km to the south-east of the site.

Current Regulated Activities and Industrial Uses including Landfills

12.7.23 According to the EPA, there are a number of licensed Integrated Pollution Prevention and Control (IPPC) and waste facilities; however, these are located approximately 5 km from the site.

12.7.24 Information gained from surrounding planning applications indicates that there no known illegal or historic landfills within 500 m of the site, however it is understood that uncontrolled waste operations are undertaken at the car centre 240 m west of the site.

Sources of Contamination

12.7.25 Based on review of desk study information, the current and former uses of the site indicated that there is a low to moderate potential for significant or widespread soil and groundwater contamination. However, due to the lack of development at the site and the generally agricultural uses of the site, the risk of contamination is more likely to be low.

12.7.26 No particular types of potential contaminants were identified from the current and historical use of the site, and therefore the 2022 ground investigation carried out by ISGL included a typical contaminated land chemical testing suite comprising of; heavy metals, total petroleum hydrocarbons (TPHs),

asbestos, organic contaminants such as polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs).

12.7.27 The findings of the initial contaminated land assessment (i.e., comparison of soil and leachate contaminant levels against GAC) as detailed in Appendix 12.2 of EIAR Volume 3 is as follows:

- There are no potentially significant contaminative activities on-site;
- No significant visual or olfactory field evidence of contamination within soils was found on-site;
- Very low levels of soil and soil leachate contamination were recorded on-site, typical of a greenfield site at concentrations that do not present a significant risk to potential receptors;
- No asbestos was detected on-site; and
- No significant potential off-site contamination sources were identified.

12.7.28 Additionally, low levels of contamination in groundwater typical of a greenfield site were found at the site immediately west of the subject site. The concentrations were deemed to be representative of general background groundwater quality in the site's urban industrial setting reflective of the subject site's groundwater quality in absence of sources of potential contamination at the subject site.

12.7.29 Below is a summary of the site sensitivity in relation to geology, hydrogeology, hydrology and contamination:

- The site has been predominantly greenfield and agricultural use historically. There is no evidence of any historical waste disposal or source of contamination.
- The site is underlain by a LI aquifer.
- The site is underlain by the Lucan formation comprising dark grey to black limestone and shale from the Carboniferous Age.
- Very low levels of soil and soil leachate contamination were recorded typical of a greenfield site at concentrations that do not present a significant risk to potential receptors.

Future Baseline

12.7.30 As per the methodology set out in Chapter 2: EIA Process and Methodology, effects of the proposed development are to be assessed against a future baseline, which considers the July 2022 DUB-1 permitted development as operational.

Sensitive Receptors

12.7.31 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 12-4.

Table 12-4: Summary of Sensitive Receptors

Receptor	Sensitivity
Construction workers	Low
Adjacent site users	Low
Future site users	Low
Water environment (Baldonnel Stream)	Medium
Groundwater beneath the site (aquifers)	Medium

[15] EPA, 2018. Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous. July 2018 EPA

[16] HazWasteOnline, 2012. Waste Assessment Tool [online]. Available at: https://www.hazwasteonline.com/ [Accessed on 28/07/2021].

12.8 Assessment of Effects

Demolition and Construction Effects

Embedded Mitigation

12.8.1 This section identifies a range of embedded mitigation measures that are incorporated within the Proposed Development.

Construction Environment Management Plan

12.8.2 A project-specific Construction and Environmental Management Plan (CEMP) will be established and maintained by the contractors during the demolition and construction stage which will cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures.

12.8.3 The measures identified in this section (including those in relation to control of soil excavation, material export, fill materials, fuel and chemical handling, transport and storage and control of water) would be included in the CEMP.

Control of soil excavation

12.8.4 Subsoil will be excavated to facilitate the construction of access roads, car parking areas, expansion of drainage connections and other ancillary works (SUDs / attenuation ponds etc.). The proposed development will incorporate the reduction, reuse and recycle approach in terms of on-site soil excavations. The proposed works will be carefully planned to ensure only material required to be excavated will be, with as much material left in situ as possible. Reuse of on-site excavated soil and capping with hardstand will minimise any increase in aquifer vulnerability. Construction works will require local removal of soil cover where levelling of the site is required and its use for re-instatement elsewhere on the site. It is envisaged that any soil excavated will be retained on-site and reused as fill material orlandscaping.

12.8.5 Excavation works will be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil should be tested and classified as hazardous or non-hazardous in accordance with the EPA's Waste Classification –List of Waste & Determining if Waste is Hazardous or Non-Hazardous'[15] publication, HazWasteOnline tool[16] or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with EC Decision 2003/33/EC[17]. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.

12.8.6 Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of an appropriate earthworks handling protocol during construction within the CEMP. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body.

12.8.7 Dust suppression measures (e.g., damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment is free of nuisance dust and dirt on roads.

Export of material from site

12.8.8 It is currently envisioned that all soil/stones arising on the site will be re-used on site. In the event that any excavated material requires removal off-site, it may be removed as either a waste or, where

[17] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.

appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011[18]. EPA agreement will be obtained before re-using the spoil as a by-product. However, it is not currently anticipated that any excavated material will be removed offsite or imported onto the site for reuse as a by-product. Where material cannot be reused off site it will be sent for recovery or disposal at an appropriately authorised facility.

12.8.9 If any waste soil requires removal from site, it will be classified by an experienced and qualified environmental professional to ensure that the waste soil is correctly classified for transportation and recovery/disposal offsite. Refer to Chapter 14: Waste for further information.

Sources of fill and aggregates

12.8.10 All fill and aggregate for the proposed development will be sourced from reputable suppliers. All suppliers would be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development;
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company.

Fuel and chemical handling

12.8.11 The following procedures will be included in the CEMP in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures would be taken:
  - Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;
  - The pump or valve would be fitted with a lock and would be secured when not in use;
  - All bowsers to carry a spill kit;
  - Operatives must have spill response training; and
  - Drip trays used on any required mobile fuel units.

12.8.12 In the case of drummed fuel or other potentially polluting substances which may be used during the demolition and construction stage the following procedures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they would be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

12.8.13 The aforementioned list of measures is non-exhaustive and would be included in the CEMP.

Control of water during construction

12.8.14 Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthwork operations will be carried out with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management, as set out in the CEMP, will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation.

12.8.15 Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any off-site impacts. All run-off will be prevented from directly entering into any water courses or drainage ditches.

12.8.16 Should any discharge of demolition or construction related water be required, discharge would be to foul sewer. Pre-treatment and silt reduction measures on-site would include a combination of silt fencing, settlement measures (e.g., silt traps, 20 m buffer zone between machinery and watercourses, off-site refuelling of machinery) and use of hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits.

Groundworks

12.8.17 The proposed development would involve groundworks, which would inevitably have an interaction with the on-site soils and water environment. As outlined above, demolition and construction works will be undertaken in compliance with a CEMP.

12.8.18 Proposed activities that are likely to be occurring at the site during the demolition and construction stage which could involve, or which could affect the ground, are as follows:

- Formation of landscape bunds, SUDs / attenuation ponds and improvements to the Baldonnel Stream;
- Re-use of excavated material within construction works where possible in order to minimise off-site material movements, including excavated soils, roads and demolition materials;
- Foundations;
- Soil stripping, excavation and/or exposure of underlying materials;
- Topsoil and subsoils would be segregated during the works;
- Excavations for foundations, drainage works or services (standard open trenching techniques would be used for excavations);
- Dewatering of excavations (if required);
- Site-won material would be re-used on-site wherever possible, subject to relevant geotechnical testing. Imported materials would also be required to provide engineered fill as part of the construction of structures and embankments;
- Where waste material is to be disposed of off-site this would be to a licensed waste facility in accordance with a Materials Management Plan (MMP) or equivalent;
- Establishment of a temporary construction compound(s), storage and use of fuels or chemicals – the establishment stage sits prior to the installation of appropriate bunds and other pollution control measures and as such represents the highest risk. All storage areas for fuels and oils would be appropriately bunded in line with best practice guidance;
- Movement of plant and machinery within the proposed development and to/from the compound;
- Wheel washing facilities would be provided during the demolition and construction stage for plant and vehicles; and
- Vehicles moving across soils within the site.

12.8.19 As outlined above the activities required for the demolition and construction stage of the proposed development represents the greatest risk of potential impact on the geological environment. These activities primarily pertain to the site preparation, excavation, levelling and infilling activities required to facilitate construction of proposed development and ancillary services.

[18] Article 27 of the European Communities (Waste Directive) Regulations 2011,

12.8.20 Taking the above into account, the likely effects associated with contamination during the demolition and construction stage are as follows:

- A proportion of the development area would be covered in hardstanding, which provides protection to the underlying aquifer, but also reduces local recharge in this area of the aquifer. As the area of aquifer is large this reduction in local recharge would have no significant change in the natural hydrogeological regime.
- Excavated and stripped soil can be disturbed and eroded by site vehicles during the works. Rainfall and wind can also impact on non-vegetated/uncovered areas within the excavation or where soil is stockpiled. This can lead to run-off with high suspended solid content which can impact on water bodies. The potential risk from this indirect impact to water bodies and/or habitats from contaminated water would depend on the magnitude and duration of any water quality impact.
- Due to the lack of development at the site and the historical agricultural use the risk of contaminated soils being present on-site is low. Nonetheless material, which is exported from site, if not correctly managed or handled, could impact negatively on human beings (on-site and off-site) as well as water and soil environments. However, it is currently anticipated that all soil would be reused on-site.
- As with all construction projects, there is potential for water (e.g., surface water, groundwater) to become contaminated with pollutants associated with the demolition and construction works. Contaminated water which arises from construction sites can pose a risk to groundwater quality for the duration of the construction if contaminated water is allowed to percolate to the underlying aquifer. The potential main contaminants include:
  - Increase in suspended solids due to muddy water with increase turbidity, arising from excavation and ground disturbance;
  - Spills and releases of cement and concrete causing an increase turbidity and pH arising from the use of these construction materials; and
  - Spills and releases of wastewater (nutrient and microbial rich) arising from poor on-site toilets and washrooms.

12.8.21 With consideration of the embedded mitigation measures outlined above predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the demolition and construction stage (low magnitude). Effects would be temporary to temporary, **Imperceptible** to **Imperceptible/Not Significant Negative** i.e., **Not Significant** in EIA terms.

Accidental spills and leaks

12.8.22 During the construction of the proposed development, there is a risk of accidental pollution incidences from the following sources:

- spillage or leakage of temporary oils and fuels stored on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles;
- spillage of oil or fuel from refuelling machinery on site; and
- run-off from concrete and cement during pad foundation construction.

12.8.23 Accidental spillages may result in localised contamination of soils and groundwater underlying the site, should contaminants migrate through the subsoils and impact underlying groundwater. Groundwater vulnerability at the site is currently classified as extreme and high. Any soil stripping will also further reduce the thickness of subsoil and the natural protectionthey provide to the underlying aquifer. However, capping of site with impermeable paving and building and associated drainage infrastructure will provide additional protection following construction.

12.8.24 With consideration of the embedded mitigation measures outlined predicted impacts on the hydrogeological environment from accidental spills and leaks would be unlikely to occur during the demolition and construction stage (low magnitude). Effects would be temporary to short-term, **Imperceptible/Not Significant Negative** i.e., **Not Significant** in EIA terms.

Loss of agricultural land

12.8.25 There would be local loss of approximately 2.30 Ha of agricultural soil within the site as a result of the proposed development; however, the area of development is small in the context of the overall agricultural land available in the region. Furthermore, the site has been zoned under Objective EE of the SDCC Development Plan 2016-2022 to provide for enterprise and employment uses.

12.8.26 There would be no impact to mineral resources (such as sands and gravels / or quarried stone) in the area as a result of the proposed development.

12.8.27 As such effects would be permanent and **Imperceptible Negative** i.e., **Not Significant** in EIA terms.

Operation Effects

Embedded Mitigation

Environmental procedures & Fuel Storage

12.8.28 As detailed in Chapter 4: Description of Development, the Applicant would implement an Environmental Safety and Health Management System for the proposed development. Prior to operation of the proposed development, a comprehensive set of operational procedures would be established which will include site-specific mitigation measures and emergency response measures.

12.8.29 The primary potential impact relates to a failure or accidental spill of diesel fuel which is stored and used on-site for back-up power generation.

12.8.30 In order to minimise any impact on the underlying subsurface strata from material spillages, the fuel storage tank is located above ground in designated fuel storage bund with an impervious base. One 40,000 litre bunded tank will be provided next to the data centre. The tank will be bunded to volume of 110 % of the capacity of the tank within the bund (plus an allowance of 30 mm for infiltration). Drainage from the bunds is be diverted for collection and safe disposal. Fuel delivery to the bulk storage tank would take place within designated bunded unloading area. Diesel would be piped from the bulk storage tank to belly tank at the back-up generator unit. The belly tank would be double skinned. Delivery of fuel will be undertaken following a documented procedure which minimises risk of spills and spill containment or clean-up kit shall be readily available on-site. It is anticipated, based on the Applicant's experience, that the back-up generator would rarely be used.

Operational Activities

12.8.31 Reasonably foreseeable activities or factors during the operational stage which could affect or be affected by the ground are as follows:

- Periodic maintenance which could involve small scale excavations;
- Areas of soft landscaping and planting; and
- Drainage and storm water attenuation.

12.8.32 These potential impacts are not anticipated to occur following the implementation of mitigation measures outlined below.

12.8.33 With consideration of the embedded mitigation measures outlined above predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the operation stage (low magnitude). Effects would be long term to permanent, **Imperceptible** to **Imperceptible / Not Significant Negative**, and **Not Significant** in EIA terms.

Accidental spills and leaks

12.8.34 During the operational stage there is a potential for leaks and spillages from the fuel storage (bulk storage and local storage at the back-up generators) to occur on-site. In addition, there is a potential

for leaks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental spillages and leaks of oil, petrol or diesel could cause soil/groundwater contamination if the spillages and leaks are unmitigated.

12.8.35 In the event of an on-site fire, firewater would also need to be contained or it may contaminate soils and/or groundwater.

12.8.36 With consideration of the embedded mitigation measures outlined above predicted impacts on the hydrogeological environment would be unlikely to occur during the operation stage (low magnitude). Effects would be long term to permanent, **Imperceptible / Not Significant Negative**, and **Not Significant** in EIA terms.

12.9 Additional Mitigation

12.9.1 No additional mitigation measures are proposed.

12.10 Enhancement Measures

12.10.1 No enhancement measures are proposed.

12.11 Assessment of Residual Effects

Demolition and Construction Residual Effects

12.11.1 The residual demolition and construction effects remain as reported in the assessment of effects section:

- Temporary Imperceptible to Imperceptible/Not Significant effect from groundworks.
- Temporary **Imperceptible/Not Significant** effect from accidental spills/leaks.
- Permanent **Imperceptible** effects from loss of agricultural land.

Operation Residual Effects

12.11.2 The residual operation stage effects remain as reported in the assessment of effects section:

- Permanent, **Imperceptible** to **Imperceptible/Not Significant** effects associated with general operation activities such as periodic maintenance including with areas of soft landscaping and planting and use of the site's drainage network.
- Permanent, **Imperceptible/Not Significant** effects associated with accidental spills and leaks.

Summary of Residual Effects

12.11.3 Table 12-5 provides a summary of the outcomes of the ground conditions assessment of the proposed development. Where **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 12-5: Summary of Residual Ground Conditions Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P
Demolition and Construction								
Construction workers	Impact to human health from exposure to contaminated soils / dust / ground gases / water during enabling and construction works.	None required	Imperceptible	-	U	D	IR	T
Adjacent site users	Impact to human health from exposure to contaminated dust during enabling and construction works.	None required	Imperceptible	-	U	I	IR	T
Water environment (Baldonnel Stream)	Increased potential for leaching of contaminants from soils and mobilisation of contamination in surface water and groundwater during earthworks and foundation works. Also, contaminants introduced to surface water by construction activities through leakages/spillages.	None required	Imperceptible/not significant	-	U	D	IR	T
Groundwater beneath the site (aquifers)		None required	Imperceptible/not significant	-	U	D	IR	T
Agricultural Land	Loss of agricultural land	None required	Imperceptible	-	U	D	IR	P
Operation								
Adjacent site users	Impact to human health from exposure to residual contaminated soils / dust /	None required	Imperceptible	-	U	I	IR	Lt to P
Future site users		None required	Imperceptible	-	U	D	IR	Lt to P

Table 12-5: Summary of Residual Ground Conditions Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P
	ground gases / water.							
Water environment (Baldonnel Stream)	Contaminants released by operation activities through leakages/spillages.	None required	Imperceptible/not significant	-	U	D	IR	Lt to P
Groundwater beneath the site (aquifers)		None required	Imperceptible/not significant	-	U	D	IR	Lt to P

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

12.12 Cumulative Effects

Intra-Project Effects

12.12.1 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Intra-Cumulative Effects.

Inter-Project Effects

12.12.2 Table 12-6 provides a summary of the likely inter-project cumulative effects resulting from the proposed development and the cumulative developments.

Table 12-6: Inter-Project Cumulative Effects

Cumulative Schemes	Demolition and Construction & Operation	
	Cumulative Effects Likely?	Reason
SD20A/0283 Microsoft, Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 VA06S.308585 SD20A/0121 UBC Properties, townlands within Grange Castle Business Park, Baldonnel, Dublin 22	No	Cumulative effects are unlikely as each site would be mitigated through an appropriate staged approach to contaminated land assessment and ground investigation as required under EPA (2013) guidance, *Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites*. Cumulative effects are unlikely from other operational sites nearby as each site would have spill response procedures and will have been subject to contaminated land assessment and ground investigation as required under EPA (2013) guidance. Similarly, each development site would

Table 12-6: Inter-Project Cumulative Effects

Cumulative Schemes	Demolition and Construction & Operation	
	Cumulative Effects Likely?	Reason
308585 UBC Properties - Grange Castle South Business Park, Dublin 22 SD17A/0377 Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 SD18A/0134 Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 SD20A/0295 (amendment to SD18A/0134) Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 VA06S.309146 Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 SD21A/0167 Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 SD21A/0186 Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD22A/0156 amendment to SD21A/0186) SD21A/0217 Digital Netherlands VIII B.V - Profile Park, Nangor Road, Clondalkin, Dublin 22 312793 Vantage Data Centers Dub 11 Limited - Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22		have embedded mitigation through their site specific contaminated land management procedures documented in the site environmental management systems.

Demolition and Construction Cumulative Effects

12.12.3 Cumulative effects from other developments nearby are unlikely as each development site would be mitigated through an appropriate staged approach to contaminated land assessment and ground investigation as required under EPA (2013) guidance, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. Similarly, each development site would have embedded mitigation through their site-specific contaminated land management procedures documented in the site CEMP.

Operation Cumulative Effects

12.12.4 Cumulative effects from other operational sites nearby are unlikely as each site would have spill response procedures to manage storage and use of potential polluting fuels and chemicals and will have been subject to contaminated land assessment and ground investigation as required under EPA (2013) guidance, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. Similarly, each development site would have embedded mitigation through their site-specific contaminated land management procedures documented in the site environmental management systems.

12.13 Summary of Assessment

Background

12.13.1 This chapter has detailed the potential ground condition effects due to the demolition and construction and operational stages of the Proposed Development. The assessment of effects has been undertaken using the relevant national and local guidance and regulations.

12.13.2 Baseline assessment has been made using, publicly available information supplemented by a ground investigation assessing soil quality. The assessment of the baseline information and ground investigation results indicate that:

- The site has been predominantly greenfield and agricultural use historically. There is no evidence of any historical waste disposal or source of contamination within the site itself.
- The site is underlain by the Lucan formation comprising dark grey to black limestone and shale from the Carboniferous Age.
- The site is underlain by a locally important aquifer with the Baldonnel Stream running through the southern area of the site.
- Very low levels of soil contamination were recorded typical of a greenfield site at concentrations that do not present a significant risk to potential receptors.

12.13.3 Overall, the results of the baseline assessment identified no significant sources of ground contamination in soils.

Demolition and Construction Effects

12.13.4 The proposed development would involve groundworks, which would have an interaction with the on-site soils and water environment.

12.13.5 The activities that could affect the ground, are:

- ;
- Formation of landscape bunds, SUDs / attenuation ponds and improvements to the Baldonnel Stream;
- Re-use of excavated material within construction works where possible in order to minimise off-site material movements, including excavated soils, roads and demolition materials;
- Excavations for foundations, drainage works or services (standard open trenching techniques would be used for excavations) and any dewatering of excavations (if required);
- Movement of plant and machinery within the proposed development and to/from the compound;
- Wheel washing facilities would be provided during the demolition and construction stage for plant and vehicles; and
- Vehicles moving across soils within the site.

12.13.6 With consideration of the embedded mitigation measures outlined above, predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the demolition and construction stage. Effects would be temporary, Imperceptible to Imperceptible/Not Significant i.e., not significant in EIA terms.

12.13.7 Also, during the construction, there is a risk of accidental pollution incidences from the following sources:

- spillage or leakage of temporary oils and fuels stored on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles;
- spillage of oil or fuel from refuelling machinery on site; and
- run-off from concrete and cement during pad foundation construction.

12.13.8 Again, with consideration of the embedded mitigation measures outlined predicted impacts on the hydrogeological environment from accidental spills and leaks would be unlikely to occur during the demolition and construction stage. Effects would be Imperceptible/Not Significant Negative i.e., not significant in EIA terms.

12.13.9 Overall, it is considered that the demolition of the existing site and construction of the proposed development would result in a temporary and Imperceptible/Not Significant effect on the ground conditions and identified receptors, and as such **would not give rise to significant effects**.

Operational Effects

12.13.10 During the operational stage there is a potential for leaks and spillages from the fuel storage (bulk storage and local storage at the back-up generators) to occur on-site. In addition, there is a potential for leaks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental spillages and leaks of oil, petrol or diesel could cause soil/groundwater contamination if the spillages and leaks are unmitigated.

12.13.11 With consideration of the embedded mitigation measures predicted impacts on the hydrogeological environment would be unlikely to occur during the operation stage. Effects would be permanent, Imperceptible to Imperceptible/Not Significant i.e., not significant in EIA terms.

12.13.12 Reasonably foreseeable activities or factors during the operational stage which could affect or be affected by the ground are as follows:

- Periodic maintenance which could involve small scale excavations;
- Areas of soft landscaping and planting; and
- Drainage and storm water attenuation.

12.13.13 With consideration of the embedded mitigation measures predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the operation stage. Effects would be permanent, Imperceptible/Not Significant i.e., not significant in EIA terms.

12.13.14 Overall, it is considered that the operation of the proposed development would result in an imperceptible/Not Significant effect on the ground conditions and identified receptors, and as such **would not give rise to significant effects**.

Cumulative Effects

12.13.15 **No significant effects** are predicted on the ground conditions as a result of the proposed development alone in either the demolition and construction or the operation stage so there is no potential for cumulative effects.

13 CLIMATE CHANGE

13.1 Introduction

13.1.1 This chapter of the EIAR reports on the likely significant Climate Change effects to arise from the demolition and construction stage, and the operation stage of the proposed development.

13.1.2 The chapter describes the climate change policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely climate change effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

13.1.3 There are no technical appendices associated with this chapter.

13.1.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - The Paris Agreement, which builds upon the United National Framework Convention on Climate Change (UNFCC)[1];
  - Kyoto Protocol of the UNFCCC[2];
  - European Union (EU) Nationally Determined Contribution (INDCs)[3] under the UNFCCC;
  - European Union Emission Trading Scheme (2015)[4];
- National Legislation and Policy:
  - The Climate Action and Low Carbon Development Act 2015 (Amendment Bill 2021)[5];
  - Government of Ireland National Mitigation Plan (2017)[6];
  - Government of Ireland Climate Action Plan (2021)[7];
  - Climate Action and Low Carbon Development (Amendment) Act 2021[8];
- Regional Policy:
  - Eastern and Midland Regional Assembly Corporate Plan 2019-2024[9];
  - Eastern and Midland Regional Assembly Regional Spatial & Economic Strategy[10];
- Local Policy:
  - South Dublin County Council (SDCC) Climate Change Action Plan 2019-2024[11];
  - SDCC 2020 - 2024 Corporate Plan, Theme 4 Environment, water and climate change, Objective 1: Create a sustainable low carbon and climate-resilient county[12];
  - South Dublin County Council Development Plan 2022-2028 (2022)[13]
- Guidance and Industry Standards:
  - Institute of Environmental Management and Assessment (IEMA), Environmental Impact Assessment: Guide to assessing GHG emissions and evaluating their significance 2nd edition (2022)[14];
  - IEMA's Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (2020)[15];
  - Environmental Protection Agency research, National Risk Assessment of Impacts of Climate Change: Bridging the Gap to Adaptation Action (2016)[16];
  - Ireland's Climate Change Advisory council report (2018)[17];
  - EPA's Guidelines on the information to be contained in Environment Impact Assessment Reports (2022)[18];
  - PAS 2080:2016 Carbon management in infrastructure[19]; and
  - RICS Guidance Whole life carbon assessment for the built environment (2017)[20].

13.2 Assessment Scope

13.2.1 There is currently no specific climate change assessment guidance in Ireland and therefore, this chapter provides a preliminary assessment of the potential climate impacts and effects from the demolition and construction, and operation stages of the proposed development, following the methodology set out in IEMA's aforementioned guidances[14][15]. However, terminology regarding the scale of impacts has been altered to reflect that set out in the Environmental Protection Agency's (EPA) Guidelines[18] on the information to be contained in Environment Impact Assessment Reports.

[1] UNFCCC, 2015, Paris Agreement. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement [Accessed 12/04/2021].
[2] UNFCCC, 1998, Kyoto Agreement. Available at https://unfccc.int/kyoto_protocol. [Accessed 25/08/2022]
[3] UNFCCC, 2016. NDC User Guide. Available at: https://unfccc.int/files/focus/indc_portal/application/pdf/ndc_parties_userguide_version_1__may_2016_(2).pdf [Accessed 25/08/2022].
[4] EU Emissions Trading System (EU ETS). Available at: https://ec.europa.eu/clima/policies/ets_en [Accessed 25/08/2022].
[5] Climate Action and Low Carbon Development (Amendment) Bill 2021. Available at: https://www.gov.ie/en/publication/984d2-climate-action-and-low-carbon-development-amendment-bill-2020/ [Accessed 25/08/2022].
[6] Department of Communications, Climate Action & Environment. National Mitigation Plan (2017). Available at: https://www.climatecaseireland.ie/wp-content/uploads/2018/04/National-Mitigation-Plan-2017.pdf [Accessed 25/08/2022].
[7] Government of Ireland. Climate Action Plan (2021). Available at https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/ [Accessed 25/08/2022].
[8] Climate Action and Low Carbon Development (Amendment) Act 2021. Available at: Climate Action and Low Carbon Development (Amendment) Act 2021 (irishstatutebook.ie) [Accessed 25/08/22].
[9] Eastern and Midland Regional Assembly. Corporate Plan 2019-2024 (2019). Available at: https://emra.ie/dubh/wp-content/uploads/2020/11/EMRA_CorpPlan19-24-final.pdf [Accessed 22/08/2022].
[10] Eastern and Midland Regional Assembly. Regional Spatial & Economic Strategy (2017). Available at: https://emra.ie/dubh/wp-content/uploads/2017/11/EMRA_IssuesPaper_Nov17.pdf [Accessed 22/08/2022].
[11] SDCC, 2019. South Dublin Climate Change Action Plan (CCAP) 2019-2024 [online]. Available at: SDCC's Climate Change Action Plan - SDCC [Accessed 25/08/2022].
[12] SDCC, 2020. Corporate Plan (2020) [online]. Available at: https://www.sdcc.ie/en/services/our-council/policies-and-plans/corporate-plan/ [Accessed 25/08/2022].
[13] SDCC, 2022. South Dublin County Council Development Plan 2022-2028 [online]. Available at: https://www.sdcc.ie/en/devplan2022/adopted-plan/county-development-plan-written-statement/county-development-plan-written-statement.pdf [Accessed on 25/08/2022].
[14] IEMA, 2022. Institute of Environmental Management & Assessment (IEMA) Guide to Assessing GHG Emissions and Evaluating Their Significance 2nd Edition. Lincoln. IEMA.. Available at: https://web.iema.net/iemanet-ay0iq/pages/edmcwxrjeeyjqwanoi1neg.html?PageId=c102d3116374ec118943000d3a2d6712 [Accessed 25/08/2022].
[15] IEMA, 2020, Climate Change Resilience and Adaptation. Available at: https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020 [Accessed 25/08/2022].
[16] EPA Research. (2016). National Risk Assessment of Impacts of Climate Change: Bridging the Gap to Adaptation Action Available at: https://www.epa.ie/publications/research/climate-change/Research_Report_346.pdf [Accessed 25/08/2022].
[17] Climate Change Advisory Council. 2018. Annual Review 2018. Available at: https://www.climatecaseireland.ie/wp-content/uploads/2019/03/CCAC_AnnualReview2018.pdf [Accessed 30/09/2022].
[18] Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR). Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf [Accessed 22/08/2022].
[19] BSi, 2016, PAS2080 Carbon management in infrastructure.
Available at: https://shop.bsigroup.com/ProductDetail?pid=000000000030323493 [Accessed 25/08/2022].
[20] RICS., 2017., Whole life carbon assessment for the built environment. Available at: https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf [Accessed 22/08/2022].

13.2.2 The technical scope of the assessment has considered the following:

- Climate Change Resilience (CCR);
- In-combination climate impacts (ICCI); and
- GHG emissions.

13.2.3 This chapter presents the proposed development's demolition, construction and operational stages' sources of GHG emissions. GHG emissions have been measured in carbon dioxide equivalent emissions (CO_2e), which is a measure used to compare the emissions from various GHGs based upon their global warming potential.

13.2.4 Table 13-1 presents the GHG emissions assessment boundaries.

Table 13-1: GHG Emissions Assessment Boundaries

Item	Description	Input Data	Emissions Factors*
Demolition and Construction Stage			
Embodied GHG emissions	Embodied GHG emissions which are emitted during the manufacture, transport and construction of materials used in the construction works.	Estimated quantities construction materials	University of Bath Inventory of Carbon and Energy[21] and Average embodied carbon GHG emissions associated to PV from IEA (2015)[22], Ecoinvent V3[23] and M. Ito (2011)[24]
Waste disposal GHG emissions	GHG emissions associated with the disposal of waste from construction, demolition, and excavation (CDE) works.	Estimated volumes of waste arisings and demolition material	UK Government GHG Emissions Factors[25]
On-site GHG emissions	GHG emissions associated with on-site energy requirements during demolition and construction works (e.g. electricity and water consumption).	Estimated energy consumption associated with the demolition and construction works	UK Government GHG Emissions Factors[25]
Transport GHG emissions	GHG emissions associated with vehicles travelling to and from the proposed development.	Distances travelled by construction vehicles	UK Emissions Factors Toolkit (EFT) v11[26]
Operation Stage			
Operational energy demand	GHG emissions associated with the operation of the proposed development (emergency back-up generators)	Kilowatt hours (kWh) of energy and fuel consumption	UK Government GHG Emissions Factors[25]
Operational GHG emissions	GHG emissions associated with the operation of the proposed development (traffic)	Annual average daily traffic (AADT)	UK Emissions EFT v11[26]
associated to traffic			
Replacement	Replacement of solar photo-voltaic (PV) panels at the end of their design life (25 years) to cover for the assumed design life (60 years) of the proposed development.	PV panel kWp	Average embodied carbon GHG emissions associated to PV from IEA (2015)[27], Ecoinvent V3[28] and M. Ito (2011)[29]

* UK Government emissions factors have been used as there is no Irish Government equivalent available.

Technical Scope

CCR and ICCI

13.2.5 The assessment of the potential impacts and likely effects of the proposed development on climate has considered the following:

- Vulnerability of the proposed development to extreme weather and projected climate change; and
- The additive impact that climate and climate change may have on impacts identified by other environmental topics as a result of the proposed development, now and in future years.

GHG Emissions

13.2.6 The assessment of GHG emissions, associated to demolition, construction, and operational activities, has considered the following emissions sources:

- GHG emissions resulting from the demolition and construction stage, such as primary extraction, manufacturing and transportation of materials and other demolition and construction processes associated with the proposed development; and
- GHG emissions resulting from the operation stage of the proposed development.

13.2.7 Sources of GHG emissions during the demolition and construction stage include:

- GHG emissions associated with the required raw materials, including raw material supply, transport, and manufacture; and
- GHG emissions associated with construction processes, including transport to/from works sites and construction/installation processes.

13.2.8 Sources of potential GHG emissions during the operation stage include:

- GHG emissions associated with the powering of the data center; and
- Transport of workers to and from the site.

[21] University of Bath Inventory of Carbon and Energy (ICE) Version 2.0. Available at: http://www.circularecology.com/embodied-energy-and-carbon-footprint-database.html#.XPaGoFWWyUk [Accessed 25/08/2022]

[22] International Energy Agency. 2022. Technology Collaboration Programme. Available at: https://iea-pvps.org/?id=314&eID=dam_frontend_push&docID=2391 [Accessed 30/09/2022].

[23] EcoInvent. 2022. Available at: https://ecoinvent.org/ [Accessed 30/09/2022].

[24] M.Ito. 2011. Life Cycle Assessment of PV systems. Available at: https://www.intechopen.com/chapters/17733 [Accessed 30/09/2022].

[25] UK Government conversion factors for company reporting of greenhouse gas emissions. 2021. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021 [Accessed on 25/08/2022]

[26] UK Emissions Factors Toolkit (EFT) v11. Available at: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html [Accessed on 25/08/2022].

[27] International Energy Agency. 2022. Technology Collaboration Programme. Available at: https://iea-pvps.org/?id=314&eID=dam_frontend_push&docID=2391 [Accessed 30/09/2022].

[28] EcoInvent. 2022. Available at: https://ecoinvent.org/ [Accessed 30/09/2022].

[29] M.Ito. 2011. Life Cycle Assessment of PV systems. Available at: https://www.intechopen.com/chapters/17733 [Accessed 30/09/2022].

Spatial Scope

CCR and ICCI

13.2.9 The study area for the CCR and ICCI assessments comprised the demolition and construction footprint of the proposed development, including compounds and temporary land take (i.e. the site).

GHG Emissions

13.2.10 For the assessment of GHG emissions associated with the demolition and construction stage, the study area has taken account of GHG emissions associated with extraction, processing, and transport of materials from outside of the site (red line) boundary alongside site-based emissions that result from construction activities within the site (red line) boundary.

13.2.11 The study area for GHG emissions associated with operation energy consumption of the proposed development comprised the site (redline) boundary. The study area for operation stage GHG transport emissions was consistent with the area selected for the proposed development's traffic model. This area is described in the study area section of Chapter 8: Air quality of this EIAR Volume. Emissions that result from maintenance and repair activities arise from outside of the site (red line) boundary.

Temporal Scope

13.2.12 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be temporary (less than one year), and from the operational stage, which would be expected to be long-term (15 to 60 years) in nature.

13.2.13 The assessment of the proposed development has been undertaken in line with the information provided in Chapter 5: Construction Description of this EIAR Volume. The works are anticipated to be undertaken over a 11-month period, with a completion targeted of Q4 2024. The indicative start of operation is 2025 and the estimated design life of the proposed development is 60 years[30]. There is no phasing during the construction of the Proposed Development.

13.2.14 For the operation stage climate assessment, consideration has been given to the modelling scenarios outlined in Chapter 2: EIA Process and Methodology. Three scenarios have been proposed as the proposed development would be powered via the EirGrid connection through the wider DUB-1 campus or powered by the consented Multifuel Generation Plant (MFGP) on the DUB-1 campus. The MFGP has been designed to include the proposed development and no change in capacity will be required to power the proposed development. The proposed development would not result in an increase in the MFGP emissions, which have previously been assessed and reported within the DUB-1 EIAR. The proposed development does not create any additional MFGP emissions that have not already been assessed and permitted, and therefore no assessment of the MFGP emissions have been carried out in this EIAR.

13.2.15 From a climate perspective, Chapter 2: EIA Process and Methodology proposed scenario 1 and scenario 2 would not generate additional GHG emissions that have not already been assessed and permitted and have therefore been scoped out of this assessment. Only the Emergency scenario (Scenario 3) listed in Chapter 2: EIA Process and Methodology, has been assessed for the proposed development.

13.2.16 The proposed development is an extension to the July 2022 DUB-1 permitted development and would operate as part the wider data center campus. As per Chapter 2: EIA Process and Methodology, the future baseline includes the operation of the July 2022 DUB-1 permitted development reported within the DUB-1 EIAR. The proposed development operation future baseline has been assumed to be 2025, which is the projected year when the proposed development would become operational and is also when the July 2022 DUB-1 permitted development would become fully operational with the MFGP powered by gas.

13.3 Baseline Characterisation Method

Desk Study

13.3.1 In order to establish the existing climate change baseline within the study area, relevant data was reviewed and assessed. The data sets and associated sources can be summarised as follows:

- Met Éireann, Dublin Airport 1981-2010 Averages[31];
- Met Éireann, A Summary of Climate Averages for Ireland 1981-2010[32];
- EPA, 2019 GHG Emissions Projections Report for 2018-2040 Field Study (2020)[33]; and
- Met Éireann, Irelands Climate: The Road Ahead (2013)[34].

Field Study

13.3.2 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

13.4 Assessment Method

Methodology

Demolition and Construction Stage and Operation Stage

CCR and ICCI

13.4.1 The CCR assessment has assessed the vulnerabilities of the proposed development to climate change during the demolition and construction and operation stages of the proposed development. The ICCI assessment has evaluated the potential additive impact that climate change may have on receptors identified by other environmental topics. Professional judgement has been used to assess whether projected climate change could increase the magnitude of the effects as identified by the disciplines, change the sensitivity of the receptors, or reduce the effectiveness of embedded mitigation measures. In line with IEMA guidance[15], qualitative assessments have been undertaken for the CCR and ICCI assessments by:

- Identifying sensitive receptors;
- Analysing the current and future climate in the study area using data from the EPA and Met Éireann and assessing projected changes on climate variables;
- Summary of embedded design and mitigation measures to improve resilience to extreme weather;
- Assessing the likelihood and consequence of the climate impact on the proposed development to determine the significance; and
- Identifying mitigation and adaptation measures for any significant effects, in liaison with the proposed development's design team and relevant environmental discipline specialists.

[30] For the purposes of the GHG emissions assessment and in line with the reference study period specified in the RICS guidance, which is based on the principles outlined in EN 15978, a 60-years design life has been assumed for the proposed development.

[31] Met Éireann. Dublin Airport 1981-2010 Averages (2022). Available at: https://www.met.ie/climate-ireland/1981-2010/dublin.html [Accessed on 25/08/2022].

[32] Met Éireann. A Summary of Climate Averages for Ireland 1981-2010 (2012). Available at: https://www.met.ie/climate-ireland/SummaryClimAvgs.pdf [Accessed on 25/08/2022].

[33] EPA, 2020. 2019 GHG Emissions Projections Report for 2018-2040 Field Study. Available at: https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Irelands-Greenhouse-Gas-Emissions-Projections-report-2020-2040v2.pdf [Accessed 25/08/2022].

[34] Met Éireann. Irelands Climate: the road Ahead (2013). Available at: http://edepositireland.ie/handle/2262/71304 [Accessed on 25/08/2022].

GHG Emissions

13.4.2 The goal of the GHG emissions assessment is to estimate the emissions that would be generated or avoided by the proposed development, within the redline boundary during the demolition and construction and operation stages. The GHG assessment considers emissions associated to buildings/structures within the site. The GHG emissions associated with the July 2022 DUB-1 permitted development have been previously assessed and are reported on within the DUB-1 EIAR. Therefore, the GHG assessment of the proposed development has given regard to the GHG emissions from the July 2022 DUB-1 permitted development qualitatively as part of the future baseline within the assessment of effects and a quantitative assessment has not been undertaken. A quantitative assessment for the proposed development has been undertaken. Therefore, this chapter has:

- Estimated GHG emissions associated to the proposed development for the relevant scenarios: 'Do-Something' (i.e. with the proposed development (quantitative) and assuming the July 2022 DUB-1 permitted development has been implemented (qualitative)) and 'Do-Nothing' (i.e. no proposed development but assuming the July 2022 DUB-1 permitted development has been implemented (qualitative));
- Enabled comparison of the 'Do-Something' scenario against the 'Do-Nothing scenario'; and
- Enabled identification of emissions hot spots within the 'Do-Something' scenario to inform identification and prioritisation of mitigation measures.

13.4.3 The 'Do-Nothing' scenario includes an assessment of 'Business as usual', and therefore considers GHG emissions associated to buildings/ structures within the site. In this case this includes an approximately sized 305m^2 residential building (quantitative), as well as the July 2022 DUB-1 permitted development (qualitative).

13.4.4 As outlined in the 'Temporal Scope' section, the 'Do Something' assessment has assessed 'Scenario 3' the Emergency Scenario only. Therefore, this chapter has:

- Estimated GHG emissions associated with the 13 diesel powered back-up generators;
- Estimated GHG emissions associated to the proposed development's additional traffic, using; and
- Estimated GHG emissions associated with the replacement of PV panels at the end of their design life (25 years).

13.4.5 Furthermore, the IEMA guidance indicates that it is appropriate to contextualise emissions[14]. Therefore, the estimated GHG emissions associated with the proposed development have been compared to the carbon budgets for Ireland to provide a national context. The proposed carbon budgets are listed as follows:

- Carbon Budget 1 (2021-2025)- 295 Mt CO_2e;
- Carbon Budget 2 (2026-2030)- 200 Mt CO_2e; and
- Carbon Budget 3 (2031-2035)- 151 Mt CO_2e.

13.4.6 Demolition and Construction GHG emissions: Carbon has been assessed based on information provided by the design team and information from similar projects, including the use of products or materials, construction transport, construction plant and construction waste;

13.4.7 Demolition and construction and operation activities have been broken down into a product's life cycle stages as specified in PAS2080[18].

13.4.8 End of life or decommissioning impacts have not been considered due to the long design life of the proposed development and given that emissions associated with end of life are commonly relatively small.

GHG emissions in each scenario have been compared to assess the contribution of the proposed development to climate change. Values are reported in MtCO_2e. This measure considers the six Kyoto Protocol gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF6), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). This calculation normalises the global warming potential of the main GHG into one measure, based on the global warming potential of CO_2e.

Cumulative Stage

CCR

13.4.9 The climate resilience effects resulting from the demolition and construction and operation stages would be limited in their spatial extent to the site boundary and the proposed development in isolation. Therefore, cumulative climate change resilience effects with other schemes would not be considered.

ICCI

13.4.10 The in-combination climate impacts resulting from the demolition and construction and operation stages would be limited in their spatial extent to the relevant technical assessments in the EIAR for the proposed development. Therefore, cumulative effects would not be considered for each technical discipline as opposed to in-combination with cumulative schemes.

GHG Emissions

13.4.11 GHG emissions contribute cumulatively, with all sources globally, to cause climate change. In line with IEMA guidance[14], the assessment would only consider GHG emissions in the context of those in local area and the UK.

13.5 Assessment Criteria

13.5.1 The assessment of significance of effect with regards to climate change is based on professional judgement of the sensitivity of the receptor and the magnitude of effect.

13.5.2 The general criteria used to assess if an effect is significant or not, is set out in Table 13-7 and Table 13-8. This is determined by consideration of the sensitivity of the receptor, probability of the impact and consequence of the impact for CCR and ICCI. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement

Receptor Sensitivity/Value Criteria

CCR

13.5.3 In line with IEMA guidance[15], the sensitivity of receptors to potential climate change impacts have been considered. In determining the sensitivity of receptors, the following factors have been considered as well as the value or importance of the receptor:

- Susceptibility of the receptor (e. g. ability to be affected by a change); and
- Vulnerability of the receptor (e. g. potential exposure to a change).

13.5.4 The susceptibility of the receptors has been classified as low, moderate or high in accordance with the criteria set out in Table 13.4.

Table 13-4: Receptor Sensitivity Criteria

Sensitivity	Criteria
Low	Climatic factors have little influence on the receptors (consider whether it is justifiable to assess such receptors further within the context of EIAR – i.e. it is likely that such issues should have been excluded through the EIAR scoping process).
Medium	Receptor has some limited ability to withstand/not be altered by the projected changes to the existing/prevailing climatic conditions (e.g. retain elements of its original function and form).

Table 13-4: Receptor Sensitivity Criteria

Sensitivity	Criteria
High	Receptor has no ability to withstand/not be substantially altered by the projected changes to the existing/prevailing climatic factors (e.g. lose much of its original function and form).

13.5.5 The vulnerability of a receptor can be defined on a scale from low to high in accordance with the criteria set out in Table 13-5.

Table 13-4: Receptor Vulnerability Criteria

Vulnerability	Criteria
Low	Climatic factors have little influence on the receptors (consider whether it is justifiable to assess such receptors further within the context of EIAR – i.e. it is likely that such issues should have been excluded through the EIAR scoping process).
Medium	Receptor is dependent on some climatic factors but able to tolerate a range of conditions (e.g. a species which has a wide geographic range across the entire UK but is not found in southern Spain);
High	Receptor is directly dependent on existing/prevailing climatic factors and reliant on these specific existing climate conditions continuing in future (e.g. river flows and groundwater level) or only able to tolerate a very limited variation in climate conditions);

ICCI

13.5.6 The ICCI assessment focuses on the potential for climate change to exacerbate the effects on receptors identified by individual environmental disciplines. For this reason, the sensitivity of the receptors is considered the same as that specified by the individual environmental assessments in the EIAR.

GHG Emissions

13.5.7 GHG emissions associated within the proposed development would be released to the global atmosphere. Therefore, the global atmosphere is considered to be the receptor and is considered to be of high sensitivity. In line with standard practice, the sensitivity of human and natural receptors is not considered within this assessment.

Impact Magnitude Criteria

CCR

13.5.8 The magnitude of impact has been assessed using professional judgement as a combination of both the probability (likelihood) of the impact and the consequence of the impact.

13.5.9 In line with IEMA guidance[15], the probability of the impact refers to the likelihood of a climate impact occurring and having an impact on the proposed development, over its lifespan. This includes consideration of embedded mitigation measures within the design. The probability of the impact is classified as unlikely, possible (as likely as not) and likely in accordance with the criteria set out in Table 13-5.

Table 13-5: Probability of Impact Criteria

Likelihood level	Criteria
Unlikely	The climate impact is not anticipated to occur during the lifetime of the proposed development (60 years).
Possible (as likely as not)	The climate impact may occur a limited number of times during the lifetime of the proposed development (60 years).
Likely	The climate impact may occur multiple times during the lifetime of the proposed development (60 years).

13.5.10 In line with IEMA guidance[15], consequence of the impact occurring considers the geographical extent of the effect or the number of receptors affected (e.g., scale), the complexity of the effect, degree of harm to those affected and the duration, frequency, and reversibility of effect. The consequence of the impact is classified as very low, low, medium, high, and very high in accordance with criteria set out in Table 13-6.

Table 13-6: Consequence of the Impact Criteria

Consequence Level	Health and Safety	Disruption to Construction/ Operation	Cost
Very High	Multiple fatalities	Site-wide disruption lasting more than one week	>10 % of the proposed development construction value
High	Single fatality / multiple long-term injuries	Site-wide disruption lasting more than one day but less than one week	8-10 % of the proposed development construction value
Medium	Long-term injury or illness, prolonged hospitalisation, or inability to work	Partial disruption across elements of the site / proposed development lasting more than one day but less than one week	4–8 % of the proposed development construction value
Low	Lost time injury or medical treatment required, short-term impact on persons affected	Partial disruption across elements of the site / proposed development lasting less than a day	1–3 % of the proposed development construction value
Very Low	Minor harm or near miss	Disruption to an isolated section of the site / proposed development lasting less than a day	<1 % of the proposed development construction value

13.5.11 The magnitude of climate change impacts have been assessed on the basis of the likelihood of impact and consequence as presented in matrix shown in Table 13-7.

Table 13-7: CCR Magnitude Criteria

Consequence Level	Probability/Likelihood of Impact		
	Unlikely	Possible	Likely
Very High	Medium	High	High
High	Medium	High	High
Medium	Low	Medium	High
Low	Low	Low	Medium
Very Low	Low	Low	Medium

ICCI

13.5.12 In line with the IEMA guidance, the ICCI assessment has been completed based on the likely environmental effects as identified and defined by the individual environmental assessments in the ES. Additional mitigation has been identified to address the potential for climate change to exacerbate these environmental effects.

GHG Emissions

13.5.13 In line with IEMA guidance[14], it should be noted that the crux of significance for the GHG assessment is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Contextualisation of the carbon footprint of a scheme determines whether or not it supports or undermines the trajectory towards net zero. Therefore, the total GHG emissions associated with the proposed development have been compared to the carbon budget for Ireland. Additional mitigation has been identified to reduce GHG emissions where necessary.

Scale of Effect Criteria

CCR and ICCI

13.5.14 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 13-7.

Table 13-8: CCR Scale of Effect Criteria

Magnitude	Value/Sensitivity		
	Unlikely	Possible	Likely
High	Slight to Moderate	Very Significant to Profound	Profound
Medium	Imperceptible to Not Significant	Slight to Moderate	Very Significant to Profound
Low	Imperceptible	Imperceptible to Not Significant	Slight to Moderate

13.5.15 Based on EPA Guidelines on the information to be contained in Environment Impact Assessment Reports[18] (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in terms of EIA.

GHG Emissions

13.5.16 In line with the updated IEMA guidance[15], the scale of effects for the GHG assessment has been described in Table 13-9 below. However, the terms have been altered to reflect the Environmental Protection Agency's (EPA) guidance[18].

Table 13-9: Greenhouse Gas Scale of Effect Criteria

Scale	Description
Negative Effect	
Very Significant/ Profound	The proposed development's GHG emission impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing SDCC and Ireland's policy for projects of this type. The proposed development is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Significant	The proposed development's GHG emissions impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with SDCC and Ireland's policy goals for projects of this type. The proposed development falls short of fully contributing to the UK's trajectory towards net zero.
Non-Significant/ Slight/ Moderate	The proposed development's GHG emissions impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. The proposed development is fully in line with measures necessary to achieve Ireland's trajectory towards net zero.
Imperceptible Effect	
The proposed development's GHG emissions impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. The proposed development provides GHG emissions performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.	
Positive Effect	
The proposed development's net GHG emissions impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-proposed development baseline. The proposed development substantially exceeds net zero requirements with a positive climate impact.	

Nature of Effect Criteria

CCR and ICCI

13.5.17 The nature of the effect has been described as either negative, neutral, or positive as outlined in Chapter 2: EIA Process and Methodology.

GHG Emissions

13.5.18 In line with the EPA guidance[18], the nature of effects for the GHG assessment has been described as either negative, neutral or positive, as follows.

- Negative – when the project follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the Ireland's net zero trajectory or follows accepted aligned practice or area-based transition targets. Similarly, a project that is compatible with the budgeted, science-based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that can also be considered to have an adverse effect.
- Imperceptible – when the project achieves emissions mitigation that goes substantially beyond the Ireland's GHG reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory and has minimal residual emissions.
- Positive – the project's net GHG emissions impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-proposed development baseline. The proposed development substantially exceeds net zero requirements with a positive climate impact.

13.6 Assumptions and Limitations

CCR and ICCI

13.6.1 The assessments have relied on data provided by Met Éireann; the climate projections data are generated from Phase 5 of the Coupled Model Intercomparison Project (CMIP5) simulations. It has been assumed that these data sets have been reported correctly.

13.6.2 Climate projections can be used to determine likely future trends in climate conditions in the locality of the proposed development through its lifetime. The climate trends included in this assessment are based on a range of GHG emissions scenarios which are subject to a degree of uncertainty. How the climate would react to different levels of emissions is also uncertain. There are three key sources of uncertainty within climate projections:

- Natural climate variability: either from natural external influences on climate (e.g. change in atmospheric particulates due to volcanic activity), or changes in the energy received from the sun;

- Incomplete understanding of Earth system processes and their imperfect representation in climate models (modelling uncertainty); and
- Uncertainty in future man-made emissions of GHG emissions and other pollutants.

13.6.3 The ICCI assessment has also relied on the data and professional judgement of other chapters within this report.

GHG Emissions

13.6.4 The GHG emissions assessment presented in this chapter considers the demolition and construction, and operation stages GHG emissions, and should not be considered a full whole life carbon assessment. For example, emissions associated with end of life of the proposed development are not included in the GHG assessment as they are considered out of scope.

13.6.5 Estimated quantities of key materials associated to the construction of the proposed development were not available at the time of writing. Therefore, the estimated GHG emissions associated with the construction of the proposed development have been based on waste data included within Chapter 14: Waste of this EIAR. The waste estimates in this chapter were calculated from a detailed review as part of the July 2022 DUB-1 permitted development adjacent. When conducting the review, the proposed development's Gross Floor Area (GFA) was used to normalise the data and create key performance indicators (KPIs) to estimate potential waste volumes for the proposed development. In addition, the assessment took into consideration published data by the EPA in National Waste Reports. Demolition and construction material quantities were calculated by assuming the wastage quantities as a percentage of the total construction materials used in the development; the percentages were equivalent to the wastage rates described in the Waste and Resources Action Programme (WRAP) Net Waste Tool. Additionally, construction and demolition waste quantities have also been extracted from Chapter 14: Waste.

13.6.6 Furthermore, GHG emissions associated with the sourcing of raw materials, manufacturing and transport of PV panels were estimated utilising the kWp (40) included within the Energy Statement accompanying this EIAR and the PV panel embodied carbon KPI (2560 $kgCO_2e/kWp$)[22,23,24].

13.6.7 The kwh required for the estimation GHG emissions associated to the use of the PV panel have been estimated using the Photovoltaic Geographical Information System (PVGIS) Tool[35] provided by the European Commission. For the purposes of this assessment, the following assumptions were considered:

- PVGIS-Sarah 2 solar radiation database;
- Installed peak PV power [kWp] of 40;
- Roof added / Building integrated mounting position;
- Profile Park business park location;
- PV panel Slope angle of 40°;
- PV panel Azimuth angle of 0°; and
- System loss of 14%.

13.6.8 This tool produced the annual Kwh. This was converted to tCO_2e by the UK government conversion factors[25], due to the Irish equivalent figures not being produced. It was assumed PV panels would need to be replaced every 25 years, as this is considered to be the industry standard[36].

13.6.9 As complete data on materials and proposed material quantities for embodied carbon calculations are not available at the planning stage, this assessment should therefore be considered indicative. The materials included are those which are considered to represent the majority of embodied carbon emissions. Given the design life of the proposed development (approximately 60 years), technological advancement, application and uptake of circular economy principles, and the recent commitments in Ireland as part of the Climate Action plan[7] and Climate Act 2021[5] to reach net zero emissions by no later than 2050, it is considered likely that accelerated carbon reduction would have occurred throughout the design life of the proposed development. The emissions from the deconstruction stage cannot be accurately quantified at this stage as a result of future uncertainty in methods of construction, deconstruction and decarbonisation across the industry. The full specification of construction materials is not anticipated to be known until detailed design has been completed.

13.6.10 In the assessment, there are assumed to be 13 back-up generators. This is the same number of generators as DUB-12, as per the July 2022 DUB-1 permitted development.

13.6.11 Power for the proposed development would be derived through the July 2022 DUB-1 permitted development via connection to the 110 kV substation south of Falcon Avenue or from the MFGP permitted as part of the July 2022 DUB-1 permitted development. As such GHG emissions associated with the proposed development during operation in normal circumstances (with power from these sources) have already been assessed as part of the DUB-1 EIAR and are not considered quantitatively as part of this assessment. Instead, the future baseline has been considered qualitatively within the assessment of effects section. Therefore, only GHG emissions from emergency back-up generators (Emergency scenario – 'Scenario 3') are assessed for the operation of the proposed development.

13.6.12 Emissions created by the transportation of materials to site and operation of on-site plant and machinery have been calculated using guidance from the Building Research Establish (BRE), which is 1,400kg of CO_2e per £100,000 of project value.

13.6.13 It has been assumed that the concrete hardstanding would not be demolished as part of this scheme, and therefore the associated quantities of concrete have not been included within the carbon calculations. However, if the concrete hardstanding is to be demolished, it is assumed that the concrete materials arising from demolition would be reused onsite, and therefore carbon emissions associated to the demolition of the concrete hardstanding would be minimum.

13.6.14 It has been assumed that the design life of the Proposed Development is 60 years, this has been based on the principles outlined in section 7.3 of the BS EN 15978: 2011 and the RICS guidance[20].

13.6.15 GHG emissions associated to the existing residential building have been estimated utilising the KPI (182.1 kWh/m_2) specified by the European commission for residential buildings[37].

13.6.16 Vehicle movements associated with access and construction would vary through the demolition and construction stage programme, with short periods of peak Heavy Goods Vehicle (HGV) and Light Goods Vehicle (LGV) movements associated with delivery of material resources and waste. Values have been calculated using the Central Statistics Office Transport Omnibus 2019 Transport statistics.

13.6.17 Information on Republic of Ireland (ROI) traffic emissions is not readily available. Therefore, traffic emissions for this GHG assessment have been calculated using Defra's Emission Factors Toolkit (EFT) (v11.0)[26]. The EFT allows users to calculate road vehicle pollutant emission rates for CO_2e for a specified year, road type, vehicle speed and vehicle fleet composition.

13.6.18 The EFT makes an estimate of future vehicle fleet mix and emission factors in the UK, including Northern Ireland, assumed as the representative region for the development area. In EFT v11, CO_2 emission factors have been factored to account for improved engine efficiency in future years, in line with DfT predictions. The EFT is updated periodically, considering the change in vehicle fleet compositions across the UK. For years 2031-2050, version 11 includes basic vehicle fleet composition data provided by DfT/HE for England (non-London) only. For Northern Ireland the EFT v11 provides predicted emission rates for all years up to 2030 only.

[35] European Commission.2022. Photovoltaic Geographical Information System (PVGIS). Available at: https://re.jrc.ec.europa.eu/pvg_tools/en/tools.html [Accessed 28/09/2022].

[36] Energy Saving Trust, Generating renewable electricity: Solar Panels (2022). Available at: https://energysavingtrust.org.uk/advice/solar-panels// [Accessed on 28/09/2022].

[37] European Commission, Energy Use in Buildings. Available at: https://ec.europa.eu/energy/eu-buildings-factsheets-topics-tree/energy-use-buildings_en [Accessed 28/09/2022]

13.6.19 The traffic flows for construction and operational stages were provided by the projects Transport Consultant, Ramboll. The construction emissions for DUB 13 were based on Peak 2024 traffic flows. The operational emissions were based on 2025 traffic flows. No future traffic flows have been provided and therefore the proposed development traffic flows have been assumed to remain constant during the assessment period.

13.6.20 The proposed development traffic flows are expected to arrive via the main R roads, therefore, an average speed of the 80 kilometres per hour (kph) has been inputted into the EFT, based on the current speed limits. The average vehicle kilometres travelled per year and day were estimated based on information from the Central Statistics Office Transport Omnibus 2019 Transport statistics. Note that this data assumed a decrease in transport emissions overtime in response to committing to the ROI's national net zero targets.

13.7 Baseline Conditions

Existing Baseline

CCR and ICCI

13.7.1 A local climate baseline has been provided by Met Éireann[32] which presents a set of 30-year averages, covering the period 1981-2010 for a range of parameters and locations. The nearest meteorological station to the site is Dublin Airport[31]. Data from this station has been used to provide a baseline for this assessment and is a robust basis.

13.7.2 Climate data available for Dublin Airport shows a mean annual temperature of 9.8 °C (degrees Celsius), which is within the range for the whole of Ireland of 9-10 °C. The average annual maximum temperature at the vicinity of the proposed development is 13.3 °C; the average annual minimum temperature is 6.4°C with an annual mean of 29.4 air frost days. Higher temperature values in Ireland are generally found in coastal regions. The average annual rainfall within the proximity of the proposed development is 758.0 mm (millimetres), compared to an average for Ireland of 1,230 mm. The Dublin Airport station experiences a mean annual wind speed of 10.3 knots, with an average of 8.2 days with gales per year.

13.7.3 The Flood Risk Assessment (FRA) (Technical Appendix 10.2: Site-Specific Flood Risk Assessment, EIAR Volume 3) indicates the site is affected by the 0.1 % annual exceedance probability (AEP) and 1.0 % AEP flood events and it is suggested that the site is at risk from fluvial flooding.

13.7.4 Ireland's Climate: The Road Ahead (2013) details historic climate trends from 1900-2012, which can inform and provide context for future projections. The following trends have been observed across Ireland between 1900-2012:

- Mean annual temperature has increased by approximately 0.8 °C;
- A 5% increase in mean annual precipitation; and
- Increase in the number of days with heavy rain (10 mm or more) in the west and north-west of Ireland.

GHG Emissions

13.7.5 The site comprises a triangular parcel of agricultural land with a residential dwelling located in the north-west corner of the site, associated out-buildings and an area of hardstanding within the south-west of the site. It has been estimated that the existing building would produce 12 tCO_2e per year.

13.7.6 National CO_2 emissions statistics are published by the EPA[38]. Total emissions in 2021 were 61.53 Mt CO_2e, which is +4.7 % lower than emission in 2020. There was a decrease of 3.4 % in emissions reported for 2020 compared to 2019. Emissions are over 1% higher than pre-pandemic 2019 figures. Since 2020, residential, waste and commercial and public services sector showed decreases in emissions. However, emissions from the Agriculture, Transport, Energy and Industrial sectors increased since 2020.

13.7.7 Ireland's CO_2 emissions in 2021 consisted of 37.5 % from agriculture, 17.7 % from transport, 16.7 % from energy industries and 11.4 % from residential, 7.5 % from manufacturing combustion, and 4.0 % from industrial processes.

13.7.8 The total CO_2 emissions in South Dublin in 2021 was 1,874,753 tonnes of CO_2, equivalent to 6.7 tCO_2e per capita. The sectors that produced the most emissions were transport, commercial and residential, producing 39 %, 32 % and 24 % respectively, of total emissions in South Dublin[39]. By 2021 South Dublin County had achieved a 34.4 % improvement in energy efficiency in the intervening years since 2009, reaching its target one year ahead of schedule. In addition, CO_2 emissions had been reduced by 33.6 % in the same period[13].

13.7.9 However nationally, in the most recent review by the EPA, which details emissions up to 2018, the data published in 2020 states that Ireland has exceeded its 2018 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by 5.59 $MtCO_2e$.

13.7.10 Carbon Budgets

13.7.11 The National Policy Position provides a high-level policy direction for the adoption and implementation by Government of plans to enable Ireland to move to a low carbon economy by 2050. The Government of Ireland have committed to reducing its greenhouse gas emissions by 51 % by 2030 and reaching net zero by 2050 at the latest, across the electricity generation, built environment and transport sectors.

13.7.12 Note that this means operational emissions from electricity would begin to decline due to the gradual greening of the national grid if the substation follows Scenario 3, in which the proposed development is connected to via a substation.

13.7.13 The Minister for Communications, Climate Action and Environment has brought forward a new Climate Action (Amendment) Act that adopted the three five-year period carbon budgets presented below. Details of these carbon budgets were released in October 2021 within the Climate Change Advisory Council Carbon Budget Technical Report[40], although they have not yet been legislated by the government and Oireachtas.

- Carbon Budget 1 (2021-2025)- 295 Mt CO_2e;
- Carbon Budget 2 (2026-2030)- 200 Mt CO_2e; and
- Carbon Budget 3 (2031-2035)- 151 Mt CO_2e.

Future Baseline

CCR and ICCI

13.7.14 Future climate projections have been published by EPA through the Regional Climate Model (RCM) simulations which take the outputs from global climate models to produce more refined projections of the potential local and regional impacts of climate change. Climate projections can be used to determine the likely future climate conditions in the locality of the proposed development through its operational life. RCM simulations include projections of a range of climate variables, such as temperature and precipitation.

13.7.15 Climate projections are subject to uncertainty due to both natural variability and an incomplete understanding of the climate system. These uncertainties can create large outliers in the model ensemble which skew the mean projections. To allow for this, different percentiles are considered which allows a quantification of the likelihood of projections. There are also several Representative Concentrations

[38] Environment Protection Agency. Greenhouse Gas Emissions. Current Situation [online]. Available at: https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/ [Accessed on 22/08/2022].

[39] South Dublin County Council. South Dublin Baseline Emissions Report (2016). Available at: https://www.codema.ie/images/uploads/docs/South_Dublin_Baseline_Report.pdf [Accessed 25/08/2022].

[40] Climate Change Advisory Council. Carbon Budgets (2021). Available at: https://www.climatecouncil.ie/carbonbudgets/ [Accessed on 22/08/2022].

Pathways (RCP) available for RCM simulations with each pathway resulting in a different range of global mean temperature increases over the 21st century. Simulating climatic changes under different RCP scenarios accounts for the uncertainty surrounding future GHG emissions. IEMA guidance recommends the use of RCP 8.5 at the 50 % percentile, for the 2071-2100 timeline to ensure a suitably conservative approach.

13.7.16 The projections informing this assessment were generated from a regional scale-down of eight datasets from phase 5 of the Coupled Model Intercomparison Project, using three RCMs for Ireland. The high spatial resolution (3.8 and 4 km) of these projections provides a good evaluation of regional climate variation. The RCM simulations were found to be robust when compared to observational datasets.

13.7.17 The general climate trends for Ireland have been described below, summarised from the RCM projections. The projections are for the future period of 2041-2060 compared to the baseline period of 1981-2000, simulated for RCP8.5:

- An increase of 1.3-1.6 °C in mean annual temperatures, with the largest increases seen in the east of the country;
- Warming would be enhanced at the extremes with an increase in summer daytime and winter night-time temperatures of 1-2.4 °C;
- Summer heatwave events are expected to occur more frequently, with the largest increases in the south of the country;
- Precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events;
- A mean reduction in wind speed of 2.6 %, with a decrease in all seasons; and
- A decrease in the number of frost days of 58 % and ice days of 78 %.

13.7.18 The climate projections for Dublin indicate increased likelihood of milder wetter winters for the future assessment period in comparison to the 1981-2000 baseline, as shown in Figure 13-1 and Figure 13-3 respectively. However, due to natural variability, some cold and dry winters would still occur. Mean wind speeds are projected to decrease in all seasons, with the largest decreases for summer months as shown in Figure 13-2.

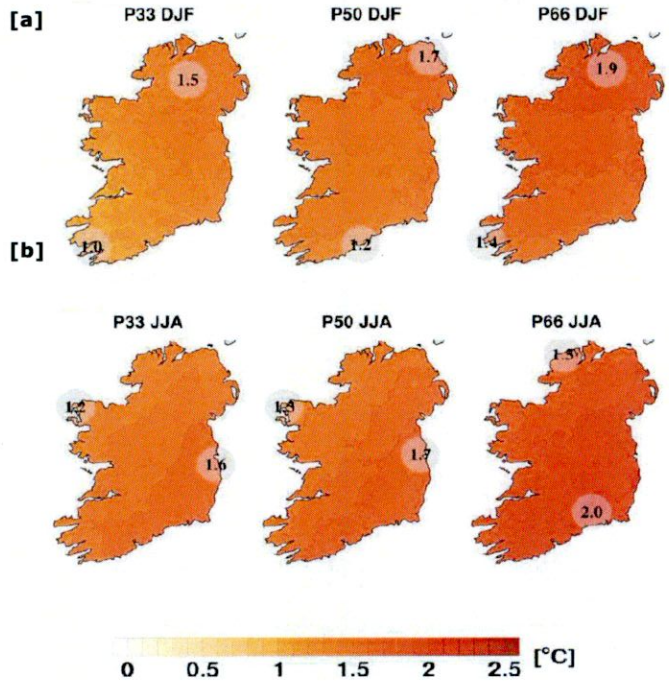


Figure 13-1 The 33rd, 50th and 66th percentiles of [a] winter and [b] summer temperature projections for the RCP 8.5 scenario. *The future period (2041-2060) is compared with the reference period (1981-2000). The numbers on each plot are the minimum and maximum projected changes at their locations*

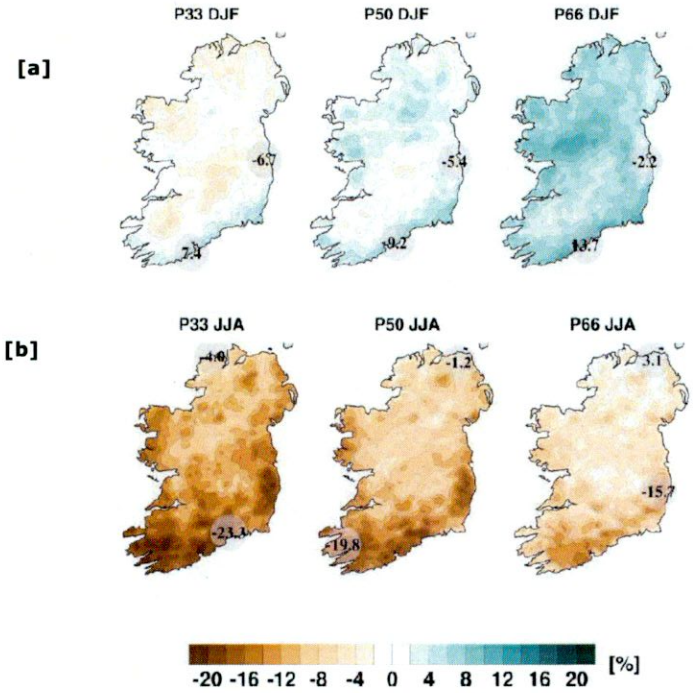
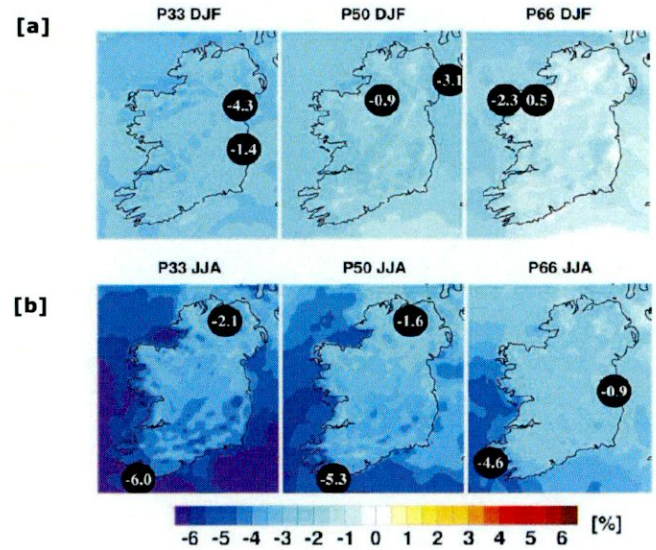


Figure 13- The 33rd, 50th and 66th percentiles of [a] winter and [b] summer wind speed projections for the RCP 8.5 scenario. *The future period (2041-2060) is compared with the reference period (1981-2000). The numbers on each plot are the minimum and maximum projected changes at their locations.*



The 33rd, 50th and 66th percentiles of [a] winter and [b] summer mean precipitation projections for the RCP 8.5 scenario. *The future period (2041-2060) is compared with the reference period (1981-2000). The numbers on each plot are the minimum and maximum projected changes at their locations*

GHG Emissions

13.7.19 In the absence of the proposed development (do-nothing), the GHG emissions from the site are anticipated to change compared to the existing baseline due to the operation of the July 2022 DUB-1 permitted development. The anticipated GHG emissions to be generated during the operation of the July 2022 DUB-1 permitted development for years between 2025-2084 are outlined in Table 13-9. Details of the methodology and scenarios associated with the July 2022 DUB-1 permitted development GHG emissions can be identified in the DUB-13 EIAR, Chapter 13: Climate Change.

Table 13-9: Estimated Operation ('use stage') GHG emissions for modelled opening year (2025) and total over the assumed 60-year operational period (2025-2084) for the July 2022 DUB-1 permitted development

Main stage of project lifecycle	Sub-stage of lifecycle	Emissions (tCO_2e)	
		2025 (modelled opening year)	Total (cumulative) over modelled 60-year operation (2025*-2084)
Operation ('use-stage')	Use of the proposed development by the end-user – Scenario 1	2,024,425	151,986,822
	Use of the proposed development by the end-user – Scenario 1 with emergency backup	2,028,556	152,227,825

Table 13-9: Estimated Operation ('use stage') GHG emissions for modelled opening year (2025) and total over the assumed 60-year operational period (2025-2084) for the July 2022 DUB-1 permitted development

	Use of the proposed development by the end-user – Scenario 1 with mitigation outlined in Table 13.12	2,024,421	151,983,905
	Use of the proposed development by the end-user – Scenario 2	105,339	6,323,046
	Use of the proposed development by the end-user – Scenario 2 with emergency backup	109,470	6,564,050
	Use of the proposed development by the end-user – Scenario 2 with mitigation outlined in Table 13.12	105,335	6,320,130
	Traffic associated with the proposed development	247	3,484.52
The opening modelled year was assessed as 2025 as this is the first year that DUB12 is operational, with electricity being consumed from EirGrid and with the MFGP running 24/7 on natural gas (Scenario 1), and electricity is being consumed from EirGrid with no MFGP in operation (Scenario 2). *DUB11 is operational from Q3 2023 and the GHG emissions associated with its operation using HVO in 2023 and 2024 are captured in the above.			

13.7.20 The EPA has produced GHG emission projections for two scenarios; 'With Existing Measures' and a 'With Additional Measures' which include implementation of Ireland's 2019 Climate Action Plan. Under the 'With Existing Measures' scenario, the projections indicate that Ireland would have total emissions of 57.96 $MtCO_2e$ by 2030. For the energy sector, emissions are project to increase by 1.4 % to 8.6 $MtCO_2e$ over the period 2020 to 2030.

13.7.21 Under the "With Additional Measures" scenario, which includes changing the source of electricity generation from coal and peat to wind power and diesel, and increasing use of electric vehicle engines, the projections indicate that Ireland would have a total emission of 47.87 $MtCO_2e$ by 203022. The energy sector emissions are projected to decrease by 24.8 % to 6.3 $MtCO_2e$ over the period 2020 to 2030.

Sensitive Receptors

CCR

13.7.22 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 13.10.

Table 13-10: Summary of Sensitive Receptors

Receptor	Sensitivity
Buildings and infrastructure receptors (including equipment, materials and building operations)	High
Human health receptors (e. g. construction workers, occupants and site users)	High
Environmental receptors (e. g. integrity of landscape features, habitats and species)	High

ICCI

13.7.23 The ICCI assessment is based on the receptors identified by each of the technical disciplines included within the EIAR.

GHG Emissions

13.7.24 GHG emissions associated with demolition and construction and operation of the proposed development would be released to the global atmosphere. Therefore, this is the receptor and is of high sensitivity. In line with standard practice, the sensitivity of human and natural receptors is not considered within this assessment.

13.8.2 The CCR assessment for the proposed development has not identified any significant effects for the demolition and construction, taking into consideration the embedded mitigation measures of the proposed development. All impacts are considered to be of low consequence of impact with possible probability/likelihood of impact; therefore, the effects are considered to range from **Temporary Imperceptible to Not Significant**, **Negative** in nature and **Not significant** in terms of EIA.

13.8 Assessment of Effects

Demolition and Construction Effects

CCR

13.8.1 A summary of potential CCR impacts during the demolition and construction stage, as well as embedded and additional mitigation measures have been provided in Table 13-11.

Table 13-11: Demolition and construction CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
Increased frequency and intensity of extreme weather events: Intense rainfall events	Demolition and construction	**Receptor:** Buildings and infrastructure Extreme rainfall events could result in the erosion of stockpiles and resultant silting of drainage assets. This could result in secondary impacts such as localised flooding.	As committed to in Chapter 5: Demolition and Construction Environmental Management, a detailed Construction Environmental Management Plan (CEMP) would be secured by means of an appropriately worded planning condition and would be prepared in advance of the construction works following the appointment of the key contractors. The detailed CEMP would include a Construction and Demolition Waste Management Plan (CDWMP) and would consider specific measures to minimise stockpiling on-site by avoiding and minimising the potential for contamination, for example by: • Ensuring deliveries would be 'just-in-time' to avoid storing large volumes of materials that could be affected; • Minimise emissions from stockpiles by covering, seeding, fencing, or damping down;	**Likelihood level**: Unlikely **Consequence level:** Low as a result of partial disruption across elements of the site lasting less than a day. **Temporal Scale:** Temporary	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

Table 13-11: Demolition and construction CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
			• Material stockpiles and structures would be inspected before and after extreme weather events to ensure stability and incorporating measures; and • Covering, seeding, fencing, screening, or damping down of stockpiles would also occur; • Appropriate storage, handling, and management of construction materials with due regard to the potential for mobilisation into surface drainage. Furthermore, re-vegetating earthworks of exposed soil stockpiles would occur as soon as practicable; • Water pollution would be minimised by implementing adequate bunding for dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association (CRIA) provides guidance on the control and management of water pollution from construction sites[41]; and as stated in EIAR Chapter 5: Demolition and Construction Environmental Management, material would be stored in sheltered parts of the site to minimise interaction with rainfall and damage by the weather; and • As stated within the earthwork's specification, all work involving topsoil would not occur in heavy rain, or if areas of soil were exposed to 60mm of rainfall over the previous 60mm, unless permitted by the engineer. Stockpiles would also not exceed 1.5m in height and be on free draining ground.	**Scale of Effect:** Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	
	Construction	**Receptor:** Buildings and Infrastructure / Programme Extreme rainfall events and their secondary impacts could affect the ability to undertake certain construction activities leading to programme delays (e.g. pouring of concrete and asphalt) increasing project costs.	In line with best practice, vulnerable activities such as the construction of earthworks would take place in appropriate weather conditions (considering construction programme timescale constraints). This would reduce the likelihood of weather-related delays to these activities and would be undertaken in accordance with measures detailed in the CEMP. The contractor would be required to ensure that site activities, such as site preparation works, are postponed during rainfall events. As stated in the outline CEMP, materials would be stored in sheltered parts of the site to minimise interaction with rainfall and damage by the weather, while stockpiling would be limited when possible. Covering, seeding, fencing/ screening, or damping down of stockpiles would also occur.	**Likelihood level**: Unlikely **Consequence level:** Low as a result of partial disruption across elements of the site lasting less than a day. **Temporal Scale:** Temporary **Scale of Effect:** Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Construction	**Receptor:** Environment Extreme rainfall events could result in increased runoff of concrete or cement products when equipment and vehicles are being washed which, as well as flooding of the ground excavations, which could lead to contaminants entering nearby watercourses.	As committed to in EIAR Chapter 5: Demolition and Construction Environmental Management, which anticipates the environmental issues and necessary management controls that would need be covered within the CEMP, good practice measures would be employed on site to prevent uncontrolled runoff. This includes provision of on-site pollution control kits and use of settlement system prior to discharge. To ensure no contaminant-pathway-receptors pathways are created and to reduce the potential for contamination to occur during construction, all site activities would be undertaken in accordance with relevant water regulations. The Applicant would also be responsible for obtaining all necessary consents and ensuring compliance with the conditions of the consents. Within the CEMP, the following provisions would be covered: • Handling of construction materials is undertaken with due care and consideration to minimise the risk of accidental spills; and	**Likelihood level**: Unlikely **Consequence level:** Low as a result of partial disruption lasting less than a day. **Temporal Scale:** Temporary **Scale of Effect:** Imperceptible to Not Significant **Nature:**	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

[41] Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors – C532 CIRIA Report (Masters-Wouldiams et al, 2001)

Table 13-11: Demolition and construction CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
			• Material stockpiles should be adequately protected to avoid being washed or blown away from the immediate area. Potential pathways for contamination would be minimised as follows: • Groundwater would be prevented from entering excavations by dewatering; • Surface water would be prevented from entering excavations by using cut-off ditches, covering the excavation, or captured within the groundwater pumping system; • Concrete preparation would be constrained to dedicated protected areas where contaminated water can be collected; • Contaminated water from excavations would be collected within a settlement tank or lagoon to enable treatment prior to release; • Implementing good construction practices including adequate bunding for oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance; and • Adhering to guidance provided by the Construction Industry Research and Information Association (CIRIA), that provide information on the control and management of water pollution from construction sites in their publication[41]. The proximity of the site to potential sources, pathways, and impacts of pollution; and the historical uses of the site would be examined early in project planning and design, to ensure that suitable redesign and mitigation measures are undertaken as necessary. A contingency plan for pollution emergencies should also be developed and regularly updated, which would identify the actions to be taken in the event of a pollution incident. In addition, the construction drainage system for the proposed development would be designed and managed to comply with appropriate industry standards British Standard (BS) 6031:2009[42] (or equivalent), which details methods that should be considered for the general control of drainage on construction sites. Further advice is also contained within BS 8004:2015[43] (or equivalent). Water pollution would be minimised by adequate bunding for oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance. Practises would adhere to guidance specified by CIRIA[41]. As specified in Chapter 5: Demolition and Construction Environmental Management Earthwork operations should be designed with adequate drainage, falls and profile to control run-off and prevent flowing and the contamination of local water courses. Correct management would ensure that there would be minimal inflow of shallow/perched groundwater into any excavation. Care would be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces would be within the main excavation site which limits the potential for any offsite impacts.	Negative **EIA Significance:** Not significant	
Increased frequency and intensity of high temperatures: Drought conditions	Demolition and construction	**Receptor:** Human health Heatwaves, higher temperatures and drought conditions could impact dust generated during construction activities.	Best practice measures would be employed to reduce dust generating activities such as: storing cement products in enclosed tankers to prevent dust generation and pollution; dampening down areas of the site that have the potential to give rise to dust (i.e. stockpiles and earthworks); and covering or enclosing vehicles that deliver materials. The CEMP would focus on dust management, temporary dust screens as high as any stockpiles, preparing and implementation of a CDWMP, and appropriately sourcing materials. A Dust Management Plan (DMP) would also be developed to mitigate dust generation.	**Likelihood level**: Unlikely **Consequence level:** Low as a result of health and safety impacts. **Temporal Scale:** Temporary	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

[42] British Standard Institution, 2009. BS6031:2009 British Standard Code of Practice for Earthworks. London. BSi.
[43] British Standard Institution, 2015. BS8004:2015 Code of Practise for Foundations. London. BSi.

Table 13-11: Demolition and construction CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required

			Construction practices would adhere to requirements as set out in the Safety, Health and Welfare at Work (Construction) Regulations 2013[44].
			Dust generated from construction works would also be managed by means of 2.4 m high site hoarding and dust suppression measures, such as the use of water sprays, dampening down of roads and covering of storage areas, such that the potential for negative dust generation is reduced. According to the Outline Construction Traffic Management Plan accompanying this application, hoarding would be inspected daily. Other measures design to mitigate the emissions and impact of dust include:
			• Carrying out regular dust soiling checks of buildings within 100 m and provide cleaning;
			• Removing dusty materials from the application site;
			• Cutting, grinding or sawing equipment only to be used with suitable dust suppression equipment or techniques;
			• Re-using and recycling waste to reduce dust from waste materials; and
			• Using tackifier, a sticky substance that temporally binds the surface of stockpiled material, reducing dust emissions.
			EIAR Chapter 5: Demolition and Construction Environmental Management stipulates the following dust mitigation measures to be reviewed regularly:
			• The contact details of a person to contact regarding dust issues shall be displayed, while a Complaints Register relate to dust nuisance would be kept on site together with details of any remedial actions carried out;
			• Where feasible, hoarding would be erected around site boundaries which would prevent larger particles from impacting nearby sensitive receptors;
			• Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
			  • At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash; and
			  • Re-vegetating areas, and only removing small areas during work and not all at once.
				Scale of Effect: Imperceptible to Not Significant
				Nature: Negative
				EIA Significance: Not significant	

Increased frequency of extreme weather events: Windstorms and wind gusts	Construction	**Receptor:** Human health
		Winds gusts could result in the damage of stockpiles. Secondary impacts could include site personnel welfare impacts.
			The following measures would be implemented during the construction of the proposed development:
			• Best practice measures for stockpile management would be utilised;
			• Prefabrication off-site would be considered to minimise stockpilingon-site;
			  • The Principal Contractor or equivalent would monitor the contractors' performance to ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised;
			  • Where possible stockpiles should be located downwind of sensitive receptors;
			• Deliveries would generally be 'just-in-time' to avoid storing large volumes of materials. Any construction materials that are stored on-site would be protected; and
			• Construction practices would adhere to requirements as set out in the Safety, Health and Welfare at Work (Construction) Regulations 2013.
			EIAR Chapter 5: Demolition and Construction Environmental Management stipulates the following dust mitigation measures to be reviewed regularly:
			• During working hours, dust control methods would be monitored as appropriate;
				Likelihood level: Unlikely
				Consequence level: Low as a result of health and safety impacts.
				Temporal Scale: Temporary
				Scale of Effect: Imperceptible to Not Significant
				Nature: Negative
				EIA Significance: Not significant
					Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

[44] Government of Ireland, 2013. Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013).

Table 13-11: Demolition and construction CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required

			• The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board would also include head/regional office contact details;
			• Community engagement shall be undertaken before works commence on site;
			• A complaints register would be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
			• The procedures put in place would be reviewed at regular intervals and monitoring conducted and recorded by the principal contractor. It is recommended that reviews are conducted monthly as a minimum;
			• Overburden material would be protected from exposure to wind by storing the material in sheltered parts of the site;
			• Regular watering would take place during dry/windy periods to ensure the moisture content is high enough to increase the stability of the soil and suppress dust;
			  • Where feasible, hoarding would be erected around site boundaries which would prevent larger particles from impacting nearby sensitive receptors; and
			  • More mitigation measures would be included as part of the DMP.		

Increased frequency and intensity of high temperatures: Heatwaves	Demolition and construction	**Receptor:** Human health Heatwaves, higher temperatures could impact on site construction personnel welfare, for example, causing heat stress and unsafe working conditions.	All works on-site would be undertaken in accordance with the provisions of the Safety Health and Welfare at Work (Construction) Regulations 2013. The risk of heat stress to site personnel working outdoors would be managed through health and safety procedures. This would include provision of necessary Personal Protective Equipment (PPE) and Toolbox Talks to highlight risks of heatstroke.	**Likelihood level:** Possible **Consequence level:** Low as a result of health and safety impacts relating to heat stress. **Temporal Scale:** Temporary **Scale of Effect:** Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

ICCI

13.8.3 A summary of potential ICCI effects during the demolition and construction stage is provided in Table 13-14. The assessment is based on professional judgment informed by a review of individual technical assessments within the EIAR.

13.8.4 The ICCI assessment for the proposed development has not identified any significant effects for the demolition and construction stage, taking into account embedded mitigation measures of the proposed development. All effects are therefore considered to be **Temporary**, **Imperceptible to Not Significant**, **negative** in nature and **Not significant** in terms of EIA.

Table 13-12: Demolition and Construction Stage ICCI Effects

Effect of Proposed Development on Receptors	Existing Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
Population and Human Health					
Potential interactions of climate change with the identified effects are considered to be Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Transport and Accessibility					
Potential interactions of climate change with the identified effects are considered to be Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Air Quality					
Exposure of sensitive receptors to dust from demolition and construction activities.	A DMP would be prepared for the site and included as part of the CEMP. This would be secured by means of an appropriately worded planning condition. The DMP would include measures such as the implementation of dust suppression techniques. The CEMP would also include mitigation measures to minimise impacts from construction HGV traffic.	Increased frequency and intensity of high temperatures: Drought conditions.	Extended periods of drought could arise as a result of warmer summer months and limited precipitation. This may increase dust production and reduce deposition which has the potential to affect human health.	Temporary, negative, Imperceptible to Not Significant (not significant in terms of EIA) due to the design and mitigation measures committed to in the CEMP (e.g. increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather; development and implementation of an DMP).	No additional measures required.
Exposure of sensitive receptors to dust from demolition and construction activities.	Control of dust would rely upon good site management and mitigation techniques, including some that rely on water, such as ensuring effective water suppression during demolition and construction.	Increased frequency and intensity of high temperatures: Drought conditions.	Drought conditions may reduce the availability of water for dust suppression mitigation measures, which would reduce the effectiveness of embedded mitigation measures.	Temporary, Imperceptible to Not Significant, negative (not significant in terms of EIA) due to mitigation measures which do not rely on water as committed to in the CEMP (e.g. covering stockpiles and minimising stockpile size).	No additional measures required. Temporary storage of water could be considered during the construction stage to be used for dust suppression in drought conditions.
Noise and Vibration					
Potential interactions of climate change with the identified effects are considered to be Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Water Resources and Flood Risk					
Exposure of sensitive receptors to water from demolition and construction activities.	Demolition and construction works are to be undertaken in compliance with a Construction and Environmental Management Plan (CEMP), which will cover all potentially polluting activities and emergency response procedures.	Increased frequency and intensity of extreme weather events: Intense rainfall events	An increase in global temperature can increase the intensity and frequency of rainfall events.	Temporary, negative, Imperceptible to Not Significant (not significant in terms of EIA) as the FRA assessed that the site is not at risk of pluvial flood risk. Additionally, implementation of the drainage strategy in compliance with the Greater Dublin Strategic Drainage Strategy (GDSDS) would mitigate any risk of flood. The proposed surface water management strategy includes an allowance for climate change would result in a positive impact of low magnitude on the flood risk status (high sensitivity).	It is recommended that a Specific Flood Risk Mitigation Plan be prepared, in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities.[45]
Ecology					

[45] Office of Public Works. 2009. Available at: https://www.opr.ie/wp-content/uploads/2019/08/2009-Planning-System-Flood-Risk-Mgmt-1.pdf [Accessed 28/09/2022].

Table 13-12: Demolition and Construction Stage ICCI Effects

Effect of Proposed Development on Receptors	Existing Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
Exposure of sensitive receptors to demolition and construction, and construction activities.	The demolition and construction stage would adhere to all relevant legislation and best practise construction and pollution prevention methods.	Increased frequency and intensity of high temperatures: Drought conditions.	Potential impacts during the demolition and construction stage include indirect loss or damage of habitats as a result of dust and other air or water-borne pollution. This may have a negligible impact on the Baldonnel stream but will most likely be worsened by climate change.	Temporary, negative, Imperceptible to Not Significant (not significant in terms of EIA) as best practise, pollution prevention methods, and the DMP should mitigate effects. It is therefore expected to cause only negligible impact.	No additional measures required.
Ground Conditions					
Exposure of sensitive receptors (water) to demolition and construction activities	A project-specific Construction and Environmental Management Plan (CEMP) will be established and maintained by the contractors during the demolition and construction stage which will cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures. Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthwork operations will be carried out with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management, as set out in the CEMP, will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation.	Increased frequency and intensity of extreme weather events: Intense rainfall events	An increase in global temperature can increase the intensity and frequency of rainfall events.	Temporary, negative, Imperceptible to Not Significant (not significant in terms of EIA) as the FRA assessed that the site is not at risk of pluvial flood risk. Additionally, implementation of the drainage strategy in compliance with the GDSDS would mitigate any risk of flood. The proposed surface water management strategy includes an allowance for climate change would result in a positive impact of low magnitude on the flood risk status (high sensitivity).	No additional measures required.
Waste Potential interactions of climate change with the identified effects are considered to be Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Material Assets					
Exposure of sensitive receptors (surface water) to demolition and construction activities via surface runoff	A project-specific CEMP would be established and maintained by the contractors during the demolition and construction stage which would cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures.	Increased frequency and intensity of extreme weather events: Intense rainfall events	An increase in global temperature can increase the intensity and frequency of rainfall events. The site currently drains into the Baldonnel Stream. Above ground surface water attenuation ponds would be constructed as part of the proposed development meaning they would be in place during most of the construction stage. As with all construction projects, there is potential for surface water runoff to become contaminated with pollutants associated with the demolition and construction works. Contaminated water which arises from construction sites can pose a risk to surface water quality within the stream.	Temporary, negative, Imperceptible to Not Significant (not significant in terms of EIA) when considering the embedded mitigation measures outlined above and within Chapter 5: Demolition and Construction Environmental Management.	No additional measures required.
Exposure of sensitive receptors (water supply) to demolition and construction activities	Welfare facilities will be required for the construction staff. A temporary connection to the mains water supply would be established for the construction stage. The water demand during the construction stage would not be significant enough to effect	Increased frequency and intensity of high temperatures: Drought conditions.	Drought conditions may reduce the availability of water for the construction stage.	Temporary, Imperceptible to Not Significant, negative (not significant in terms of EIA), as effects associated with water supply are considered to be manageable.	No additional mitigation required.

Table 13-12: Demolition and Construction Stage ICCI Effects

Effect of Proposed Development on Receptors	Existing Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
	existing pressures and from discussions with the SDCC, it is understood that there is adequate capacity within the existing watermain network to supply the proposed development.				

GHG Emissions

13.8.5 The proposed development would result in GHG emissions during the demolition and construction stage. Embedded mitigation measures and potential impacts have been identified in this section and a preliminary assessment of effects has also been provided below.

13.8.6 Consideration has been given to the proposed development's opportunities to reduce, minimise or avoid GHG emissions. In line with the Government of Ireland National Mitigation Plan (2017)[6] the Government of Ireland Climate Action Plan (2019)[7], and more specifically the SDCC Climate Change Action Plan 2019-2024[11], which set out the Irish Government's carbon reduction plan targets, as part of the design process potential impacts on GHG emissions have been considered.

13.8.7 The proposed development has sought to minimise GHG emissions, wherever possible, to contribute to the achievement of Ireland's GHG reduction targets and carbon budgets. The embedded mitigation measures relevant to the demolition and construction stage of the proposed development has been presented in Table 13-13.

Table 13-13: GHG mitigation measures during Demolition and Construction stage

Mitigation measure	Mitigation detail	Method of reduction
Excavation of materials	Material excavated during construction would be processed for use in the works wherever possible to reduce the amount of material disposed of off-site, as well as imported from other sources and associated GHG emissions. Possible uses of excavated materials include general fill and other graded materials. Processing of material would take place on-site.	Reduce
Sustainable materials	Using sustainability sourced, recycled or secondary materials with lower embedded GHG emissions and water consumption; e.g. Specifying products with a high recycled content and (e.g. Pulverised Fuel Ash (PFA) replacement for up to 30 % of the cementitious material (i.e. as replacement for Portland cement); Using recycled crushed concrete in granular sub-base materials in pavements sourced from existing pavements on site to be demolished as part of the works;	Reduce
Reporting	Energy consumption and materials use would be recorded and reported on an ongoing basis during the construction phase of the development;	Reduce
Equipment	Using low-emissions or electric construction plant, including the potential for portable PV panels for use in powering temporary compound and equipment;	Reduce
Procurement	Procuring materials with Environmental Product Declarations (EPD) to allow for the most informed procurement choices; and procuring materials from suppliers that offer take back schemes, where possible;	Reduce
Reuse	Reusing the materials from the pre-existing building wherever possible.	Avoid/ prevent
Minimising waste during construction	Following measures would be proposed in the CDWMP to minimise waste generation on-site; ordering the quantity of materials required for the job, thus reducing over-ordering.	Reduce

13.8.8 In addition, and to reduce GHG emissions associated with vehicles from workers, the following mitigation measures would be implemented:

- Cycle parking would be provided, and this would be covered and secure;
- Facilities for changing and storing cycling clothes would be provided;
- The developer would investigate the provision of public transport vouchers to encourage workers to travel to the application site by bus or rail;
- The contractor would encourage workers to car share where possible and would set up a car sharing database to identify where matches could be made;
- Incentives such as a free breakfast once a week for those walking, cycling, car sharing or using public transport would be provided;
- Selecting electrically driven equipment where possible in preference to internal combustion powered; hydraulic power in preference to pneumatic; and wheeled in lieu of tracked plant;
- Operating plant at low speeds where possible and incorporating automatic low speed idling; and
- Switching off vehicle engines where vehicles are standing for extended periods and avoid unnecessary revving of vehicle engines.

13.8.9 This assessment presents an estimation of the GHG emissions for the 'Do Something' scenario, a comparison against the 'Do Nothing' baseline, and assessment against Ireland's carbon budgets. The GHG emissions in this section are a high-level indication only and would be updated and refined as the proposed development's design develops and updated traffic and air quality modelling becomes available.

13.8.10 Due to the embedded nature of the mitigation measures proposed, some of which have already been incorporated into the design and some of which are yet to be incorporated, it is not practicable to complete a quantitative assessment of 'before' and 'after' mitigation. Rather, the assessment shows a snapshot of the current design and an assessment with and without the use of PV panels. Construction and demolition activities have been broken down into a product's life cycle stages as specified in PAS2080[19]

Table 13-14: Estimated GHG Emissions from demolition and construction activities

Main stage of project lifecycle	Sub-stage of lifecycle		Emissions (tCO_2e)	% of total construction emissions
Demolition	Demolition		1	0.01%
Construction stage	Product stage; including raw material supply, transport, and manufacture		11,634	73.50%
	Construction process stage	Transport to/from works site	1,826	11.54%
		Construction/installation processes	2,342	14.80%
		Waste treatment / disposal	25	0.16%
	Total		15,828	100%

13.8.11 Emissions from the construction stage are predicted to total in the region of 15,828 tCO_2e. The largest GHG emissions during the demolition and construction activities (73.50 %) is likely to arise from the raw material supply, transport and manufacturing of materials, associated with demolition and construction of the proposed development. GHG emissions associated to construction/installation processes equate to 14.80 % of the total construction and demolition GHG emissions, and transport of materials accounts for 11.54 % of the GHG emissions.

13.8.12 The demolition and construction of the proposed development is expected to contribute 0.00537 % of Ireland's proposed 295 $MtCO_2e$ carbon budget for 2021-2025.

13.8.13 The demolition and construction GHG emissions have been reported in tCO_2e for the duration of the demolition and construction activities (approximately 11 months) for each scenario. The IEMA guidance[14] indicates GHG emissions should be considered as 'significant' if they are not compatible with the

budgeted, science-based 1.5°C trajectory in terms of rate of emissions reduction and do not comply with up-to-date policy and 'good practice' reduction measures.

13.8.14 Due to the minor scale of the GHG emissions in comparison to the national, regional and projected sectoral carbon budgets and incorporation of the proposed mitigation measures, which include a net zero carbon offset payment, the proposed development is assessed as compatible with the budgeted, science-based 1.5 °C trajectory in terms of rate of emissions reduction. Therefore, whilst all GHG emissions contribute to climate change, the scale of effect of the proposed development on the likelihood of avoiding severe climate change, aligning with a science-based 1.5 °C compatible trajectory and achieving net zero by 2050, is considered to be **Temporary, Slight to Not-Significant Negative,** i.e. **Not significant** in terms of EIA.

Operation Effects

CCR

13.8.15 A summary of potential climate resilience impacts during the operation stage are provided in Table 13-15. Several preliminary general mitigation and adaptation measures to address the potential impacts associated with climate change events have been considered. Most weather and climate-related resilience effects during the operation stage are expected to be mitigated through measures embedded in the design of the proposed development, providing a level of resilience throughout operation. Mitigation measures considered in this preliminary assessment include:

- Drainage infrastructure has been designed with sufficient allowance to account for climate change and to withstand extreme rainfall events;
- Provision of flood compensation storage areas; and
- Soft landscape features to be maintained following establishment through watering in periods of dry weather and carrying out periodic inspections to monitor the establishment of new planting.

13.8.16 A comprehensive list of embedded mitigation and adaption measures for the operation of the proposed development for all climate impacts are included within the existing design and mitigation measures section of Table 13-15. Overall, the effects are considered to range from **long term, Imperceptible to Not Significant** and **Slight to Moderate, Negative** in nature and are **Not significant** in terms of EIA.

Table 13-15: Operation Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
Increased frequency and intensity of extreme weather events: Intense rainfall events	Operation	**Receptor:** Buildings and Infrastructure Extreme rainfall events and increased frequency of intense rainfall events could result in the overwhelming of drainage assets. This could result in secondary impacts such as localised flooding of the proposed development.	Furthermore, the FRA, Section 2.6 Pluvial Flooding states that the site is not at risk from pluvial flooding. The FRA and Engineering Planning report has been prepared to accompany the planning application notes that localised flooding would be mitigated by the following: • Storm water mitigation designed in accordance with the GDSDS; • Improve the general surface water management of the site, by introducing interceptors, attenuation measures (e.g., 2 storage ponds providing a volume of 970 m^3, swales and permeable paving storage providing a volume of 114m^3); • Storm water from the rear roof areas and would be directed via rainwater pipes into an on-site reticulation system. This flow would then be transported to the surface water drainage network and discharged into storm-water storage ponds and swales; • Storm water from all car park areas and access roads / delivery areas would be drained by on-site gullies and channels that drain into a below ground gravity storm water system; • Permeable paving; • Consideration of levels and topography to provide a graduated fall in water levels from the proposed buildings to avoid pooling of water; • A drain on the building's frontal roof areas that drain into the permeable paving sub-base, prior to draining into storage ponds and then ultimate discharge into the ditch/stream to the east; and • Oil inceptors would be installed on all drainages systems that collects surface water from roads, loading docks and parking areas before it gets discharged into storage ponds for attenuation. The total attenuation volume required has been calculated as being approximately 1,084m^3. The storm water drainage within the entire development has been designed to accommodate a 1:2-year storm frequency as well as a 1:100year storm event + 20% climate change. According to the Engineering Report, storm water drainage proposals for the site have been designed in accordance with the GDSDS and ensures that Best Management Practise has been incorporated into the design.	**Likelihood level:** Unlikely **Consequence level:** Medium as a result of partial disruption lasting more than one day but less than one week. **Temporal Scale:** long-term **Scale of Effect:** Slight to Moderate **Nature:** Negative **EIA Significance:** Not significant	According to the FRA, Section 9-Residual Risk, there is a residual flood risk that must be addressed during their operational life, for example the failure of building drainage due to lack of maintenance. At present the site has blockages surrounding its inlets and culverts, for example, there is potential, for example in the event of culvert collapse, of the stream surcharging within the site to a level in excess of that predicted by the models. To address this residual risk, it is recommended that a Site-Specific Flood Risk Mitigation Plan prepared in accordance with the guidelines is implemented throughout the operational life of the proposed development. This must include a maintenance regime for all drainage features within the site and for regular inspection of drainage features immediately upstream and downstream of the site. This would mitigate against the effects.

Table 13-15: Operation Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
	Operation	**Receptor:** Buildings and Infrastructure Extreme rainfall events could lead to flooding of the underground foundations or services (electrical cables)	According to the FRA, an initial assessment of flood risk indicators suggested that the site could be at risk from fluvial flooding during 1.0% AEP and 0.1% AEP events. Cumulatively, the proposed development would increase floodplain storage by 2,018 m^3 and would lead to a slight reduction in flood risk. It is noted in the SFRA that if all surface water mitigation measures in the Engineering report are implemented, then the proposed development would not be at risk of fluvial flooding. The FRA, Section 8 states that the site is not at risk from pluvial flooding. The materials used in the manufacture of electrical cables and ducts would be in accordance with BS 3506:1996[46] (or equivalent) to protect against weathering (Section 4.3 of Tender Document Volume 5: Scope 5.2 Contract Specifications).	**Likelihood level:** Unlikely **Consequence level:** Medium as a result of partial disruption lasting more than one day but less than one week. **Temporal Scale:** long-term **Scale of Effect:** Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor:** Buildings and Infrastructure Extreme rainfall events could lead to fluvial flooding, including of the Baldonnel stream highlighted within the FRA. This conclusion was identified based from a visual assessment of the channel of the stream and the culverts suggests that both pipes have significant blockages that could greatly reduce the overall capacity of the culvert; the extent of the blockages was such as that the survey could not be completed for the full length of the culvert.	Publicly available flood risk mapping (OPW, CFRAM and SFRA (as described in the FRA) suggests that there is no potential fluvial flood risk at the site during extreme events, with exception of the very south of the site. The Site may be at risk of flooding caused by inadequate hydraulic culvert capacity downstream of the Site. As described, the Baldonnel stream is culverted downstream of the site. There is potential for blockages, however a full survey could not be completed for the full length of the culvert. To mitigate this, it is recommended that an overflow be constructed from the site which would allow such excess to discharge to the stream immediately downstream of the Nangor Road. Subject to the capacity being available, this overflow could possibly discharge to existing surface water drainage in the Nangor Road but a dedicated surface water pipe might be required from the Site to a new outfall downstream of the Nangor Road. It is also proposed that finished floor levels (FFLs) be kept above the 1% AEP flood level with an appropriate allowance for freeboard. The maximum water level during a 1% AEP flood event is 72.15 m. The minimum floor level is 74.00m and the minimum parking level is 73.45 m and so both meet the recommendations of the guidelines. Storm water from the proposed development has been designed in accordance with the GDSDS and ensures that Best Management Practice has been incorporated into the design. The total attenuation volume required has been calculated as being approximately 1,084 m^3. This would be provided via a combination of 2 storage ponds with an attenuation volume of 970 m^3, and permeable paving. This attenuation would lead to a slight reduction in flood risk. The proposed development therefore meets the requirements of the Guidelines for Compensatory Storage. The subject site currently comprises a greenfield site and the proposed surface water measures are aimed at improving the general surface water management of the site, by introducing interceptors, attenuation measures and by restricting discharge to an acceptable rate. SuDS measures have been designed to accommodate a 1 in 100 annual probability storm event plus a 20% climate change allowance (a 20% increase in peak rainfall depths). The outflow from the proposed development would be to the Baldonnel	**Likelihood level**: Possible **Consequence level**: Medium **Temporal Scale:** long-term **Scale of Effect**: Slight to Moderate **Nature:** Negative **EIA Significance:** Not significant	A Site-Specific Flood Risk Mitigation Plan should also be prepared in accordance with the Guidelines is implemented throughout the operational life of the proposed development. This must include a maintenance regime for all drainage features within the Site and for regular inspection of drainage features immediately upstream and downstream of the site. This would ensure that the long-term residual operation effects would remain as reported in the assessment of effects section.

[46] BSi, 1998. BS EN ISO 3506-3:1998 - Mechanical properties of corrosion-resistant stainless-steel fasteners. Set screws and similar fasteners not under tensile stress.

Table 13-15: Operation Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
			Stream and would be restricted by way of a Hydrobrake which would limit the total discharge to 2.8 l/s (the calculated QBAR greenfield run-off rate). Storm water from all car park areas and delivery areas would be drained by a series of on-site gullies and channels that drain into a separate system of below ground gravity storm water. It is noted in the FRA that if all surface water mitigation measures are implemented, then the proposed development would not be at risk of fluvial flooding and would not give rise to fluvial flood risk elsewhere.		
	Operation	**Receptor:** Buildings and Environment and infrastructure Extreme rainfall events could lead to flooding of the drainage assets which could result in overflow of contaminated water from the foul and surface water infrastructure impacting the water quality and ecology of nearby watercourses.	Water quality would also be monitored to achieve the agreed discharge license levels with SDCC. Within FRA section 8, it is stated that pluvial flooding does not pose a risk and further assessment is not required. The storm water drainage within the entire development has been designed to accommodate a 1:2-year storm frequency. The pond, attenuation tank and permeable paving sub-base areas have been designed to accommodate a 1:100-year storm event +20 % climate change. The peak flows from the development the diverged stream would be restricted to match existing flow rates to ensure existing drainage regime is maintained. Storm water attenuation measures, e.g., SuDS would be incorporated into the proposed development as mentioned previously. All appropriate methods would be utilised to ensure that surface water arising during construction activities would contain minimum sediment, prior to the ultimate discharge to the proposed attenuation pond/tanks and the existing stream. Grease traps would be installed on foul sewers where necessary. Best practice in design and construction would be employed for the installation of surface water and sanitary drainage. As specified in the Engineering report, road gullies would be precast trapped gullies to the relevant standard BS5911:Part2:1982, which would minimise the risk of floating contamination of the surface water system. Hydrocarbon interceptors would be provided on storm water drainage sewers from car parking areas as required. A range of Separators for use within the Surface Water Drainage strategy, which would be used to prevent hydrocarbons from mixing with clean water located within drainage systems. This includes implementation of an oil alarm system. Prior to discharging into the proposed pond, the storm water from the car park and access roads, which is drained via the methods as described above, would be directed through an appropriately sized Conder Separators (or similar approved) petrol interceptor. Source control SUDS must also be considered and incorporated where suitable.	**Likelihood level**: Unlikely **Consequence level**: Low **Temporal Scale:** long-term **Scale of Effect**: Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor:** Human health Increased frequency of intense rainfall events could result in wet pavement surface leading to reduced skid resistance leading to unsafe conditions for site personnel.	As committed to in the Engineering Report, storm water from all car park areas and access roads / delivery areas would be drained by a series of on-site gullies and channels that drain into a separate system of below ground gravity storm water, and Permeable Paving.	**Likelihood level**: Unlikely **Consequence level**: Medium as a result of health and safety impacts requiring medical treatment. **Temporal Scale:** long-term **Scale of Effect**: Imperceptible to Not Significant **Nature:**	Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. However, it is recommended that glass bead and grain mix should be applied on pavements to increase skid resistance and site personnel safety.

Table 13-15: Operation Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
				Negative **EIA Significance:** Not significant	
Increased frequency and intensity of high temperatures: Heatwave	Operation	**Receptor**: Environmental receptors Increased frequency and severity of extreme heat events (i.e., heat waves) could result in the landscape design being compromised (e.g., tree and shrubs die).	Climate change and long-term maintenance requirements would be key considerations for the selection of vegetation species: • A diverse tree planting palette of 849 new trees and 4,449 saplings would be used to increase overall resilience to disease and climate change; • The detailed planting design would promote sustainable planting by developing planting designs that are appropriate for their location, including the availability of sunlight and water; Drought tolerant and low maintenance species would be considered for street trees and planting to minimise water use; and Excess water from the data centre's cooling system can be used to water vegetation.	**Likelihood level**: Possible **Consequence level**: Low due to cost implications of replacing plants **Temporal Scale:** long-term **Scale of Effect**: Imperceptible to Not Significant **Nature:** Negative **EIA Significance**: Not significant	Additional Mitigation not required – Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor**: Buildings and Infrastructure Increased frequency and severity of extreme heat events could result in overheating of the electrical equipment (e.g. data servers).	As stated in the energy strategy, the recommended range of the data servers is 18-27 °C, and the allowable range is 15-32 °C. Under the RCP8.5 scenario, it is not predicted that the average temperature for the future baseline would exceed both the recommended and allowable ranges regularly. It is predicted future heatwaves with extreme high temperatures would occur more frequently. Air conditioning would be used to mitigate extreme heat on such days. This would include Chilled water will be produced by premium efficiency air-cooled chillers located on the roof, and 12 air handling units. Heating would reduce the risk of internal cold temperatures during operation. Electrical specification for electrical equipment including cabinets, should account for appropriate temperature thresholds to reduce risks of overheating during operation	**Likelihood level**: Unlikely **Consequence level**: low **Temporal Scale:** long-term **Scale of Effect**: Imperceptible to Not Significant **Nature:** Negative **EIA Significance**: Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor**: Buildings and Infrastructure Transformers affected by urban heat islands and coincident air conditioning demand leading to overloading in summer months.	When operational the EirGrid substation would provide power to the site with power demand offset by the MFGP within the July 2022 DUB-1 permitted development. The EirGrid substation is subject to a separate SID application to ABP (due to be decided).	**Likelihood level**: Unlikely **Consequence level**: Medium **Temporal Scale:** long-term **Scale of Effect**: Imperceptible to Not Significant **Nature:** Negative **EIA Significance:**	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. However, it is recommended that smart grid technology should be explored in order to store energy ready for peaks in energy demand.

Table 13-15: Operation Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
				Not Significant	
	Operation	**Receptor**: Buildings and Infrastructure High temperatures and heatwaves could result in overheating and unsuitable conditions e.g., discomfort for occupants in ancillary buildings and office spaces	Within the energy strategy, the Applicant has reviewed the following passive design measures for reducing overheating risk in the residential elements: • Mechanical ventilation with heat recovery is proposed for to provide heat from the data modules to the administrative office areas; and • Air conditioning would be used to mitigate extreme heat on such days. This would include Chilled water will be produced by premium efficiency air-cooled chillers located on the roof, and 12 air handling units.	**Likelihood level**: Unlikely **Consequence level**: Low **Temporal Scale:** long-term **Scale of Effect**: Imperceptible to Not Significant **Nature:** Negative **EIA Significance**: Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. However, it is recommended that passive design measures for reducing overheating are explored, including: • Building shape/de-tailing (blinds); • Low g-value glazing; and • Openable windows.
	Operation	**Receptor**: Buildings and Infrastructure Heatwaves, higher temperatures could damage the building structure	As stated in the EIAR, Management Plans would specify measures to regularly inspect the data center. Materials required to construct the Vantage data center should be selected that provide increased tolerance to high temperatures in accordance with BS EN 1367-4:2008[47] - Test for thermal and weathering properties of aggregates – Part 4: Determination of dry shrinkage.	**Likelihood level**: Unlikely **Consequence level**: Medium **Temporal Scale:** long-term **Scale of Effect**: Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor**: Buildings and Infrastructure Heatwaves, high temperatures and increased humidity could lead to lightning striking the data center resulting in damage to infrastructure or loss of power.	It is understood that emergency response and contingency plans would be put in place to manage the risk of lightning strikes. Back-up generators would be present to ensure the continual running of the data center despite a lack of electrical power.	**Likelihood level:** Unlikely **Consequence level:** High as a result of health and safety impacts and disruption to operations **Temporal Scale:** long-term **Scale of Effect**: Slight to Moderate **Nature:** Negative **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
Increased frequency and	Operation	**Receptor**: Infrastructure and human heath	Emergency response and contingency plans would be put in place to manage the risk of fires.	**Likelihood level:** Unlikely	Additional Mitigation not required. Existing design and mitigation

[47] BSi, 2009. BS EN 1367-4:2008 – Tests for thermal and weathering properties of aggregates. Determination of drying shrinkage. June 2009.

Table 13-15: Operation Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
intensity of high temperatures: Drought		Prolonged periods of drought could lead to vegetation drying, increasing risk of grassland fires near the Data center. Secondary impacts include infrastructure damage and vegetation	As stated in the EIAR, Maintenance and Management Plans would specify measures to effectively manage vegetation to reduce risk of grassland fires. Native trees, shrub species and meadow grass seed mix would be planted that are suitable for the climate conditions of the area. Water used to cool the data center could be used to ensure vegetation did not become dry.	**Consequence level:** High as a result of health and safety impacts. **Temporal Scale:** long-term **Scale of Effect**: Slight to Moderate **Nature:** Negative **EIA Significance:** Not significant	measures are appropriate to account for climate change/ extreme weather.
Increased frequency and intensity of high temperatures: Drought	Operation	**Receptor:** Human health receptors Prolonged periods of drought could affect water and potable water availability.	The proposed development would comply with the following: • A leak detection system capable of detecting a major water leak on the mains waterwould be installed; and • Installation of flow control devices and water efficient sanitary fittings on WCs.	**Likelihood level**: Unlikely **Consequence level:** Low **Temporal Scale:** long-term **Scale of Effect**: Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	Additional mitigation not required. Existing design and mitigation measures areappropriate to account for climate change/ extreme weather.
Extreme weather events: Cold weather events	Operation	**Receptor:** Buildings and Infrastructure and human health Freeze-thaw could damage the proposed development, e.g. cracking, deformation, that reduces the proposed development's service life.	Materials required to construct the proposed development should be selected that offer increased tolerance to temperatures in accordance with BS EN 1367-4:2008 - Test for thermal and weathering properties of aggregates – Part 4: Determination of dry shrinkage.	**Likelihood level**: Low **Consequence level**: Low **Temporal Scale:** long-term **Scale of Effect**: Imperceptible to Not Significant **Nature:** Negative **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

ICCI

13.8.17 The ICCI assessment for the proposed development has not identified any significant effects for the operation stage once existing design mitigation measures are taken into account. All effects are therefore considered to be long term, **Imperceptible to Not Significant**, **negative** in nature and **not significant** in terms of EIA.

13.8.18 A summary of potential ICCI effects during the operational stage is provided in Table 13-16. The assessment is based on professional judgment informed by a review of individual technical assessments within the EIAR.

Table 13-16: Operational Stage ICCI

Effect of Proposed Development on Receptors	Existing Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
Population and Human Health Potential interactions of climate change with the identified effects are considered to be Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Transport and Accessibility Potential interactions of climate change with the identified effects are considered to be Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Air Quality Potential interactions of climate change with the identified effects are considered to be Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Noise and Vibration Potential interactions of climate change with the identified effects are considered to be Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Water Resources and Flood Risk					
Exposure of sensitive receptors to water during operation	Demolition and construction works are to be undertaken in compliance with a Construction and Environmental Management Plan (CEMP), which will cover all potentially polluting activities and emergency response procedures.	Increased frequency and intensity of extreme weather events: Intense rainfall events	An increase in global temperature can increase the intensity and frequency of rainfall events.	Long term, Imperceptible to Not Significant, negative (not significant in terms of EIA) as the FRA assessed that the site is not at risk of pluvial flood risk. Additionally, implementation of the drainage strategy in compliance with the GDSDS would mitigate any risk of flood. The proposed surface water management strategy includes an allowance for climate change would result in a positive impact of low magnitude on the flood risk status (high sensitivity).	It is recommended that a Specific Flood Risk Mitigation Plan be prepared, in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities[45].
Ecology Potential interactions of climate change with the identified effects are considered to be long term, Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Ground Conditions Potential interactions of climate change with the identified effects are considered to be long term, Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Waste Potential interactions of climate change with the identified effects are considered to be long term, Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					
Material Assets Potential interactions of climate change with the identified effects are considered to be long term, Imperceptible to Not Significant, negative (not significant in terms of EIA) based on professional judgement and review of the topic EIAR chapter.					

GHG Emissions

13.8.19 The proposed development would result in GHG emissions during the operation stages. Embedded mitigation measures and potential impacts have been identified in this section and a preliminary assessment of effects has also been provided below.

13.8.20 Consideration has been given to the proposed development's opportunities to reduce, minimise or avoid GHG emissions. In line with the Government of Ireland National Mitigation Plan (2017)[6], the Government of Ireland Climate Action Plan (2019)[7], and more specifically the SDCC Climate Change Action Plan 2019-2024[11], which set out the Irish Government's carbon reduction plan targets, as part of the design process potential impacts on GHG emissions have been considered.

13.8.21 Embedded mitigation measures have been described in Table 13-17.

Table 13-17: GHG mitigation measures during operation stage

Mitigation measure	Mitigation detail	Method of reduction
Renewable Energy	Photovoltaic panels would be installed on the roof above the Administration block, in line with policy E7 of the SDCC Development Plan 2022-2028[13].	Avoid/ prevent
Internal Lighting	Internal lighting would be provided by high-efficient, low energy LED luminaires combined with presence detection controls or local switching where appropriate, to reduce operational energy demand. LED luminaires are also to be used for the emergency lighting installation, which is de-signed to reduce energy demand, complying with requirements EN 1838 and IS 3217:2013+A1:2017;	Reduce
External Lighting	External lighting would make use of high efficiency, low energy LED luminaires. Secondary external lighting in areas such as the generator compound would be operated via daylight detection to minimize hours of operation and thus keep energy usage to a minimum.	Reduce
Transformers	To reduce electrical losses between HV/MV/LV conversions, the applicant would install low loss transformers which comply with the Ecodesign directive 548/2014 as a minimum.	Reduce
Cooling system	Chilled water would be produced by premium efficiency air-cooled chillers. The chillers would be selected for elevated supply and return temperature to maximise system efficiency. Chillers would have an integral economizer capability to allow the compressor energy to be reduced or eliminated as the outside ambient temperature decreases. This reduces energy consumption in weather conditions where they are not required.	Reduce
Ventilation System	Hot Aisle containment would be used to separate supply and return air paths and maximize system efficiency by allowing elevated supply air temperatures. During winter conditions the ambient air would be pre-heated using low temperature hot water (LTHW) supplied by the roof mounted heat pump (described later). High efficiency total enthalpy recovery wheel will be provided to recover energy from the exhaust system before discharge.	Remediate
Direct Drive EC Fans	All air supply and extract systems serving the data module rooms are provided with high efficiency direct drive fans. The EC direct drive fans are lighter in weight and require less power than a traditional centrifugal fan with variable speed drive (VSD). Typically, savings of 10-20% in power consumption is achievable with an EC fan versus a centrifugal fan.	Reduce
Waste Heat Recovery	The waste heat from the data modules would be used to heat the administration office areas, assisted by heat pump technology. The return water from the cooling process will be used to maximize the water sourced heat pumps efficiency, used for the admin block heating system. The chilled water system could reject heat into a local heat network. The above provisions could allow the supply of heat energy to a future district heating scheme developed by others, external to the site boundary. A district heating system and energy from waste system are recommended for data centers as part of the SDCC development plan 2022-2028[13].	Remediate
Emergency Back-Up Generators-	Standby power to each electrical room would be provided by containerised, diesel-powered emergency back-up generators. These generators would only provide emergency back-up power in event of loss of the utility supply and therefore would be non-operational for most of time.	Reduce
Offices & Ancillary Areas	Building Energy Rating BER - A3 or higher is targeted for the office development with the utilisation of roof mounted air-cooled free cooling chillers and roof mounted PV Panels in compliance with nZEB "Nearly Zero – Energy Buildings" requirements. Heating to the office area would be provided by heat pumps and energy efficient heat recovery units, which would recover waste heat from the office spaces and re-use to pre-heat the air with the HRU. This would reduce the overall energy consumption for this system, and subsequently GHG emissions.	Remediate
Materials	It is assumed that materials/assets with longer lifespans would be specified. to avoid future need for replacement	Avoid/ prevent
External Areas	Provision of 60 car parking spaces, 12 of which will be dedicated to EV charging. 3 dedicated disabled bays and 26 cycle parking spaces would also be provided. All car parking spaces would contain the potential for future electric hook-up.	Avoid/ prevent

13.8.22 This assessment presents an estimation of the GHG emissions for the 'Do Something' scenario, a comparison against the 'Do Nothing' baseline, and assessment against Ireland's carbon budgets. The GHG emissions in this section are a high-level indication only and would be updated and refined as the proposed development's design develops and updated traffic and air quality modelling becomes available.

13.8.23 The GHG emissions associated with the operation of the proposed development are reported in tonnes of CO_2e for the first full year of operation, as well as over the estimated design life (approximately 60 years). The GHG emissions are summarised in Table 13.18.

Table 13-18: Estimated Operation ('use stage') GHG emissions for 2026 and total over the assumed 60-year operational period (2025-2085)

Main stage of project lifecycle	Sub-stage of lifecycle	Emissions (tCO_2e)	
		2026 (modelled opening year)*	Total (cumulative) over modelled 60-year operation (2025-2085)
Operation	Emergency backup from diesel generators with PV panels	1,505	90,319
	Traffic associated with the proposed development	82	440

Table 13-18: Estimated Operation ('use stage') GHG emissions for 2026 and total over the assumed 60-year operational period (2025-2085)

	Total	1,587	90,759	

*The opening modelled year has been stated as 2026 as this is the first full year that the proposed development is operational.

13.8.24 The operation of the proposed development is expected to contribute 0.00028 % of Ireland's proposed 295 $MtCO_2e$ carbon budget for 2021-2025, 0.00392 % of the 250 $MtCO_2e$ 2026-2030 carbon budget, and 0.00502 % of the 151 Mt 2031-2035 carbon budget.

13.8.25 Due to the minor scale of the GHG emissions in comparison to the national, regional and projected sectoral carbon budgets and incorporation of the proposed mitigation measures, which include a net zero carbon offset payment, the proposed development is assessed as compatible with the budgeted, science-based 1.5 °C trajectory in terms of rate of emissions reduction. Therefore, whilst all GHG emissions contribute to climate change, the scale of effect of the proposed development on the likelihood of avoiding severe climate change, aligning with a science-based 1.5 °C compatible trajectory and achieving net zero by 2050, is considered to be **Slight to Non-Significant** in magnitude, **Negative** in nature and **Not Significant** in EIA terms.

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13.8.26 In line with IEMA guidance[14], due to the nature of GHG emissions it is good practice to report whole life GHG emissions associated with the proposed development.

13.8.27 The operational GHG emissions have been reported in tCO_2e for the anticipated opening year of the proposed development (Q1 2025) and for the period covering Ireland's carbon budgets (2021 to 2025, 2026 to 2030 and 2031 to 2035).

13.8.28 The demolition, construction and operation of the proposed development is expected to contribute 0.00565 % of Ireland's proposed 295 $MtCO_2e$ carbon budget for 2021-2025, 0.00392 % of the 250 $MtCO_2e$ 2026-2030 carbon budget, and 0.00502 % of the 151 Mt 2031-2035 carbon budget.

13.8.29 Due to the minor scale of the GHG emissions in comparison to the national carbon budgets and incorporation of the proposed mitigation measures, the proposed development is assessed as compatible with the budgeted, science-based 1.5 °C trajectory in terms of rate of emissions reduction. Therefore, whilst all GHG emissions contribute to climate change, the scale of effect of the proposed development on the likelihood of avoiding severe climate change, aligning with a science-based 1.5 °C compatible trajectory and achieving net zero by 2050, is considered to be **Slight to Non-Significant** in magnitude, **negative** in nature and **not significant** in EIA terms.

13.9 Additional Mitigation

Demolition and construction Stage

CCR and ICCI

13.9.1 The proposed development has been designed to improve its resilience to climate change through a range of design and construction standards, good engineering practice. No additional mitigation measures for the CCR and ICCI assessments beyond the mitigation already described in Table 13-12 would be required for the demolition and construction stage.

GHG Emissions

13.9.2 The IEMA guidance indicates GHG emissions should be considered as 'significant' if they are not compatible with the budgeted, science-based 1.5°C trajectory in terms of rate of emissions reduction and do not comply with up-to-date policy and 'good practice' reduction measures. As GHG Emissions from the demolition and construction stage of the proposed development are low in comparison to Ireland's Carbon Budget, no additional mitigation measures are required have been identified to be required..

Operation Stage

CCR

13.9.3 Taking into consideration the additional mitigation proposed in Chapter 10: Water Resources and Flood Risk, no additional mitigation is proposed for CCR.

ICCI

13.9.4 No additional mitigation is proposed for ICCI.

GHG Emissions

13.9.5 The IEMA guidance indicates GHG emissions should be considered as 'significant' if they are not compatible with the budgeted, science-based 1.5°C trajectory in terms of rate of emissions reduction and do not comply with up-to-date policy and 'good practice' reduction measures. As GHG emissions from the operation stage of the proposed development are low in comparison to Irelands Carbon Budget, no additional mitigation measures are required.

13.10 Enhancement Measures

13.10.1 No enhancement measures are proposed or required in respect of Climate Change.

13.11 Assessment of Residual Effects

Demolition and Construction Residual Effects

CCR and ICCI

13.11.1 As no additional mitigation would be required, the residual demolition and construction effects remain as reported in the Assessment of Effects section.

GHG Emissions

13.11.2 As no additional mitigation would be required, the residual operation effects remain as reported in the Assessment of Effects section.

Operation Residual Effects

CCR

13.11.3 Assuming that the residual risk of flooding from the Baldonnel stream and overwhelming of the drainage system would be mitigated through a Detailed Flood Mitigation Plan, the residual effects would be reduced from **Imperceptible to Not Significant** and **Slight to Moderate,** to **Imperceptible to Not Significant**.

13.11.4 As such the impact of consequence of these residual effects are reduced as followed:

- Overwhelming of drainage assets: Likelihood level: **Possible**; Consequence level: **Low**; Scale of Effect: **Imperceptible to Not Significant** (**Not Significant** in terms of EIA); and
- Flooding of the Baldonnel stream: Likelihood level: **Possible**; Consequence level: **Low**; Scale of Effect: **Imperceptible to Not significant** (**Not Significant** in terms of EIA).

ICCI

13.11.5 As no additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section.

GHG Emissions

13.11.6 As no additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section.

Summary of Residual Effects

Table 13.19 provides a summary of the outcomes of the Climate Change assessment of the proposed development.

Table 13-19: Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Demolition and construction								
CCR								
Buildings and Infrastructure	Extreme rainfall events could result in the erosion of stockpiles and resultant silting of drainage assets.	None required	Imperceptible to Not Significant	-	U	D	R	T
Buildings and Infrastructure	Extreme rainfall events and their secondary impacts could affect the ability to undertake certain construction activities leading to programme delays (e.g. pouring of concrete and asphalt) increasing project costs.	None required	Imperceptible to Not Significant	-	U	D	R	T
Environment	Extreme rainfall events could result in increased runoff of concrete or cement products nearby watercourses.	None required	Imperceptible to Not Significant	-	U	I	R	T
Human health	Heatwaves, higher temperatures and drought conditions could impact dust generated during construction activities.	None required	Imperceptible to Not Significant	-	U	D	R	T
Human heath	Winds gusts could result in the damage of stockpiles. Secondary impacts could include site personnel welfare impacts.	None required	Imperceptible to Not Significant	-	U	I	R	T
Human health	Heatwaves, higher temperatures could impact on site construction personnel welfare, for example, causing heat stress and unsafe working conditions.	None required	Imperceptible to Not Significant	-	U	D	R	T
ICCI								
Population and Human Health Sensitive Receptors	Potential interactions of climate change with the identified Population and Human Health effects	None required	Imperceptible to Not Significant	-	U	D	R	Mt
Transport Sensitive Receptors	Potential interactions of climate change with the identified transport effects.	None required	Imperceptible to Not Significant	-	U	D	R	Mt
Air Quality Sensitive Receptors	Exposure of sensitive receptors to dust from demolition and construction activities.	None required	Not significant	-	U	D	R	Mt
Air Quality Sensitive Receptors	Exposure of sensitive receptors to dust from demolition and construction activities.	None required	Not significant	-	U	D	R	Mt
Noise and Vibration Sensitive Receptors	Potential interactions of climate change with the identified Noise and Vibration effects.	None required	Imperceptible to Not Significant	-	U	D	R	Mt

Table 13-19: Summary of Residual Effects

Water Resources and Flood Risk Sensitive Receptors	Exposure of sensitive receptors to water from demolition and construction activities.	None required	Imperceptible to Not Significant	--	U	D	R	Lt
Ecology Sensitive Receptors	Exposure of sensitive receptors to demolition and construction activities.	None required	Imperceptible to Not Significant	-	U	I	IR	Mt
Ground Conditions Sensitive Receptors	Exposure of sensitive receptors (water) to demolition and construction activities	None required	Imperceptible to Not Significant	-	U	D	R	Mt
Waste Sensitive Receptors	Potential interactions of climate change with the identified Waste effects	None required	Imperceptible to Not Significant	-	U	D	R	Mt
Material Assets Sensitive Receptors	Exposure of sensitive receptors (surface water) to demolition and construction activities	None required	Not significant	-	U	D	R	Mt
Material Assets Sensitive Receptors	Exposure of sensitive receptors (water supply) to demolition and construction activities	None required	Imperceptible to Not Significant	-	U	I	R	Lt
GHG Emissions								
Global Climate	GHG Emissions	None required	Slight to Not Significant (not significant)	-	IR	D	L	LT
Operation								
CCR								
Buildings and Infrastructure	Extreme rainfall events and increased frequency of intense rainfall events could result in the overwhelming of drainage assets.	None Required	Imperceptible to Not Significant	-	U	D	R	Lt
Buildings and Infrastructure	Extreme rainfall events could lead to flooding of the underground foundations or services (electrical cables)	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Buildings and Infrastructure	Extreme rainfall events could lead to fluvial flooding, including of the Baldonnel stream highlighted within the FRA; culvert has potential blockages	Non required	Imperceptible to Not Significant	-	U	D	R	Lt
Buildings and Infrastructure	Extreme rainfall events could lead to flooding of the drainage assets	None required	Imperceptible to Not Significant	-	U	I	R	Lt
Human Health	Increased frequency of intense rainfall events could result in wet pavement surfaces leading to reduced skid resistance and unsafe conditions for site personnel.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Environment	Increased frequency and severity of extreme heat events (i.e., heat waves) could result in the landscape design being compromised (e.g., tree and shrubs die).	None required	Imperceptible to Not Significant	-	U	I	R	Lt
Buildings and Infrastructure	Increased frequency and severity of extreme heat events could result in overheating of the electrical equipment (e.g. data servers).	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Buildings and Infrastructure	Transformers affected by urban heat islands and coincident air conditioning demand leading to overloading in summer months.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Buildings and Infrastructure	High temperatures and heatwaves could result in overheating and unsuitable conditions e.g., discomfort for	None required	Imperceptible to Not Significant	-	U	D	IR	Lt

Table 13-19: Summary of Residual Effects

	occupants in ancillary buildings and office spaces							
Buildings and Infrastructure	Heatwaves, higher temperatures could damage the building structure	None required	Imperceptible to Not Significant	-	U	D	IR	Lt
Buildings and Infrastructure	Heatwaves, high temperatures and increased humidity could lead to lightning striking the data centre resulting in damage to infrastructure or loss of power.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Infrastructure and Human Health	Prolonged periods of drought could lead to vegetation drying, increasing risk of grassland fires near the Data centre. Secondary impacts include infrastructure damage and vegetation	None required	Imperceptible to Not Significant	--	U	I	IR	Lt
Human Health	Prolonged periods of drought could affect water and potable water availability.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Buildings and Infrastructure and human health	Freeze-thaw could damage the proposed development, e.g. cracking, deformation, that reduces the proposed development's service life.	None required	Imperceptible to Not Significant	-	U	D	IR	Lt
ICCI								
Population and Human Health Sensitive Receptors	Potential interactions of climate change with the identified Population and Human Health effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Transport Sensitive Receptors	Potential interactions of climate change with the identified transport effects.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Air Quality Sensitive Receptors	Potential interactions of climate change with the identified Air Quality effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Noise and Vibration Sensitive Receptors	Potential interactions of climate change with the identified Noise and Vibration effects	None required	Imperceptible to Not Significant	-		D	R	Lt
Water Resources and Flood Risk Sensitive Receptors	Exposure of sensitive receptors to water from operational stage	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Ecology Sensitive Receptors	Potential interactions of climate change with the identified Ecological effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Ground Conditions Sensitive Receptors	Potential interactions of climate change with the identified Ground Conditions effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Waste Sensitive Receptors	Potential interactions of climate change with the identified Waste effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
Material Assets Sensitive Receptors	Potential interactions of climate change with the identified Material effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
GHG Emissions								
Global Climate	GHG Emissions	None required	Slight to Non Significant	-	IR	D	L	LT

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

13.12 Cumulative Effects

Intra-Project Effects

13.12.1 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Intra Cumulative Effects. However, in the instance of this climate assessment, in line with IEMA guidance, intra-cumulative effects have been considered in the ICCI assessment.

Inter-Project Effects

CCR

13.12.2 The climate resilience effects identified are limited in their spatial extent to the site boundary and the proposed development in isolation. Therefore, cumulative CCR effects with other schemes have not been considered.

ICCI

13.12.3 The ICCI identified are limited in their spatial extent to the relevant technical assessments in the EIAR for the proposed development. Therefore, cumulative effects have been considered for each technical discipline as opposed to in-combination with cumulative schemes.

GHG Emissions

13.12.4 GHG emissions contribute cumulatively with all sources of GHG emissions globally to cause climate change. This assessment has considered GHG emissions in the context of GHG emissions in Ireland and no further consideration of the proposed developments GHG emissions with other sources of GHG emissions is necessary.

13.13 Summary of Assessment

Background

13.13.1 This chapter has detailed the potential climate change effects due to the demolition and construction and operation stages of the proposed development. The assessment of demolition and construction and operation stages have been undertaken taking into account the relevant national and local guidance and regulations.

Demolition and construction Effects

13.13.2 During demolition and construction works, it is expected that general climate trends for Ireland, including extreme weather events (e.g., increased wind speeds, drought, intensity of precipitation events) would continue to occur irrespective of whether the proposed development is built or not.

CCR

13.13.3 The CCR assessment has reviewed the potential vulnerability of the proposed development to extreme weather and projected climate change. Considering embedded mitigation measures, all effects have been of low or medium magnitude and therefore the effects are considered to range from **Imperceptible to Not Significant, negative** in nature and **not significant** in terms of EIA.

ICCI

13.13.4 The basis of this assessment was to review the identified effects, the receptors and embedded mitigation measures for each technical assessment contained within the EIAR. Professional judgement has been used to assess whether projected climate change could increase the magnitude of the effects as identified by the disciplines, change the sensitivity of the receptors, or reduce the effectiveness of embedded mitigation measures.

13.13.5 Overall, the effects are considered to be **Imperceptible to Not Significant, negative** in nature and **not significant** in terms of EIA.

GHG Emissions

13.13.6 The high-level GHG emissions assessment has estimated the demolition and construction of the proposed development would result in approximately 15,828 tCO_2e over the course of the demolition and construction stage. Considering embedded mitigation measures (shown in Table 13-13), the effect of GHG emissions are considered to be **Slight to Not Significant, (Not Significant** in terms of EIA**)** in comparison with Ireland's carbon budgets.

Operation Effects

13.13.7 During the operation stage, it is expected that general climate trends for Ireland, including extreme weather events, would continue to occur irrespective of whether the proposed development is built or not. This includes:

- an increase in mean annual temperatures;
- warming would be enhanced at the extremes with an increase in summer daytime and winter night-time temperatures;
- summer heatwave events are expected to occur more frequently;
- precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events;
- a mean reduction in wind speeds; and
- a decrease in the number of frost days and ice days.

CCR

13.13.8 The CCR assessment has reviewed the potential vulnerability of the proposed development to extreme weather and projected climate change. Considering embedded mitigation measures, a medium effect was considered for the flooding of the Baldonnel stream, and the overwhelming of drainage assets, causing secondary flooding. However, with the consideration of embedded mitigation, and additional mitigation identified through technical chapter assessment the residual effects are considered to be low or medium magnitude. This effect is therefore considered to be **Imperceptible to Not Significant, Negative** in nature and **Not significant** in terms of EIA.

13.13.9 Considering embedded mitigation measures, all other effects have been of low magnitude and are therefore considered to range from **Imperceptible to Not Significant** to **Slight, negative** in nature and **not significant** in terms of EIA.

ICCI

13.13.10 The basis of this assessment was to review the identified effects, the receptors and embedded mitigation measures for each technical assessment contained within the EIAR. Professional judgement has been used to assess whether projected climate change could increase the magnitude of the effects as identified by the disciplines, change the sensitivity of the receptors, or reduce the effectiveness of embedded mitigation measures.

13.13.11 Overall, the effects are considered to be **Imperceptible to Not Significant, Negative** in nature and **Not significant** in terms of EIA.

GHG Emissions

13.13.12 The high-level GHG emissions assessment has estimated the operation of the proposed development would result in approximately 90,759 tCO_2e over the course of the operation stage.

Considering embedded mitigation measures (shown in Table 13-17), the effect of GHG emissions are considered to be **Slight to Not Significant Negative, (Not Significant** in terms of EIA**)** in comparison with Ireland's carbon budgets

Demolition, Construction and Operation Stage – Assessment against Ireland Carbon Budgets

13.13.13 The demolition, construction and operation of the proposed development is expected to contribute 0.00565 % of Ireland's proposed 295 $MtCO_2e$ carbon budget for 2021-2025, 0.00392 % of the 250 $MtCO_2e$ 2026-2030 carbon budget, and 0.00502 % of the 151 Mt 2031-2035 carbon budget. And effects are considered to be **Slight to Not-Significant, Negative** in nature and **Not Significant** in EIA terms.

Cumulative Effects

CCR

13.13.14 The CCR identified are limited in their spatial extent to the site boundary and therefore no cumulative effect with other committed developments has been considered.

ICCI

13.13.15 The ICCI assessment identified are limited in their spatial extent to the relevant technical assessments in the EIAR for the proposed development. Therefore, cumulative effects have been considered for each technical discipline as opposed to in-combination with cumulative schemes.

GHG Emissions

13.13.16 GHG emissions contribute cumulatively with all sources of GHG emissions globally to cause climate change. This assessment has considered GHG emissions in the context of GHG emissions in Ireland and no further consideration of the proposed developments GHG emissions with other sources of GHGs is considered necessary.

14 WASTE

14.1 Introduction

14.1.1 This chapter of the EIAR reports on the likely significant waste effects to arise from the demolition and construction stage and the operation stage of the proposed development.

14.1.2 The chapter describes the waste policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely waste effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

14.1.3 There are no technical appendices supporting this chapter.

14.1.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - Waste Framework Directive (2008/98/EC)[1];
  - Landfill Directive (1999/31/EC), as amended in 2003 (2003/33/EC).
- National Legislation and Policy:
  - Waste Management Act 1996 (as amended)2;
  - Waste Management (Licencing) Regulations 20043;
  - European Communities (Waste Directive) Regulations 20114;
  - National Climate Action Plan 20215
  - Draft Best Practice Guidelines for the Preparation of Waste Management Plans for Construction Demolition Projects (2021)6 – which revised previous Guidelines set in 20067
  - the Litter Pollution Act 1997 (revised in April 2022)8 ; and
  - Environmental Protection Agency (EPA) National Waste Statistics Summary Report for 2018[9].
- Regional Policy:
  - Eastern Midlands Regional Waste Management Plans 2015-2021 (2017)10;
  - Construction and Demolition (C&D) Waste: Soil and Stone Recovery/Disposal Capacity, Update Report (2020)11;
- National guidance and Industry Standards:
  - Waste Action Plan for a Circular Economy 2020-2025 (2021)[12];
  - Guidance on Soil and Stone By-Products (2019)[13];
  - Materials and Waste in Environmental Impact Assessment (2020)[14]; and
  - A Resource Opportunity – Waste Management Policy in Ireland (2012)[15].

14.2 Assessment Scope

14.2.1 In considering the generation and management of waste, it is important to define when, under current legislation and understanding, a material is considered to be waste. The Waste Framework Directive (2008/98/EC) defines waste as *"...any substance or object which the holder discards, intends to discard or is required to discard"*.

14.2.2 More specifically, the Waste Action Plan for a Circular Economy (2021) describes C&D waste as waste from any building works, demolition, and development (including transport infrastructure).

14.2.3 The IEMA guidance relating to Materials and Waste in Environmental Impact Assessment[14] and the EPA Best Practice Guidelines for the Preparation of Waste Management Plans for Construction Demolition Projects[6] was used in the assessment. Furthermore, professional judgement, experience and best practice methods have been drawn upon to assess the significance of the potential effects of the proposed development. The assessment has taken account of all applicable legislation, policy, and industry guidance.

14.2.4 The site is located within the jurisdiction of South Dublin County Council (SDCC) and the SDCC Development Plan 2016-2022[16] sets out a number of objectives and actions for the South Dublin area in line with the objectives of the Eastern Midlands Region (EMR) Waste Management Plan (WMP) 2015-2021[8]. The waste objectives with a particular relevance to the proposed development are as follows:

- IE5 Objective 1: To support the implementation of the EMR WMP 2015-2021 by adhering to overarching performance targets, policies, and policy actions.
- IE5 Objective 2: To support waste prevention through behavioural change activities to de-couple economic growth and resource use.
- IE5 Objective 3: To encourage the transition from a waste management economy to a green circular economy to enhance employment and increase the value recovery and recirculation of resources.
- IE5 Objective 8: To secure appropriate provision for the sustainable management of waste within developments, including the provision of facilities for the storage, separation, and collection of such waste.

14.2.5 The waste types and estimated quantities used in this assessment have been based on published data by the Environmental Protection Agency (EPA) in National Waste Statistics[17], data recorded from similar previous developments, and other available research sources.

[1] European Union, 2008. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance). Document 32008L0098.
[2] Government of Ireland, 1996. Waste Management Act 1996 (as amended). Updated to 27 August 2020.
[3] Government of Ireland, 2004. Waste Management (Licencing) Regulations, 2004.
[4] Government of Ireland, 2011. European Communities (Waste Directive) Regulations 2011.
[5] Government of Ireland, 2021. National Climate Action Plan.
[6] Government of Ireland, 2021. C&D Waste. Available at: https://www.gov.ie/en/publication/c305a-construction-and-demolition-cd-waste/ [Last Accessed 08/09/2022].
[7] Department of the Environment, Heritage and Local Government, 2006. Best Practice Guidelines of the Preparation of Waste Management Plans for C&S projects. Available at: https://www.ieanbusinessireland.ie/includes/documents/BPGConstructionand%20demolition.pdf [Last Accessed 08/09/2022].
[8] Government of Ireland, 1997/2009. Litter Pollution Act 1997; Electoral (Amendment) (No. 2) Act 2009 – An Act To Regulate Expenditure By Political Parties And Candidates; To Amend The Local Elections (Disclosure Of Donations And Expenditure) Act 1999; To Amend The Litter Pollution Act 1997; And To Provide For Related Matters.
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[13] EPA, 2010. Guidance on Soil and Stone By-products. Available at: https://www.epa.ie/publications/licensing--permitting/waste/Guidance_on_Soil_and_Stone_By_Product.pdf [Last Accessed 08/09/2022].
[14] Institute of Environmental Management and Assessment (IEMA), 2020. Materials and Waste in Environmental Impact Assessment 2020. Available at: https://www.iema.net/resources/reading-room/2020/03/30/materials-and-waste-in-environmental-impact-assessment [Last Accessed 08/09/2022].
[15] Government of Ireland, 2012. A Resource Opportunity – Waste management policy in Ireland. Available at: https://www.gov.ie/en/publication/a9d98-a-resource-opportunity-waste-management-policy-in-ireland/ [Last Accessed 08/09/2022].
[16] South Dublin County Council, 2016. South Dublin County Council Development Plan 2016-2022. Available at: https://www.sdcc.ie/en/services/planning/development-plan/plan-2016-2022/ [Last Accessed 08/09/2022].
[17] Environmental Protection Agency (EPA), 2022. National Waste Statistics. Available at: https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/ [Last Accessed 08/09/2022].

Technical Scope

14.2.6 The assessment of the likely effects of the proposed development due to the generation and management of waste has considered the remaining landfill void capacity that would be depleted by waste produced during the demolition and construction stage and operation stage of the proposed development.

Spatial Scope

14.2.7 The study area for the waste assessment comprises the area of the Eastern Midlands Region of Ireland. This area has been used for baseline data investigation, and to locate potential sensitive receptors off-site, including surrounding landfill sites.

Temporal Scope

14.2.8 The assessment has considered impacts arising during the demolition and construction stage which would be of expected to be temporary (less than a year) in nature and from the operation stage which would be expected to be long term (15 to 60 years) to permanent in nature (i.e., >60 years).

14.3 Baseline Characterisation Method

Desk Study

14.3.1 In order to establish baseline waste conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- South Dublin County Council Development Plan 2016-2022[14];
- EMR WMP 2015-2021[10];
- Draft Best Practice Guidelines for the Preparation of Waste Management Plans for Construction Demolition Projects[6];
- Waste Action Plan for a Circular Economy[12];
- C&D Waste Soil and Stone Recovery/Disposal Capacity Update Report 2020[11];
- Project Ireland 2040[18]; and
- National Development Plan 2018-2027[19].

Field Study

14.3.2 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions and conditions within the wider study areas.

14.4 Assessment Method

Methodology

Demolition and Construction Stage

14.4.1 The impacts of the proposed development, arising from the generation and management of waste, has been assessed. Due to the absence of EPA/Irish guidelines for waste assessments in EIA, the assessment has considered the methodology specified in Institute of Environmental Management and Assessment guidance documents[14]. An extensive document review to assist in identifying current and future requirements of waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports has also been undertaken.

14.4.2 To assess the potential effects arising from the generation of waste during the demolition and construction, and operation stages, a desk study was carried out which included:

- A review of applicable policy and legislation to create the legal framework for waste management in Ireland;
- Description of the typical waste materials that will be generated during the demolition and construction and operation stages; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

14.4.3 The waste estimates calculated for the demolition and construction stage of the proposed development have been calculated from a detailed review of the Dub 11/12 consented development adjacent. When conducting the review, the proposed development's Gross Floor Area (GFA) was used to normalise the data and create key performance indicators to estimate potential waste volumes for the proposed development. Additionally, the assessment has taken into consideration published data by the EPA in National Waste Reports.

14.4.4 Mitigation measures were also proposed to minimise the proposed development's environmental effects during the demolition and construction stage.

Operation Stage

14.4.5 The methodology for assessing likely operation stage effects is the same as that presented for the demolition and construction stage above.

Cumulative Stage

14.4.6 The combined effects of the proposed development and the cumulative development on a given receptor have been assessed for both stages of the proposed development.

14.4.7 This cumulative assessment has been considered qualitatively.

14.5 Assessment Criteria

14.5.1 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

14.5.2 The sensitivity of waste relates to availability of regional (and where appropriate, national) landfill void capacity in the absence of the proposed development. Landfill capacity is recognised as an unsustainable and increasingly scarce option for managing waste.

14.5.3 Information presented in Table 14-1 has been used to determine the sensitivity of landfill void capacity. For the purposes of EIA, 'negligible' and 'low' are classed as Low; 'medium' is classed as Medium and 'high' and 'very high' are classed as High.

[18] Government of Ireland, 2019. Project Ireland 2040 Documents and Information. Available at: https://www.gov.ie/en/collection/580a9d-project-2040-documents/ [Last Accessed 30/06/21].

[19] Government of Ireland, 2018. National Development Plan 2018-2027. Available at: https://www.gov.ie/en/policy-information/07e507-national-development-plan-2018-2027/?referrer=/en/national-development-plan-2018-2027/ [Last Accessed 30/06/21].

Table 14-1: Receptor Sensitivity Criteria

Sensitivity	Criteria
Negligible	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to remain unchanged or is expected to increase through a committed change in capacity.
Low	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce minimally by <1 % as a result of wastes forecast.
Medium	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce noticeably by 1-5 % because of wastes forecast.
High	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce considerably by 6-10 % because of wastes forecast.
Very High	Across demolition and construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce very considerably (by >10 %); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.

Impact Magnitude Criteria

14.5.4 The magnitude of impact has been classified as 'no change', 'low', 'medium', 'high' and 'major' in accordance with the criteria set out in Table 14-2. For the purposes of EIA, 'no change' and 'low' are classed as Low; 'medium' is classed as Medium and 'high' and 'major' are classed as High.

Table 14-2: Impact Magnitude Criteria

Magnitude	Criteria
No Change	Zero waste generation and disposal from the development.
Low	Waste generated by the development will reduce regional landfill void capacity baseline by <1%
Medium	Waste generated by the development will reduce regional landfill void capacity by 1-5%.
High	Waste generated by the development will regional landfill void capacity by 6-10%.
Major	Waste generated by the development will reduce regional landfill void capacity by >10%.

Scale of Effect Criteria

14.5.5 Impacts have been assessed based on the value and sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 14-3.

Table 14-3: Scale of Effect Criteria

		Magnitude		
		Low	**Medium**	**High**
Sensitivity	**Low**	Imperceptible to Not Significant	Not Significant to Slight	Slight to Moderate
	Medium	Not Significant to Slight	Slight to Moderate	Moderate to Significant
	High	Slight to Moderate	Moderate to Significant	Very Significant to Profound

14.5.6 Based on professional judgement and Environmental Protection Agency's (EPA) Guidelines on the information to be contained in Environment Impact Assessment Reports (2022), as described in Chapter 2: EIA Process and Methodology, effects ranging from moderate to profound are considered 'significant' in EIA terms.

Nature of Effect Criteria

14.5.7 The nature of the effect has been described as either negative, neutral, or positive as follows:

- Positive – An advantageous effect to a receptor;
- Neutral – An effect that on balance, is neither positive;
- Negative – A detrimental effect to a receptor.

14.6 Assumptions and Limitations

14.6.1 The assessment for waste receptors has been based on a review of the baseline information available at the time of assessment. Whilst the baseline data sources used in this assessment have been obtained from the most recently available information, it is still possible that conditions could have changed since their publication.

14.6.2 The quantities of materials to be used for the demolition and construction stage of the proposed development design, sources of materials and their mode of transport are yet to be finalised. Values have been estimated based on data obtained from a review of other similar data center applications in the surrounding area. It has been assumed that these data sets have been reported correctly.

14.6.3 It has been assumed that a Construction and Demolition Waste Management Plan (CDWMP) would be developed by the contractor. The CDWMP will ensure suitable management of construction, demolition, and excavation (CDE) waste, prevent (where practicable) and minimisation of waste arising and maximisation of waste re-use and recycling.

14.7 Baseline Conditions

Existing Baseline

14.7.1 For waste planning purposes, Ireland is divided into three regions: Connacht-Ulster; Southern; and Eastern Midlands[12]. SDCC lies within the Eastern Midlands Region (EMR)[10]. Therefore, reference to Waste management, generation, and capacity of landfills will refer to both the wider EMR in addition to the local authority SDCC. In terms of waste management, the local authority responsible for setting and administering waste management activities in the site and study areas is SDCC. Waste management activities within the area is governed by the requirements set out in the EMR WMP 2015-2021.

14.7.2 The EU Waste Framework Directive 2008/98/EC requires that a target of 70% recovery by weight of construction and demolition (C&D) waste generated be met by the year 2020. National Waste Statistics reported that Ireland achieved 84% material recovery C&D waste in 2019, surpassing the 2020 target. This shows an improvement on the previously reported rate of 71% in 2016 and 77% 2018.

14.7.3 In general, the largest element of C&D waste consisted of excavated soil and stone (making up approximately 85% of total C&D waste)[7]. The remainder included concrete, brick, tiles, metal, glass,

wood, plastic, and metal[12]. Currently, the majority of C&D waste generated in Ireland is recovered or reused. Where recovery or reuse is not feasible, it is disposed of at suitably licensed facilities.

14.7.4 Within Ireland, the total mass of waste produced in the year 2018 was 14.1 million tonnes across all sectors[9]. For C&D waste, approximately 8.8 million tonnes were collected by authorised waste collectors for treatment in 2019. This was significantly greater than the 6.2 million tonnes reported in 2018 and 4.7 million tonnes reported in 2017, which corresponded with increases in construction activity nationally[9]. All C&D waste arises predominantly from demolition of existing structures, and from materials brought to site that were not used for their intended purposes, such as damaged items, cut offs and surplus materials.

14.7.5 According to the latest figures, most of the C&D waste collected in 2019 consisted of soil and stones (85%). The remainder was made up of concrete, bricks, tiles, and gypsum waste (7%) and mixed C&D waste (5%). Only 2.5% of C&D waste was collected separately as single material streams (wood, glass, plastic, or metal). Soil and stone waste are typically managed at Local Authority-permitted infill sites. Backfilling activities account for a significant portion of the recovery rate being achieved. The most recent figures available for C&D waste arising in Ireland, and that waste's disposal and recovery routes, are shown in Table 14.4. It should be noted that these figures are likely to have increased since then and will continue to do so in the coming years, due to the renewed growth in the economy.

Table 14-4: Collection and Management of C&D Waste Excluding Soil and Stone

Management	Recycling (tonnes)	Energy recovery (tonnes)	Backfilling (tonnes)	Disposal (tonnes)	Total (tonnes)
Metal waste	193,242	0	0	0	193,242
Segregated wood, glass, and plastic waste	13,999	19,177	2,317	14	35,507
Concrete, brick, tile, and gypsum waste	284,265	0	3,309,401	151,641	630,370
Waste bituminous mixtures	64,599	0	36,932	164	101,694
Mixed construction and demolition waste	10,407	857	48,825	20,826	80,915
Waste soils, waste stones, and dredging spoil	29,649	0	6,764,078	643,041	7,436,769
Waste treatment residues	39	14,262	25,671	227,115	267,086
Total	596,200	34,296	7,208,763	906,324	8,745,584

14.7.6 According to the C&D Waste Update Report (2020)[11] there are 106 authorised facilities in the EMR for soil and stone acceptance, including:

- Four active licenced soil recovery facilities;
- Six licenced soil recovery facilities due to start providing capacity;
- Four active inert landfills;
- 49 permitted facilities; and
- 43 registered facilities with a Certificate of Registration (CoR).

14.7.7 Overall, licensed Soil Recovery Facility (SRF) capacities in the EMR are concentrated in the local authority areas of Fingal, Meath, Kildare, and Wicklow. There are no licensed SRFs outside the Greater Dublin Area (GDA).

14.7.8 Waste licence facilities in the EMR are of the scale required by the markets[6]. EMR's current active and available annual licenced market capacity for SRF is 2.4 million tonnes (Mt). Six of the ten licenced sites have annual capacity of 300,000 tonnes or more and one facility is licenced to accept 1,500,000 tonnes of soil wastes each year. This capacity is concentrated in the Greater Dublin Area. Licensed capacity is authorised on an annual basis. The capacity for uncontaminated soil comprises of 2.4 million tonnes annual licenced capacity.

14.7.9 The permitted and registered facilities offer a much smaller capacity to the Region. The EMR remaining permitted lifetime capacity is 1.3 million tonnes (at end-2018). The registered remaining lifetime capacity in the region is much smaller by comparison with just over 188,000 tonnes available (at end-2018). While permitted and registered capacity is authorised on a lifetime capacity, meaning that these cannot be aggregated and are reported separately, and 1.52 million tonnes lifetime capacity provided by permitted and registered sites.

14.7.10 The geographical spread of these sites is reasonably good. The local authorities within Dublin County have low counts of permitted or registered facilities with no area having more than one of each. A number of local authorities (Laois, Louth, Offaly, and Westmeath) have low registered capacities and are reliant on permitted facilities.

14.7.11 There are three inert landfills in Ireland, plus the Tara Mines facility, which are all located in the EMR, providing predominantly disposal capacity. The four active inert landfill facilities have approximately 6.1 million tonnes of remaining lifetime capacity.

14.7.12 The Integrated Materials Solutions Limited Partnership (IMS) facility had 3.9 million tonnes remaining, with 2.1 million tonnes remaining at Walshestown, at the end of 2018.

14.7.13 In addition, there are a number of non-hazardous municipal landfill sites in the region which have an ongoing requirement for soil and stone material for daily cover, capping and other remediation activities at the sites. These facilities relevant to the proposed development are presented in Table 14-5.

14.7.14 The acceptance of non-hazardous waste and inert soils has reduced since 2016 as available void capacity has diminished. At the end of 2018, the remaining capacity at Drehid was 636,085 m^3 compared to 5,006,968 m^3 of available capacity when the site commenced activity. Conversely, Ballynagran increased the intake of non-hazardous soil waste for recovery from 163 tonnes in 2017, to 22,002 tonnes in 2018 in response to market demand.

Table 14-5: Licensed Capacity at Active Landfills

Landfill Facility Name	Waste for disposal (maximum tonnes per annum	Waste types for disposal (maximum tonnes per annum)	Waste types for recovery (maximum tonnes per annum)
Knockharley Landfill - Co. Meath	175,000	100,000 household 45,000 commercial 30,000 industrial	25,000 (C&D) 70,000 (inert waste)
Ballynagran Residual Landfill - Co. Wicklow	175,000	62,500 household 67,500 commercial 45,000 industrial	28,000 (C&D)
Drehid Waste Management Facility - Co. Kildare	120,000	120,000 non-hazardous municipal, commercial, and industrial wastes	No limit for inert waste were used in landfill engineering
Total	470,000	-	-

14.7.15 There are also a number of materials recover facilities/waste transfer stations in operation in the region which are suitable for the acceptance of C&D wastes should they be required. Details of the facilities relevant to the proposed development are presented in Table 14-6.

Table 14-6: Licensed Waste Transfer Stations that could potentially accept C&D waste	
Waste Transfer Station Name	**Licensed Limitation from Acceptance of C&D Waste at Active Sites (tonnes per annum) at start of 2016**
Starrus Eco Holdings Limited (now Greenstar) – Bray Depot	54,040
Nurendale Ltd., trading as Panda Waste – Rathdrinagh	120,000
Greyhound Recycling and Recovery – Clondalkin	3,000
Thorntons Recycling Centre – Dunboyne	28,020
Nurendale Ltd., trading as Panda Waste – Finglas	40,000
Dean Waste Company Ltd. – Upper Sherriff Street	105,000
Labre Park Civic Amenity Site – Ballyfermot	6,000
Total	356,060

14.7.16 There is no dedicated 'hazardous waste to energy' or landfill treatment capacity in Ireland. Hazardous soil materials, depending on the nature of the contamination, are treated, and stabilised at specialised indigenous facilities. Treatment activities at some of these facilities can change the characterisation of soil wastes from hazardous to non-hazardous, whereby the soil can then be directed back to non-hazardous facilities. The lack of final treatment capacity for hazardous soils nationally creates a reliance on overseas facilities for final treatment.

14.7.17 There has been a significant increase in the treatment of contaminated soils in Ireland. This rise in treatment of hazardous soil waste domestically, is associated with a drop in the volumes exported; in 2018 Ireland exported almost 75,000 tonnes of hazardous soil, a drop of over 26,000 tonnes from 2017, as presented in Table 14-7.

Table 14-7: Hazardous Soil Treatment and Exportation in Ireland					
Type	**Waste (tonnes)**				
	2014	**2015**	**2016**	**2017**	**2018**
Irish hazardous waste treatment facilities	1,630	5,938	682	608	18,733
Exported	5,701	14,329	79,591	101,440	74,912

Future Baseline

14.7.18 In the EIAR for the July 2022 DUB-1 permitted development it was estimated that the scheme would generate 44,472 tonnes of waste, with 42,616 tonnes reused, 1,970 tonnes recovered/recycled and 238 tonnes disposed.

14.7.19 Prediction of C&D waste was projected to increase to 8.2 million tonnes by 2025, and then increase again to 10 million tonnes by 2029. This figure is almost double that of the 2020 figure[11].

14.7.20 The generation of C&D waste, and the need for adequate management, is expected to grow over the medium- to long-term in line with the planned delivery of housing and infrastructure projects set out in Project Ireland 2040[18], which sets out Ireland's ambition and vision in terms of development over the next 20 years. The plan includes a number of major construction projects which presents huge potential in terms of preventing and recycling construction waste, as well as a challenge in terms of ensuring the generated waste is managed correctly.

14.7.21 If Ireland is to meet the targets as set out in the National Development Plan 2018-2027[19], it is vital that there is sufficient capacity for the recovery and/or disposal of the envisaged increased C&D waste. It is expected that due to the contraction in the economy following COVID-19, the envisaged C&D waste quantities may increase in 2022/2023.

14.7.22 In July 2020, there were three license applications for new waste facilities in the EMR. The combined capacity of un-commenced facilities is 1.5 million tonnes per annum. This capacity contains 73 % of the future capacity expected nationally (including new applications and un-commenced operations), which is expected to exceed 2.1 million tonnes.

Sensitive Receptors

14.7.23 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 14-8.

Table 14.8: Summary of Sensitive Receptors	
Receptor	**Sensitivity**
Landfills (i.e. reduction in capacity from disposal of waste)	Medium

14.8 Assessment of Effects

Demolition and Construction Stage

Embedded Mitigation

14.8.1 Following the successful discharge of relevant pre-commencement planning conditions, and receipt of other required statutory permissions, on-site works would commence with enabling works (described in Chapter 5: Construction Description of this EIAR Volume and will be outlined in the CEMP).

14.8.2 Prior to commencement of construction works, a CDWMP would be prepared and agreed with the planning authority. This would be in accordance with the most up to date WMP for the EMR. The following mitigation measures would also be implemented at the demolition and construction stage:

- All excavations would be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated, if encountered. If any potentially contaminated material is encountered, it will be segregated from clean/inert material, tested, and classified as either non-hazardous or hazardous and further classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC[20], which establishes the criteria for the acceptance of waste at landfills. All excavated material would be used.
- Waste materials generated at the site compound would be stored in suitable receptacles in designated areas of the site compound.
- On-site segregation of waste materials would be carried out to increase opportunities for off-site reuse, recycling, and recovery, to ensure that the majority of construction materials are either recyclable or recoverable – it is anticipated that the following waste types, at a minimum, would be segregated: made ground, soils and stones and trees/shrubbery. In addition, the following wastes would be segregated at the site compound: organic (food) waste, packaging (paper/card/plastic), mixed dry recyclables and mixed non-recyclable waste.
- All waste contractors collecting waste from the site would hold a valid collection permit to transport waste, which is issued by the National Waste Collection Permit Office (NWCPO).
- Construction wastes would be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, recycling, recover and/or disposal. As stated in the baseline section, there are numerous licensed waste facilities in the local region that have sufficient capacity to accept

[20] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.

both hazardous and non-hazardous waste materials and could manage C&D waste from the proposed development.

- All waste leaving site will be reused, recycled, or recovered where possible to avoid material designated for disposal.
- All waste leaving the site would be transported by suitable permitted contractors and taken to suitably registered, permitted, or licenced facilities.
- All waste leaving the site would be recorded and copies of relevant documentation maintained.
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) would also be segregated and would be stored in appropriate receptacles (in suitably bunded areas, where required).
- A waste manager would be appointed by the main contractor to ensure effective management of waste during the excavation and construction works.
- All construction staff would be provided with training regarding the waste management procedures.
- The waste from deliveries into the two-bay truck loading bay would be compacted on-site.

14.8.3 These mitigation measures would ensure that the waste arising from the C&D phase of the development are dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and associated regulations including the Litter Pollution Act 1997 (revised in April 2022)[21] and the EMR WMP (2015-2021). It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved and will encourage sustainable consumption of resources.

Waste Generation Volumes

14.8.4 Waste arising from the site clearance, primary infrastructure and earthworks is expected to comprise of made ground/topsoil, rubble, bricks, concrete, tarmac from former hard standings, gravel, and clay material. It is important to note that the volume of waste generated from demolition would be more difficult to segregate than waste generated during construction, as many of the building materials will be bonded together or integrated.

14.8.5 As stated in the methodology, the estimated waste arisings from the proposed development, presented in Table 14-9, have been calculated from an extensive review of surrounding relevant data centers.

Table 14-9: Estimated Demolition Waste and End Destination

Waste Type	Estimated Quantities	Reuse		Recycle/ Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Glass	4	0	0	85	3	15	1
Concrete, bricks, Tiles, Ceramics	24	95	22	0	0	5	1
Plasterboard	2	0	0	85	2	15	0
Asphalts	38	0	0	95	36	5	2
Metals	7	0	0	95	7	5	0
Slate	4	0	0	85	3	15	1
Timber	6	0	0	90	5	10	1
Total	**84**	**-**	**22**	**-**	**56**	**-**	**5**
[NOTE: Values have been rounded to the nearest 1 tonne.]							

14.8.6 Site preparation, excavations and levelling works required to facilitate construction of the foundations, access roads and the installation of services would generate approximately 6,000 m^3 of excavated material. It is currently proposed that all excavated material would be reused on-site.

14.8.7 The importation of approximately 12,500 m^3 of fill materials would be required for construction of foundations and other ground preparation works. If any soils/stones are imported onto the site from another construction site as a by-product, this would need to be carried out in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011.

14.8.8 As stated in the methodology, the estimated construction waste arisings from the proposed development, presented in Table 14-10, have been calculated from an extensive review of surrounding relevant data centers and normalised using the GFAs.

Table 14-10: Estimated Construction and Excavation Waste and End Destination

Waste Type	Estimated Quantities	Reuse		Recycle/ Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D Waste	258	0	0	90	233	10	26
Timber	219	0	0	90	197	10	22
Plasterboard	78	0	0	90	71	10	8
Metals	63	0	0	100	63	0	0
Concrete	47	100	47	0	0	0	0
Other (including cabling, ducting, conduits, packaging, and plastic	117	0	0	80	94	20	23
Topsoil	8,215	100	8,215	0	0	0	0
Excavated materials	5,943	100	5,943	0	0	0	0
Total	**14,941**	**-**	**14,205**	**-**	**657**	**-**	**79**
[NOTE: Values have been rounded to the nearest 1 tonne.]							

Demolition and Construction Worker Waste Generation

14.8.9 During the demolition and construction period the introduction of a demolition and construction workforce on site would generate municipal waste. These wastes would generally be organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins, and Tetra Pak cartons) and mixed non-recyclables.

14.8.10 With consideration of the embedded mitigation measures outlined above, predicted impacts on landfill sites (medium sensitivity) are considered to be of low magnitude. It is expected that the municipal waste generated would be **Temporary**, **Not Significant to Slight** and **Negative** and **Not Significant in terms of EIA.**

Generation of Demolition and Construction Waste

14.8.11 Recycling of inert and non-hazardous waste on site and implementing the CDWMP would ensure that impacts of construction waste are minimised. In this assessment, it has been estimated that

[21] Government of Ireland, 1997/2009. Litter Pollution Act 1997; Electoral (Amendment) (No. 2) Act 2009 – An Act To Regulate Expenditure By Political Parties And Candidates; To Amend The Local Elections (Disclosure Of Donations And Expenditure) Act 1999; To Amend The Litter Pollution Act 1997; And To Provide For Related Matters.

approximately 15,000 tonnes of C&D waste would be generated. There is currently 1,786,000 tonnes of capacity remaining in the waste management facilities and 470,000 tonnes of capacity remaining in landfill sites.

14.8.12 Therefore, the reduction in capacity of waste management facilities would be <0.05 % and the reduction in landfill capacity would be <0.05 %. In addition, it is expected that 99.5 % of the C&D waste would be diverted from landfill.

14.8.13 With consideration of the embedded mitigation measures outlined above, predicted impacts on landfill sites (medium sensitivity) are considered to be of low magnitude. It is expected that the waste generated would be **Permanent**, **Not Significant to Slight** and **Negative** and **Not Significant in terms of EIA.**

14.8.14 During enabling works, there is the potential for the generation of hazardous waste through land excavation. A ground investigation has been completed and no significant ground contamination issues have been identified, thus it is considered unlikely that there will be any hazardous wastes arising from excavation.

Operation Stage

Embedded Mitigation

14.8.15 The following mitigation measures would be implemented during the operation stage of the proposed development:

- On-site segregation of all waste materials into appropriate categories including (but not limited to): dry mixed recyclables, organic food/green waste, mixed non-recyclable waste, batteries (non-hazardous and hazardous), waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment and cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.).
- All waste materials would be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins would be clearly labelled with the approved waste type to ensure there is no cross contamination of waste materials.
- All waste collected from the development would be reused, recycled, or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available.
- A network of waste facilities would be used to ensure waste is managed efficiently. The waste hierarchy would be implemented, and waste recovery techniques would be employed if recycling is not possible.
- All waste leaving the site would be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities.
- All waste leaving the site would be recorded and copies of relevant documentation maintained.
- Any waste classified as hazardous would be stored in a designated area (suitably bunded, where required) and would be removed off site by a licensed hazardous waste contractor(s).

14.8.16 It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

14.8.17 These mitigation measures would ensure the waste arising from the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and associated regulations including the Litter Pollution Act 1997 and the EMR WMP (2015-2021). It will also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved.

Waste Generation

14.8.18 Waste would be managed according to relevant national and regional legislation such as the waste framework directive. Waste collection vehicles would service the development regularly to ensure the resources are dedicated to ensuring efficient waste management practices.

14.8.19 Additionally, hazardous waste may be generated from batteries, contaminated chemical drums and other packaging. If the packaging contains residues of or if it is contaminated by dangerous substances, it may be classified as a hazardous waste (depending on the volume and concentration of contaminants). Volumes of potential hazardous wastes are considered likely to be negligible.

14.8.20 If the waste materials are not managed and stored correctly on-site, it is likely to lead to litter, health issues or pollution events at the site and/or on adjacent developments. As stated previously, the secondary effect of litter issues is the potential presence of vermin.

Operational Waste Stream Generation

14.8.21 The nature of the proposed development means that the generation of waste materials during the operation stage is unavoidable. However, it has not been possible to estimate the quantities of waste that would be generated by the proposed development due to the lack of data.

14.8.22 Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g., paper mills and glass recycling).

14.8.23 Overall, the impact on void space in landfill sites is considered to be **Permanent**, **Not Significant to Slight,** and **Negative** and **Not Significant** in terms of EIA.

14.9 Additional Mitigation

14.9.1 No additional mitigation measures are proposed in respect of waste.

14.10 Enhancement Measures

14.10.1 No enhancement measures are proposed in respect of waste.

14.11 Assessment of Residual Effects

Demolition and Construction Residual Effects

14.11.1 The residual effects are as previously report in the Assessment of Effects section, which are:

- Effect on void space in landfill sites: **Permanent, Not Significant to Slight,** and **Negative** (**Not Significant** in terms of EIA).

Operation Residual Effects

14.11.2 The residual effects are as previously report in the Assessment of Effects section, which are:

- Effect on void space in landfill sites: **Permanent, Not Significant to Slight,** and **Negative** (**Not Significant** in terms of EIA).

Summary of Residual Effects

14.11.3 Table 14-11 provides a summary of the outcomes of the waste assessment of the proposed development. **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 14-11: Summary of Residual Ground Conditions Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect**	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P
Demolition and Construction								
Landfill Sites	Effect on void space	None required	Not significant to Slight	-	L	D	IR	P
Operation								
Landfill Sites	Effect on void space	None required	Not significant to slight	-	L	D	IR	P

Notes: * - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, IR = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = medium-term, Lt = Long-term, P = Permanent, R = Reversible. ** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

14.12 Cumulative Effects

Intra-Project Effects

14.12.1 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Intra Cumulative Effects.

Inter-Project Effects

14.12.2 There are numerous cumulative developments planned for in the surrounding area (as presented in Chapter 2: EIA Process and Methodology) that would have a cumulative impact by in-combination effects throughout the demolition and construction stage, and operation stage of the proposed development. However, it is not considered possible to reasonably undertake a quantitative cumulative assessment of the likely significant effects regarding waste for the reasons explained in the Assumptions and Limitations section of this chapter. Therefore, a qualitative assessment has been carried out.

14.12.3 It is reasonably considered that all the cumulative developments would be developed in line with the similar policy requirements as the proposed development; in particular with the requirements for maximising reuse and recycling of CDE waste through a CDWMP (or equivalent) and the meeting of targets for recycling and composting waste during operation. Therefore, results would be similar to that presented for residual effects; resulting in the following effects:

- Demolition and Construction Stage:
  - Effect on void space in landfill sites: **Permanent**, **Not Significant to Slight,** and **Negative** (**Not Significant** in EIA terms);
- Operation Stage:
  - Effect on void space in landfill sites: **Permanent**, **Not Significant to Slight,** and **Negative** (**Not Significant** in EIA terms).

14.13 Summary of Assessment

Background

14.13.1 This chapter has detailed the potential waste effects for the demolition and construction stage, and operation stage of the proposed development. The assessment has been undertaken considering the relevant national and local guidance and regulations.

14.13.2 The baseline assessment was undertaken using publicly available information and indicates that:

- The local authority responsible for setting and administrating waste management activities in the site area is SDCC.
- There are 106 authorised facilities in the EMR for soil and stone acceptance.
- Licensed SRF capacities in the EMR are concentrated in the local authority areas of Fingal, Meath, Kildare, and Wicklow.
- Waste licence facilities in the EMR are of the scale required by the current markets.
- The four active inert landfill facilities located in the EMR have approximately 6.1 million tonnes of remaining lifetime capacity to accept lightly contaminated soils.
- There are a number of non-hazardous municipal landfill sites in the region which have an ongoing requirement for soil and stone material for daily cover, capping and other remediation activities at the sites.
- There are a number of materials recover facilities/waste transfer stations in operation in the region which are suitable for the acceptance of C&D wastes (should they be required).
- There is no dedicated 'hazardous waste to energy' or landfill treatment capacity in Ireland.

14.13.3 Overall, the results of the baseline assessment identified numerous waste management infrastructure facilities and landfill sites within the surrounding area. Many of the facilities/sites were indicated to have sufficient capacity to support future influxes of C&D and operational waste.

Demolition and Construction Effects

14.13.4 During the demolition and construction stage, waste would be produced from the demolition of the single storey dwelling on-site, and the construction of the data centers and accommodating facilities.

14.13.5 Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g., paper mills and glass recycling). According to the C&D Waste Update Report (2020)[11] there are 106 authorised facilities in the EMR for soil and stone acceptance, three landfill sites for C&D waste and a number of materials recover facilities/waste transfer stations in operation in the region which are suitable for the acceptance of C&D wastes should they be required.

14.13.6 It is anticipated that the proposed development would generate approximately 15,000 tonnes of C&D waste in addition to operational waste. However, mitigation measures such as segregating of waste, using appropriate storage, and implementing a CDWMP (and CEMP) would reduce likely negative impacts and maximise the reuse and recycling and/or recovery of waste. Therefore, the reduction in landfill capacity would be < 0.05 %. In addition, it is expected that 99.5 % of the C&D waste and over 90 % of operational waste would be diverted from landfill.

14.13.7 Overall, it is considered, with embedded mitigation in place, that the demolition and construction stage activities would result in a **Negative**, **Direct**, and **Not Significant to Slight** effect (**Not Significant** in terms of EIA) on landfill sites.

Operational Effects

14.13.8 During the operation stage, waste would be managed in accordance with relevant national and regional legislation such as the Waste Framework Directive. Waste collection vehicles would service the development regularly to ensure the resources are dedicated to ensuring efficient waste management practices.

14.13.9 Additionally, hazardous waste may be generated from batteries, contaminated chemical drums and other packaging. If the packaging contains residues of or if it is contaminated by dangerous substances, it may be classified as a hazardous waste (depending on the volume and concentration of contaminants).

14.13.10 Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g., paper mills and glass recycling).

14.13.11 Overall, the effect on landfill sites is likely to be **Negative**, **Direct**, **Not Significant to Slight,** and **Not Significant** in terms of EIA.

Cumulative Effects

14.13.12 It is reasonably assumed that all the cumulative developments would be developed in line with the similar policy requirements as the proposed development, including the requirements for maximising reuse and recycling of CDE waste through a CDWMP (or equivalent) and the meeting of targets for recycling and composting waste during operation. Therefore, results would be similar to that of the proposed development, resulting in a cumulative effect that is **Negative**, **Direct**, **Not Significant to Slight,** and **Not Significant** in terms of EIA.

15 MATERIAL ASSETS

15.1 Introduction

15.1.1 This chapter of the EIAR reports on the likely significant material assets effects to arise from the demolition and construction stage and the operation stage of the proposed development.

15.1.2 The chapter describes the material assets policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely material assets effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and cumulative effects.

15.1.3 There are no technical appendices supporting this chapter.

15.1.4 The 2011 EIA Directive (2011/92/EU) state that material assets include architectural and archaeological heritage. In accordance with the 2014 EIA Directive, those heritage aspects are dealt with as components of archaeology and cultural heritage which is assessed in EIAR Volume 2 Chapter 2: Cultural Heritage.

15.1.5 Additionally, the EPA EIA Report Guidelines 2022 state that material assets are now taken to mean built services and infrastructure, roads, and traffic, as well as waste management.

15.1.6 In this EIAR, the impacts on the material assets listed above have been considered in the following Chapters and are not considered further in this Chapter:

- Chapter 6: Population and Human Health;
- Chapter 7: Transport;
- Chapter 8: Air Quality; and
- Chapter 14: Waste.

15.1.7 The European Commission refers to a number of examples of material assets including buildings, other structures, mineral resources, and water resources. The impacts on mineral resources and water resources have been considered in the following Chapters and are not considered further in this Chapter:

- Chapter 10: Water Resources and Flood Risk; and
- Chapter 12: Ground Conditions.

15.1.8 As there is no published or formalised technical guidance relating to the assessment of material assets effects, professional judgement, experience, and best practice methods have been drawn upon to assess the significance of the potential effects of the proposed development. The assessment has also taken account of applicable legislation, guidance, and policy.

15.2 Assessment Scope

Technical Scope

15.2.1 The technical scope of the assessment has considered the following:

- Direct disturbance and damage to existing or proposed infrastructure; and
- Indirect disturbance of assets in the surrounding area.

15.2.2 It has been assumed that the Proposed Development would not impact on any other structures.

15.2.3 The potential impacts on built services and infrastructure, if any, have been assessed in terms of the following:

- Power and Electricity Supply;
- Gas Supply;
- Water Services (including surface water and foul drainage infrastructure and water supply); and
- Telecommunications.

15.2.4 As several of the assets mentioned above have been addressed in other chapters within this EIAR, they are not discussed in detail in this chapter, but references are provided to other EIAR chapters where appropriate.

15.2.5 Mitigation measures are proposed (where required) to minimise the effect of the proposed development on the environment during the demolition and construction and operation stages.

Spatial Scope

15.2.6 The site lies within the South Dublin County Council (SDCC) area in the north of the Profile Park. The study area is considered to comprise the surrounding utility network within Profile Park and the wider area.

Temporal Scope

15.2.7 The assessment has considered impacts arising during the demolition and construction stage, which would be expected to be temporary (less than a year) in nature, and from the operation stage which would be expected to be long-term (15-60 years) to permanent (>60 years) in nature.

15.3 Baseline Characterisation Method

Desk Study

15.3.1 In order to establish the existing baseline material assets conditions in the study area, relevant data was reviewed and assessed. The data sets and associated sources can be summarised as follows:

- Engineering Planning Report[1];
- Drainage layout drawing[2];
- Existing Below Ground Services drawing[3].

Field Study

15.3.2 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

[1] DUB13-RP-00-C001-V0-PL-PIN
[2] DUB13-DR-UG-C127-V2-PL-PIN
[3] DUB13-DR-SP-C012-V2-PL-PIN

15.4 Assessment Method

Methodology

15.4.1 To assess potential effects on material assets a desktop study was carried out on existing material assets found at the site and within the immediate surrounding area.

Demolition, Construction and Operation Stage

15.4.2 Projections of resource use on economic assets of human origin have been undertaken for the demolition and construction and operation stages of the proposed development, and the impacts have been assessed.

15.4.3 The baseline has been defined through a desktop review of existing and planned licences, studies, applications, datasets and review of the DUB-1 EIAR. This established the current status of known and planned infrastructure within the study area.

Cumulative Stage

15.4.4 For the purposes of assessing the cumulative effects, consideration has been given to all cumulative schemes that have the potential to result in a significant cumulative effect alongside the proposed development. Full details of all the cumulative schemes are given in Chapter 2: EIA Process and Methodology. The baseline and assessment of significance, and the judgement of the magnitude of change stages are as above for the demolition and construction and operation stages. Only receptors for which the proposed development is predicted to result in a significant residual effect alone are included in this part of the assessment.

15.5 Assessment Criteria

15.5.1 The criteria used to assess whether an effect is significant or not, are given in the EPA Guidelines 2022, and are set out in Table 2-3 in Chapter 2: EIA Process and Methodology. The significance of effects is determined by consideration of the sensitivity of the receptor, the magnitude of impact and scale of the effect. In assessing the significance of an effect, consideration has been given to the quality, duration, probability and type of the effect, and its geographical extent, and the application of professional judgement. There is some flexibility based on professional judgement to take account of any particular value a heritage asset or receptor may have because of its use or presentation for public amenity and tourism or education.

15.5.2 Based on professional judgement, effects of moderate significance and above are considered significant in EIA terms.

15.6 Assumptions and Limitations

15.6.1 The assessment has relied on data pertaining to existing licences or as-built infrastructure supplied by others. It has been assumed that these datasets have been reported correctly.

15.7 Baseline Conditions

Existing Baseline

Land Ownership

15.7.1 The subject site is as described in Volume 1, Chapter 4: Description of Development.

15.7.2 The site itself is a material asset, as the land has been zoned for employment development and is owned by the Applicant. The nature of the proposed development means that the land's material asset should not be affected by the development and is not considered further.

Power and Electricity Supply

15.7.3 The main power supply to the Business Park is from the ESB EirGrid. This power network is known to be constrained in terms of providing electrical grid power to the area.

15.7.4 The main power supply to the Business Park is from the EirGrid. This power network is known to be constrained in terms of providing electrical grid power to the area.

15.7.5 The power requirements for the proposed development would be provided via a connection to a 110 kV EirGrid substation, which is subject to a SID application to ABP [An Bord Pleanála Ref - 312793]. The substation would then provide a 20 kV electrical power distribution at medium voltage throughout the site. The site distribution system supplies all electrical rooms where stepdown transformers are deployed to provide 400/230 V electricity to all loads.

15.7.6 To reduce electrical losses between HV/MV/LV conversions, the Applicant would install low loss transformers which comply with the Ecodesign directive 2009/125/EC as a minimum.

15.7.7 The MFGP consented under the July 2022 DUB-1 consented scheme would provide some supply to DUB-13 until the full electrical load is provided by the grid connection and then would be called upon for use on the local network drops in response to EirGrid's Data Centre Connection Offer Policy and Process (DCCOPP) regulations.

15.7.8 Photovoltaic panels would be installed at the site to comply with Part L of the building regulations, with an approximate ratio of 1 m2 per 20 m2 of office space.

Gas

15.7.9 The Business Park is served by the Gas Networks Ireland (GNI) network, which is a natural gas network. Supply is understood to not be constrained in the area.

Telecommunications

15.7.10 Multiple connection service lines currently exist along Falcon Avenue and Concorde Drive, including

- Virgin Media Fibre Cable;
- BT Fibre Cable;
- Colt Fibre Cable; and
- Eu Network Fibre Cable.

15.7.11 In addition, there are numerous Chambers situated along both Falcon Avenue and Concorde Drive, owned by Magnet and Virgin Media (UPC/NTL), that provide access to the underground utility services listed above.

15.7.12 A telecommunications network would be installed at the site which would serve all of the data center buildings on the site. The connection to the regional network would be implemented by the statutory network operator.

Surface Water Infrastructure

15.7.13 The Baldonnel Stream crosses under Profile Park Road and flows through the south of the site, entering the site in the southeast before meandering north-west and then leaving the site. Approximately 190 m downstream (west) it enters a short culvert, and downstream it discharges to a long twin-pipe culvert.

Foul Drainage Infrastructure

15.7.14 SDCC record drawings identified a 225mm Ø mains network, located adjacent to the south-eastern boundary of the site and within Falcon Avenue. This line forms part of reticulation network for Profile Park.

15.7.15 The existing foul sewer network is understood to have adequate capacity to cater for the proposed discharge from the site and there are no known issues noted with the sewer reticulation network.

15.7.16 A pre-connection enquiry (PCE) form has been submitted to Irish Water and a response is awaited.

Water Supply

15.7.17 SDCC record drawings identify an existing 6" (160mm) Ø main located along the south-eastern boundary of the property, within Falcon Avenue adjacent to the site. One 160mm Ø capped connection with sluice valves has been left off the aforementioned water main, in order to facilitate development at the site.

15.7.18 Additionally, there is an existing 700mm Ø trunk water main running parallel to the New Nangor Road adjacent to the northern boundary of the site.

15.7.19 From discussions with SDCC, it is understood that there is adequate capacity within the existing watermain network to supply the proposed development.

Future Baseline

15.7.20 As per the methodology set out in Chapter 2: EIA Process and Methodology, effects of the proposed development are to be assessed against a future baseline, which considers the July 2022 DUB-1 permitted development as operational.

Demolition and Construction

15.7.21 The proposed development demolition and construction works would commence in Q1 2024, with indicative completion targeted for Q4 2024 / Q1 2025. During this construction period there are no changes of relevance to material assets of the proposed development.

Operation

15.7.22 The changes to the future baseline with regard to material assets are associated with power and electricity supply and gas supply. When the July 2022 DUB-1 permitted development is operational the grid connection to the EirGrid will be available as the primary source of power to the proposed development. The MFGP consented as part of the July 2022 DUB-1 consented scheme will be operational and powered through a GNI connection source with hydrogenated vegetable oil (HVO) to be used as the primary back-up fuel.

15.7.23 The MFGP would provide some supply to DUB-13 until the full electrical load is provided by the grid connection and thereafter would operate as a peaking power unit and would address EirGrid's DCCOPP requirements and would have the capacity to provide equal energy to the amount consumed on-site. In the event of a local grid network failure this power generation facility would provide additional power to the network infrastructure on demand, in accordance with the EirGrid DCCOPP.

Sensitive Receptors

15.7.24 The receptors identified as sensitive to the proposed development, and which have been 'scoped-in' to the assessment are summarised in Table 15-1.

Table 15-1: Summary of Sensitive Receptors

Receptor	Sensitivity
Electrical grid capacity	High
Surface water infrastructure	Medium
Foul water infrastructure network	Low
Gas Network	Low
Water supply network	Low
Telecommunications network	Low

15.8 Assessment of Effects

Demolition and Construction Stage Effects

Embedded Mitigation

15.8.1 As described in Chapter 5: Demolition and Construction Environmental Effects, a project-specific CEMP would be established and maintained by the contractors during the demolition and construction stage which would cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures. The CEMP would be secured by means of an appropriately worded planning condition. An outline CEMP would be submitted as part of this application.

Power and Electrical Supply

15.8.2 During construction, contractors will require power for heating and lighting of the site and their facilities. Some on site equipment/plant will also require power and a construction compound and temporary power supply would be installed for the demolition and construction stage, however it is likely that that the construction compound would be facilitated within the July 2022 DUB-1 consented scheme

15.8.3 Power and electrical supply receptors are of high sensitivity as the development is located in what is noted as a constrained area in terms of electrical grid capacity.

15.8.4 Overall, the power demand and electrical effects from the demolition and construction stage are considered to be **Temporary**, **Imperceptible** and **Neutral** i.e. **Not Significant** in terms of EIA.

Gas Supply

15.8.5 There is currently no gas supply to the site and supply is not anticipated to be required during the demolition and construction stage.

15.8.6 Overall, effects during the demolition and construction stage are considered to be **Temporary**, **Imperceptible** and **Neutral** i.e. **Not Significant** in terms of EIA.

Surface Water Infrastructure

15.8.7 The site currently drains into the Baldonnel Stream. Above ground surface water attenuation ponds would be constructed as part of the proposed development meaning they would be in place during the majority of the construction stage, as outlined in Chapter 5: Construction Description.

15.8.8 As with all construction projects, there is potential for surface water runoff to become contaminated with pollutants associated with the demolition and construction works. Contaminated water which arises from construction sites can pose a risk to surface water quality within the stream. The potential main contaminants include:

- Increase in suspended solids due to muddy water with increase turbidity, arising from excavation and ground disturbance;
- Spills and releases of cement and concrete causing an increase turbidity and pH arising from the use of these construction materials;
- Spills and releases of wastewater (nutrient and microbial rich) arising from poor on-site toilets and washrooms.

15.8.9 There also is a risk of accidental pollution incidences from the following sources:

- spillage or leakage of temporary oils and fuels stored on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles;
- spillage of oil or fuel from refuelling machinery on site; and
- run-off from concrete and cement during pad foundation construction.

15.8.10 With consideration of the embedded mitigation measures outlined above and within Chapter 5: Demolition and Construction Description predicted impacts from surface water runoff would be low. Effects are considered to be **Temporary, Imperceptible, and Neutral i.e., Not Significant** in terms of EIA.

Foul Drainage Infrastructure

15.8.11 Welfare facilities required for the construction compound and workers with portable toilets would be provided for construction workers. A temporary connection to the foul water drainage network within Profile Park may also be required to accommodate the site welfare facilities during construction. It is understood that the foul water drainage network has sufficient available capacity for the wastewater discharges for the temporary demolition and construction stage.

15.8.12 The permanent foul connection to the wider network in Profile Park would be undertaken in consultation with Irish Water to ensure there is no impact on the network when the connection is made.

15.8.13 Accordingly, foul drainage effects on the public sewerage network during the demolition and construction stage are considered to be **Temporary, Imperceptible** and **Neutral** i.e., **Not Significant** in terms of EIA.

Water Supply

15.8.14 Welfare facilities will be required for the construction staff. A temporary connection to the mains water supply would be established for the construction phase. The water demand during the construction phase would not be significant enough to effect existing pressures and from discussions with the SDCC it is understood that there is adequate capacity within the existing watermain network to supply the proposed development.

15.8.15 Effects associated with water supply are considered to be **Temporary**, **Imperceptible** and **Neutral** i.e., **Not Significant** in terms of EIA.

Telecommunications

15.8.16 During the demolition and construction stage a mobile connection would be provided. A telecommunications network would be installed at the site which would serve all of the proposed data center buildings. The connection to the regional network would be implemented by the statutory network operator.

15.8.17 Effects associated with telecommunications during the demolition and construction stage are considered to be **Temporary, Imperceptible** and **Neutral** i.e., **Not Significant** in terms of EIA.

Operation Stage Effects

Embedded Mitigation

15.8.18 Prior to operation of the proposed development, a comprehensive set of operational procedures would be established which would include site-specific mitigation measures and emergency response measures, as outlined in Chapter 5: Demolition and Construction Environmental Management.

15.8.19 The primary potential impact on surface water infrastructure relates to a failure or accidental spill of diesel fuel which is stored and used on-site for back-up power generation.

15.8.20 The proposed development has been designed with the potential to connect to a local heat network in the future, as part of an external off-site district heating scheme developed by others, should there be a local demand. To ensure that the heating system of the proposed development has the flexibility to connect into such a system whilst also maintaining a live data centre, valved, and capped off connections would be provided on return water risers, ready for future connection to a district heating network. Whilst the proposed development has been designed to incorporate a future district heating scheme, this has not been considered as embedded mitigation in the assessment of effects as a district heating scheme within reasonable proximity to the site is yet to be established. On this basis district heating has not been considered further in this chapter.

Power and Electrical Supply

15.8.21 The power requirements for the proposed development would be provided via a connection to a 110 kV EirGrid substation, which is subject to a SID application to ABP (due to be decided). The substation would then provide a 20 kV electrical power distribution at medium voltage throughout the site. The site distribution system supplies all electrical rooms where stepdown transformers are deployed to provide 400/230 V electricity to all loads.

15.8.22 To reduce electrical losses between HV/MV/LV conversions, the Applicant would install low loss transformers which comply with the Ecodesign directive 2009/125/EC as a minimum.

15.8.23 The MFGP consented under the July 2022 DUB-1 scheme would provide some supply to DUB-13 until the full electrical load is provided by the above grid connection and then would be called upon for use on the local network drops in response to EirGrid DCCOPP regulations.

15.8.24 DUB-13 would connect to the MFGP through and internal connection through the July 2022 DUB-1 permitted development Photovoltaic panels would be installed at the site to comply with Part L of the building regulations, with an approximate ratio of 1 m^2 per 20 m^2 of office space.

15.8.25 Effects on power and electrical supply are considered to be **Permanent, Imperceptible** and **Neutral** i.e., **Not Significant** in terms of EIA.

Gas Supply

15.8.26 No gas supply is required as part of the proposed development. As such, it is considered there is **no effect** on gas supply.

Surface Water Infrastructure

15.8.27 Surface water from the proposed development has been designed in accordance with the Greater Dublin Strategic Drainage Strategy under Best Management Practice. The is site currently largely greenfield and the proposed surface water measures incorporate SuDs and are aimed at improving the general surface water management of the site, by introducing interceptors, attenuation measures and by restricting the ultimate discharge to the existing surface water network and to the Baldonnel Stream.

15.8.28 Surface water from the rear roof of the data center, would be directed via rainwater pipes into an on-site reticulation system. The outflow from this system would be connected into the surface water

drainage network collecting run-off from the road areas and would be discharged into an attenuation pond.

15.8.29 The front roof area of the buildings drain into the permeable paving sub-base, prior to ultimate discharge into Baldonnel Stream to the west via an attenuation pond.

15.8.30 Surface water from car park areas and access roads / delivery areas would be drained via a series of on-site gullies and channels into a separate system of below ground gravity surface water sewers and permeable paving.

15.8.31 The outflow from the proposed development would be restricted by way of a Hydrobrake facility, which would limit the total discharge to 2.8 l/s (litres per second) - the calculated QBAR greenfield run-off rate.

15.8.32 Oil and fuel leaks from fuel storage, parked cars, service vehicles, HGV deliveries etc. have the potential to impact surface water. This would be managed through the inclusion of hydrocarbon interceptors in the design for the surface water network draining these areas.

15.8.33 Surface water is discussed further in Chapter 10: Water Resource and Flood Risk and the Engineering Planning Report accompanying the application.

15.8.34 Effects associated with surface water infrastructure during operation are considered to be **Permanent, Imperceptible, and Neutral** i.e. **Not Significant** in terms of EIA.

Foul Drainage Infrastructure

15.8.35 The proposed development would lead to an increase in foul water discharge from the site. It is proposed to discharge foul water via a 225mm Ø gravity foul sewer outfall into the existing 225mm Ø spur connection laid along Falcon Avenue, which then runs in a southerly direction. It is understood that the foul water drainage network has sufficient available capacity for the wastewater discharges during operation.

15.8.36 As such, foul drainage effects on the public sewerage network during the operation stage are considered to be **Permanent, Imperceptible, and Neutral** i.e. **Not Significant** in terms of EIA.

Water Supply

15.8.37 It is proposed to serve the proposed development via connection off the 160mm Ø network, as located in Falcon Avenue. Water meters, sluice valves and hydrants, in line with Irish Water requirements and specifications, would be installed at the connections onto the aforementioned existing water mains, as required. It is understood that there is adequate capacity within the existing water main network to supply the proposed development.

15.8.38 As such, effects on water supply during the operation stage are considered to be **Permanent, Imperceptible, and Neutral** i.e., **Not Significant** in terms of EIA.

Telecommunications

15.8.39 Multiple connection service lines currently exist along Falcon Avenue and Concorde Drive and there is understood to be sufficient capacity available in the network to supply the proposed development with telecommunications. As such, effects associated with telecommunications during the operation stage are considered to be **Permanent, Imperceptible,** and **Neutral** i.e., **Not Significant** in terms of EIA.

15.9 Additional Mitigation

15.9.1 No additional mitigation measures are proposed.

15.10 Enhancement Measures

15.10.1 No enhancement measures are proposed aside from enhancements in flood risk and biodiversity associated with the Baldonnel Stream which are discussed in Chapter 10: Water Resource and Flood Risk and Chapter 11 Ecology.

Demolition and Construction Residual Effects

15.10.2 The residual demolition and construction effects remain as reported in the assessment of effects section:

- **Temporary, Imperceptible and Neutral** effects on power and electrical supply
- **No effect** on gas supply.
- **Temporary, Imperceptible and Neutral** effects on surface water infrastructure, foul drainage infrastructure, water supply and telecommunications.

15.10.3 These are Not Significant in terms of EIA.

Operation Residual Effects

15.10.4 The residual operation stage effects remain as reported in the assessment of effects section:

- **Permanent, Imperceptible and Neutral** effects on power and electrical supply.
- Permanent, Imperceptible, and Neutral effects on gas supply.
- **Permanent, Imperceptible, and Neutral** effects on surface water infrastructure, foul drainage infrastructure, water supply and telecommunications.

15.10.5 These are Not Significant in terms of EIA.

Summary of Residual Effects

15.10.6 Table 15-2 provides a tabulated summary of the outcomes of the material assets assessment of the proposed development. Where **Significant Positive** effects are likely these are highlighted in bold green and where **Significant Negative** effects are predicted these are highlighted in bold red.

Table 15-2: Summary of Residual Material Asset Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P
Demolition and Construction								
Power and Electrical Supply	Increased demand on the surrounding network	None required	Imperceptible	+/-	L	D	IR	T
Gas Supply				+/-	L	D	IR	T
Foul Water Infrastructure				+/-	L	D	IR	T
Water Supply				+/-	L	D	IR	T
Telecommunications				+/-	L	D	IR	T

Table 15-2: Summary of Residual Material Asset Effects

Surface Water Infrastructure	Risks of contamination from increased run-off, machinery on site, concrete activities, and/or accidental spillages.			+/-	L	D	IR	T
Operation								
Power and Electrical Supply	Increased demand on the surrounding network	None required	Imperceptible	+/-	L	D	IR	P
Gas Supply				+/-	L	D	IR	P
Foul Water Infrastructure				+/-	L	D	IR	P
Water Supply				+/-	L	D	IR	P
Telecommunications				+/-	L	D	IR	P
Surface Water Infrastructure	Risk of contamination to surrounding water environment.			+/-	L	D	IR	P

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

15.11 Cumulative Effects

Intra-Project Effects

15.11.1 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

15.11.2 Table 15-3 provides a summary of the likely cumulative effects resulting from the proposed development and the cumulative developments.

Table 15-3: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operational Stage	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
SD20A/0283 Microsoft, Grange Castle Business Park,	No	There is some overlap with the demolition and construction stages of the Microsoft, UBC Properties, Cyrus One,	No	The design of the proposed development is such that cumulative effects are unlikely.

Table 15-3: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operational Stage	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Nangor Road Clondalkin, Dublin 22 VA06S.308585 SD20A/0121 UBC Properties, townlands within Grange Castle Business Park, Baldonnel, Dublin 22 ABP Ref - 308585 UBC Properties - Grange Castle South Business Park, Dublin 22 SD17A/0377 Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 SD18A/0134 Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 SD20A/0295 (amendment to SD18A/0134) Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 ABP Ref - 309146 Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22		Equinix and Centrica developments. However, during the demolition and construction stage demand on the network would be predominantly for minor temporary connections for welfare facilities and plant and or would be provided by mobile connections. The permanent connections to the wider network in Profile Park would be undertaken in consultation with statutory consultees to ensure there is no impact on the network when connections are made.		In particular electrical and gas demand is managed though the EirGrid connection and the MFGP, which would provide suitable capacity to support the development.

Table 15-3: Inter-Project Cumulative Effects

Cumulative Development	Demolition and Construction		Operational Stage	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
SD21A/0186 Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 SD22A/0156 Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 SD21A/0217 Digital Netherlands VIII B.V - Profile Park, Nangor Road, Clondalkin, Dublin 22 SD21A/0167 Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22				
ABP Ref – 312793 Vantage Data Centers Dub 11 Limited - Profile Park Business Park and partly within Grange Castle Business Park, Dublin 22	No	The permanent electrical connection to the substation would occur before the proposed development is operational, and the connection would be undertaken in consultation with ESB to ensure there is no impact on the network when connections are made.	No	When operational the EirGrid substation will provide power to the site with power demand offset by the MFGP within the DUB-1 site. The EirGrid substation is subject to a separate SID application to ABP (due to be decided).

Demolition and Construction Cumulative Effects

15.11.3 Cumulative effects during the demolition and construction stage of the proposed development are unlikely for material assets and effects are considered to be **Temporary, Imperceptible and Neutral**.

Operation Cumulative Effects

15.11.4 Cumulative effects during the operation stage of the proposed development are unlikely for material assets and effects are considered to be **Permanent, Imperceptible, and Neutral.**

15.12 Summary of Assessment

15.12.1 This chapter has detailed the potential material assets effects due to the demolition and construction and operation stages of the proposed development. The assessment of demolition and construction and operational stages has been undertaken considering relevant national and local guidance and regulations.

15.12.2 The site lies in the north of the Profile Park and the study area is considered to comprise the surrounding utility network with Profile Park and the wider area.

15.12.3 The main power supply to the Business Park is from EirGrid. This power network is known to be constrained in terms of providing electrical grid power to the area.

15.12.4 The Business Park is served by the GNI network, which is a natural gas network. It is understood the network is not constrained.

15.12.5 The power requirements for the proposed development would be provided via a connection to a 110 kV EirGrid substation, which is subject to a SID application to ABP (due to be decided). The substation would then provide a 20 kV electrical power distribution at medium voltage throughout the site. The site distribution system supplies all electrical rooms where stepdown transformers are deployed to provide 400/230 V electricity to all loads.

15.12.6 The MFGP consented under the July 2022 DUB-1 scheme would provide some supply to DUB-13 until the full electrical load is provided by the above grid connection and then would be called upon for use on the local network drops in response to EirGrid DCCOPP regulations.

15.12.7 DUB-13 would connect to the MFGP through and internal connection through the July 2022 DUB-1 permitted development

15.12.8 In the event of a loss of power supply from EirGrid, the onsite emergency generators would provide a back-up supply.

15.12.9 The Baldonnel Stream crosses under Park Road and flows through the south of the site, entering the site in the southeast before meandering north-west and then leaving the site. Approximately 190 m downstream (west) it enters a short culvert, and downstream it discharges to a long twin-pipe culvert.

15.12.10 Surface water from the proposed development has been designed in accordance with the Greater Dublin Strategic Drainage Strategy. The is site currently greenfield and the proposed surface water measures incorporate SuDs and are aimed at improving the general surface water management of the site, by introducing interceptors, attenuation measures and by restricting the ultimate discharge to the existing surface water sewers and to the Baldonnel Stream) which will be restricted by way of a Hydrobrake, limiting the total discharge to the calculated QBAR greenfield run-off rate.

15.12.11 Foul water will be discharged via gravity sewer into the existing connection Falcon Avenue.

15.12.12 Water supply will be from a network connection located in Falcon Avenue. Water meters, sluice valves and hydrants will be installed at the connections. It is understood that there is suitable capacity in the network to supply to proposed development.

15.12.13 A telecommunications network will be installed at the site which will serve all of the data centers and will be connected to the regional network by the statutory network operator. It is understood that there is suitable capacity in the network to supply to proposed development.

Demolition and Construction Effects

15.12.14 During the demolition and construction stage demand on the networks outlined above will be predominantly for minor temporary connections for welfare facilities and plant and or will be provided by mobile connections.

15.12.15 The permanent connections to the wider network in Profile Park will be undertaken in consultation with statutory undertakers to ensure there is no impact on the network when connections are made.

15.12.16 Overall, effects during the demotion and construction are considered to be **Temporary, Imperceptible** and **Neutra**l i.e., **Not Significant** in terms of EIA.

Operation Stage Effects

15.12.17 With consideration of the July 2022 DUB-1 consented scheme the assessment identified that there is adequate power and electrical provision for the proposed development. The assessment identified that there are adequate facilities in regard to foul water, water supply and telecommunications supplies for the operation stage of the proposed development.

15.12.18 Effects on power and electrical supply during operation and are considered to be **Permanent, Imperceptible, and Neutral** i.e., **Not Significant** in terms of EIA.

15.12.19 **No Effects** are predicted in regard to gas supply.

15.12.20 Surface water from the proposed development has been designed in accordance with the Greater Dublin Strategic Drainage Strategy with restricted discharge at greenfield run off rates to the existing surface water network and to the Baldonnel Stream. The network incorporates pollution presentation measures.

15.12.21 Effects surface and foul water infrastructure, water supply and telecommunications during operation are considered to be **Permanent, Imperceptible, and Neutral** i.e., **Not Significant** in terms of EIA.

Cumulative Effects

15.12.22 Cumulative effects during the demolition and construction and operation stages of the proposed development are considered to be unlikely for material assets.

16 CUMULATIVE EFFECTS

Introduction

16.1 The Planning and Development Regulations require that the likely significant environmental effects of a development are considered, including cumulative effects which are defined in the EPA EIA Report Guidelines 2022 as *"the addition of minor or significant effects, including effects of other projects, to create larger, more significant effects"*.

16.2 The relevant Institute of Environmental Management and Assessment (IEMA) Guidance[1] identifies two types of cumulative effects:

- Inter-project effects - incremental changes caused by other development schemes occurring together with the proposed development and the cumulative effects combining to worsen the effect of a particular impact; and
- Intra-project effects - those effects that occur as a result of impact interaction between different environmental topics within the same project. For example, a project might affect bird species as a result of direct loss of habitat and by noise and light disturbance. Each of these when considered in isolation may have a limited effect but taken together the sum is greater than the parts.

Inter-Project Cumulative Effects

16.3 A list of cumulative schemes for consideration in the inter-project cumulative effect assessment of the proposed development is detailed in EIAR Volume 1, Chapter 2: EIA Process and Methodology.

16.4 Inter-project effects have been addressed in each technical chapter of the EIAR (Chapters 6-15 of EIAR Volume 1 and EIAR Volume 2), as appropriate. To avoid significant repetition, information on the potential combined effects of the proposed development together with cumulative schemes is not presented within this chapter of the EIAR.

Intra-Project Cumulative Effects

16.5 The potential for intra-project cumulative effects is considered within this chapter.

Intra-Project Cumulative Effects

Assessment Approach

16.6 As indicated earlier, there is no established EIA methodology for assessing and quantifying the combined effects of individual effects on sensitive receptors. Accordingly, Ramboll has developed an approach which uses the defined residual effects of the proposed development to determine the potential for interactions between effects and consequently the potential for significant intra-project cumulative effects to arise. This is a tried, tested, and robust approach that has been implemented and accepted on a wide range of planning applications over many years.

16.7 The approach comprised the following steps:

- First, a review of the likely residual effects (and in particular the likely significant environmental effects) presented within the EIAR was undertaken;
- Second, the likely receptors or receptor groups were identified;
- Third, the individual effects which may impact a singular receptor or receptor group were listed in a matrix format;
- Fourth, the potential for individual effects to interact for a given receptor was identified; and
- Fifth, the scale of the combined intra-project cumulative effects was assessed.

16.8 To ensure a proportionate approach, no/non-standalone imperceptible and not significant effects have been disregarded. Where a range of effects has been predicted, the full range has been considered e.g., imperceptible/not-significant to slight, negative.

16.9 It is noted that intra-project cumulative effects are more likely to arise when the receptor or receptor group is of higher sensitivity to change, such as human receptors.

16.10 Within this EIAR, topics such as air quality, transport, noise and vibration and climate change are considered in their own right and also in the context of their associated human health effects; of which, these are then assessed against relevant receptor groups (which includes human health receptors and local residents etc.) as part of the population and human health assessment. Due to the nature of the population and human health assessment these are not considered within this intra-cumulative assessment, due to the need to ensure these effects are reported within their own right and are not double counted. As such, in the instance that human health effects result in an in-combination effect within the matrices presented in this section they are disregarded (as they are already considered from an intra- cumulative perspective in Chapter 6: Population and Human Health).

16.11 Where there is more than one effect likely to arise on a particular receptor or receptor group, the potential for effect interactions and the scale of the combined effect have been determined based on professional judgement and experience. The results of the assessment are presented within a matrix format in the Assessment Results section of this chapter.

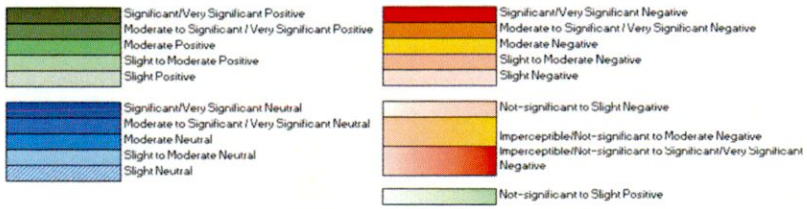
Assessment Results

16.12 Based on the methodology detailed above, Figure 16.1 and Figure 16.2 present the results of the potential for interactions of individual effects on receptors during the demolition and construction stage and once the proposed development is in operation, respectively.

[1] Institute of Environmental Management and Assessment. The State of Environmental Impact Assessment Practice in the UK. 2011

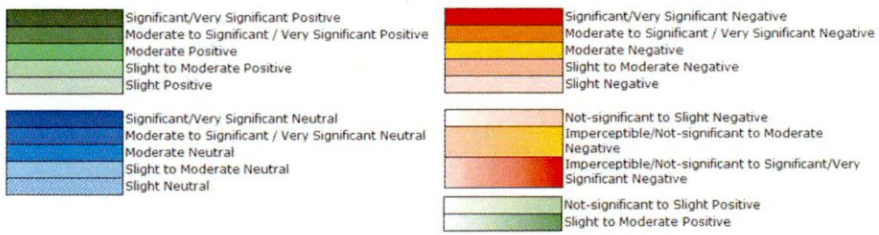
Likely Residual Effects		Receptors and Receptor Groups																
		Local Economy and New Workers	Existing Off-Site Residents	Existing Pedestrians	Existing Road Users	Existing Cyclists	Surface Water Receptors	Groundwater	Fluvial Flood Risk	Off-site Designated/ Protected Habitats	On-site Habitats and Species	Buildings and Infrastructure	Global Climate	Landfills	Existing Character Areas and Landscape Features	Site Landscape Features	Existing Views	Heritage Assets
Population and Human Health	Creation of Employment (Small Area Scale)																	
	Introduction of Resident Population (Small Area Scale)																	
	Air Quality Effects																	
	Noise Effects																	
	Transport Effects																	
Transport and Accessibility	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation																	
	Change in Driver Delay																	
	Change in Accidents and Safety																	
Noise and Vibration	Demolition and Construction noise																	
	Demolition and Construction Traffic Noise																	
	Demolition and Construction Vibration																	
Water Resource and Flood Risk	Direct impacts on surface water quality and hydrodynamic status as a result of construction works																	
	Disruption of Groundwater during Construction Excavations																	
	Loss of floodplain volume during construction																	
Climate Change	GHG Emissions																	
Waste	Effect on Void Space																	
Landscape and Visual	Removal of vegetation and dwelling with stripping of soil and change of topography to accommodate proposed development and landscaping																	
	Disturbance impacts on function and character value of the Baldonnel Stream																	
	Construction activity within urban fringe area of Newcastle Lowlands LCA that has been allocated for development																	
	Disturbance of linked green infrastructure affecting landscape context and setting																	
	Disturbance and impacts on character amenity and tranquillity																	
Potential for Effect Interaction and so Combined Cumulative Effect?		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Figure 16.1: Demolition and Construction Intra-Project Cumulative Effects



Likely Residual Effects		Receptors and Receptor Groups																
		Local Economy and New Workers	Existing and Future Off-Site Residents	Existing and Future Pedestrians	Existing and Future Road Users	Existing and Future Cyclists	Surface Water Flood Risk	Fluvial Flood Risk	Groundwater	Off-site Designated/ Protected Habitats	On-site Habitats and Species	Buildings and Infrastructure	Global Climate	Landfills	Existing Character Areas and Landscape Features	Site Landscape Features	Existing Views	Heritage Assets
Population and Human Health	Creation of Employment (Small Area Scale)																	
	Air Quality Effects																	
	Noise Effects																	
	Transport Effects																	
Transport and Accessibility	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation																	
	Change in Driver Delay																	
	Change in Accidents and Safety																	
Noise and Vibration	Plant noise under worst case operation conditions (Scenario 1)																	
	Plant noise under vest-case operation conditions (Scenario 2)																	
	Plant noise under emergency operation conditions (Scenario 3)																	
Water Resource and Flood Risk	Flood risk from the Baldonnel Stream																	
	Changes to flood risk as a result of changes to the surface water runoff regime of the site																	
Ecology	Ecological Enhancement of the Baldonnel Stream																	
Climate Change	GHG Emissions																	
Waste	Effect on Void Space																	
Landscape and Visual	Enhancement with new riverine planting and features including wetland meadow and pond																	
	Enhancement of linked green infrastructure features and increased commercial development within setting																	
	Increased commercial development within setting																	
	A small addition to the view, in context with surrounding character																	
	A notable change within the view in keeping with the character of the area.																	
Potential for Effect Interaction and so Combined Cumulative Effect?		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Figure 16.2: Operation Intra-Project Cumulative Effect



Demolition and Construction

16.13 As shown in Table 16.1, no effect interactions are likely to arise during the demolition and construction period.

Operation

16.14 As shown in Table 16.2, effect interactions are likely to arise during operation in relation to off-site human health effects, however as previously discussed, in-combination human-health effects have been disregarded due to the nature of the human health assessment (i.e., as these effects have already been considered from an intra-cumulative perspective in Chapter 6: Population and Human Health).

16.15 Therefore, no effect interactions are likely to arise during operation.

Conclusions

16.16 From the assessment of intra-project cumulative effects, no effects have been identified during demolition and construction or operation that have not already been discussed in Chapter 6: Population and Human Health.

17 RESIDUAL EFFECTS AND MITIGATION

Introduction

17.1 This chapter summarises the additional mitigation measures, the enhancement measures and the residual effects identified in the technical assessments of EIAR Volume 1 (Chapters 6-15) and EIAR Volume 2.

Additional Mitigation and Enhancement

17.2 As set out in Chapter 2: EIA Process and Methodology, the aim of an EIA is to develop measures to avoid, offset or reduce the significant negative environmental effects of a project and to enhance any beneficial effects.

17.3 Within each of the technical assessments, the need for additional mitigation measures has been considered in respect of likely significant negative effects as far as reasonably possible. In addition, opportunities for environmental enhancement have been explored where practicable. The proposed additional mitigation and enhancement measures are in addition to the embedded design and operational mitigation measures (as described in EIAR Chapter 4: Proposed Development Description) and standard embedded demolition and construction mitigation measures (as described in EIAR Chapter 5: Demolition and Construction Description), which have been considered within the technical assessments.

17.4 Table 17.1 presents a summary of the additional mitigation measures that have been identified over the course of the EIA of the proposed development categorised under the following stages:

- Demolition and Construction; and
- Operation.

17.5 It is noted that no enhancement measures have been identified within the individual technical assessments.

17.6 Reference should be made to individual technical assessment chapters for more detail.

Table 17.1: Summary of Proposed Additional Mitigation

Topic	Proposed Additional Mitigation
Demolition and Construction	
Population and Human Health	None
Transport and Accessibility	None
Air Quality	None
Noise and Vibration	None
Water Resource and Flood Risk	None
Ecology	• Pre-commencement badger survey. • All excavations should be securely covered, or a suitable means of escape provided at the end of each working day. • Pre-construction breeding bird survey (only if works are undertaken between March and August) • No demolition of buildings within the swallow summer breeding season April – October. Pre-demolition check of building for nesting birds.
Operation	
Population and Human Health	None
Transport and Accessibility	None
Air Quality	None
Noise and Vibration	None
Water Resource and Flood Risk	• Site-Specific Flood Risk Mitigation Plan and associated maintenance regime
Ecology	None
Ground Conditions	None
Climate Change	None
Waste	None
Material Assets	None
Landscape and Visual	None
Cultural Heritage	None

Residual Effects

17.7 This section summarises the likely residual environmental effects of the proposed development following the adoption and inclusion of the additional mitigation measures that are set out in Table 17.1.

17.8 Reference should be made to EIAR Chapters 6-15 in EIAR Volume 1 and Volume 2 for a detailed description of likely significant residual environmental effects.

Demolition and Construction Residual Effects

17.9 Table 17.2 summarises the residual effects which have been identified by the individual technical assessments as likely to arise from the demolition and construction of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

17.10 No significant positive or negative environmental effects have been identified.

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
Population and Human Health	Local Residents and Economy	Creation of Employment (Small area scale)	None required	Not-significant - Slight	+	L	D	R	T
	Local Residents and Economy	Creation of Employment (Electoral division and South Dublin County scale)	None required	Imperceptible	+	L	D/I	R	T
	Local Residents and Economy	Introduction of Resident Population (Small area scale)	None required	Not significant – Slight	-	L	D/I	IR	T
	Local residents	Air quality effects	None required	Not significant – Slight	-	L	D/I	IR	T
	Local residents	Noise effects	None required	Not Significant – Slight	-	L	D	IR	T
	Local residents	Transport effects	None required	Not Significant – Slight	-	L	D	IR	T
	Local residents	Amenity	None required	Imperceptible	-	L	D	R	T
Transport and Accessibility	Pedestrians	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation	None required	Slight	-	L	R	D	T
	Road users	Change in Driver Delay	None required	Slight	-	L	R	D	T
	Road users, pedestrians and cyclists	Change in Accidents and Safety	None required	Slight	-	L	R	D	T
Air Quality	Existing Off-site Human Health and Amenity	Dust Soiling and PM_{10} due to demolition and construction works	None required	Imperceptible	-	L	D	R	T
	Existing Off-site Human Health	Change in NO_2, PM_{10} and $PM_{2.5}$ levels due to vehicle emissions	None required	Imperceptible	-	L	D	R	T
Noise and Vibration	Local Residents (NSR 1)	Demolition and Construction Noise	None required	Not significant	-	L	D	IR	T
	Local Residents (NSR 2-5)	Demolition and Construction Noise	None required	Slight	-	L	D	IR	T
	Local Residents (NSR 1)	Demolition and Construction Traffic Noise	None required	Not significant	-	L	D	IR	T
	Local Residents (NSR 2-5)	Demolition and Construction Traffic Noise	None required	Slight	-	L	D	IR	T
	Local Residents (NSR 1)	Demolition and Construction Vibration	None required	Not significant	-	L	D	IR	T
	Local Residents (NSR 2-5)	Demolition and Construction Vibration	None required	Slight	-	L	D	IR	T
	Surface Water Receptors	Potential contamination as a result of silt-laden runoff across the demolition and construction site	None Required	Imperceptible/Not Significant	-	L	D	R	T

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
Water Resource and Flood Risk		and potential for contaminants to be introduced to surface water by construction activities through leakages/spillages							
	Surface Water Receptors	Direct impacts on surface water quality and hydrodynamic status as a result of construction works	None Required	Imperceptible/Not Significant	+	L	D	R	T
	Groundwater Supply	Disruption of Groundwater during Construction Excavations	None Required	Imperceptible	-	L	D	R	T
	Fluvial Flood Risk	Flood risk from the Baldonnel Stream	None Required	Imperceptible	+/-	U	D	R	T
	Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Construction	None Required	Imperceptible	+/-	U	D	R	T
Ecology	South Dublin Bay SAC, the North Dublin Bay SAC, the South Dublin Bay and River Tolka Estuary SPA and the North Bull Island SPA	Pollution	None required	Imperceptible/Not Significant	-	L	I	IR	T
	Grand Canal pNHA and Liffey Valley pNHA	Pollution	None required	Imperceptible/Not Significant	-	L	D	IR	T
	Baldonnel stream	Pollution	None required	Imperceptible	-	L	D	IR	T
	Terrestrial habitats	Habitat loss	None required	Imperceptible	-	L	D	R/IR	T
	Terrestrial habitats	Pollution	None required	Imperceptible	-	L	I	R	T
	Bats	Commuting and foraging habitat loss	None required	Imperceptible	-	L	D	R	T
	Badger	Disturbance / destruction of setts	Pre-construction badger survey	Imperceptible	-	L	D	R	T
		Accidental trapping within excavations	All excavations should be securely covered, or a suitable means of escape provided at the end of each working day.						
	Birds	Disturbance / destruction of nest	Pre-construction breeding bird survey (Only if works are undertaken between March and August)	Imperceptible to Not-significant	-	L	D	IR	T

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
			No demolition of buildings within the swallow summer breeding season April – October. Pre-demolition check of building for nesting birds.						
		Habitat loss as a result of displacement by disturbance	None required						
Ground Conditions	Construction workers	Impact to human health from exposure to contaminated soils / dust / ground gases / water during enabling and construction works.	None required	Imperceptible	-	U	D	IR	T
	Adjacent site users	Impact to human health from exposure to contaminated dust during enabling and construction works.	None required	Imperceptible	-	U	I	IR	T
	Water environment (Baldonnel Stream)	Increased potential for leaching of contaminants from soils and mobilisation of contamination in surface water and groundwater during earthworks and foundation works. Also, contaminants introduced to surface water by construction activities through leakages/spillages.	None required	Imperceptible/not significant	-	U	D	IR	T
	Groundwater beneath the site (aquifers)		None required	Imperceptible/not significant	-	U	D	IR	T
	Agricultural Land	Loss of agricultural land	None required	Imperceptible	-	U	D	IR	P
Climate Change	**CCR**								
	Buildings and Infrastructure	Extreme rainfall events could result in the erosion of stockpiles and resultant silting of drainage assets.	None required	Imperceptible to Not significant	-	U	D	R	T
	Buildings and Infrastructure	Extreme rainfall events and their secondary impacts could affect the ability to undertake certain construction activities leading to programme delays (e.g. pouring of concrete and asphalt) increasing project costs.	None required	Imperceptible to Not significant	-	U	D	R	T
	Environment	Extreme rainfall events could result in increased runoff of concrete or cement products nearby watercourses.	None required	Imperceptible to Not significant	-	U	I	R	T
	Human Health	Heatwaves, higher temperatures and drought conditions could impact dust generated during construction activities.	None required	Imperceptible to Not Significant	-	U	D	R	T
	Human Health	Winds gusts could result in the damage of stockpiles. Secondary impacts could include site personnel welfare impacts.	None required	Imperceptible to Not Significant	-	U	D	R	T
	Human Health	Heatwaves, higher temperatures could impact on site construction personnel welfare, for example,	None required	Imperceptible to Not Significant	-	U	D	R	T

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
		causing heat stress and unsafe working conditions.							
	ICCI								
	Population and Human Health Sensitive Receptors	Potential interactions of climate change with the identified Population and Human Health effects	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Transport Sensitive Receptors	Potential interactions of climate change with the identified transport effects.	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Air Quality Sensitive Receptors	Exposure of sensitive receptors to dust from demolition and construction activities.	None required	Not Significant	-	U	D	R	Mt
	Air Quality Sensitive Receptors	Exposure of sensitive receptors to dust from demolition and construction activities.	None required	Not Significant	-	U	D	R	Mt
	Noise and Vibration Sensitive Receptors	Potential interactions of climate change with the identified Noise and Vibration effects.	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Water Resources and Flood Risk Sensitive Receptors	Exposure of sensitive receptors to water from demolition and construction activities.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Ecology Sensitive Receptors	Exposure of sensitive receptors to demolition and construction activities.	None required	Imperceptible to Not Significant	-	U	I	IR	Mt
	Ground Conditions Sensitive Receptors	Exposure of sensitive receptors (water) to demolition and construction activities	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Waste Sensitive Receptors	Potential interactions of climate change with the identified Waste effects	None required	Imperceptible to Not Significant	-	U	D	R	Mt
	Material Assets Sensitive Receptors	Exposure of sensitive receptors (surface water) to demolition and construction activities	None required	Not Significant	-	U	D	R	Mt
	Material Assets Sensitive Receptors	Exposure of sensitive receptors (water supply) to demolition and construction activities	None required	Imperceptible to Not Significant	-	U	I	R	Lt
	GHG Emissions								
	Global Climate	GHG Emissions	None required	Slight to Not Significant (not significant)	-	IR	D	L	LT
Waste	Landfill Sites	Effect on void space	None required	Not Significant to Slight	-	L	D	IR	P
Material Assets	Power and Electrical Supply	Increased demand on the surrounding network	None required	Imperceptible	+/-	L	D	IR	T
	Gas Supply				+/-	L	D	IR	T
	Foul Water Infrastructure				+/-	L	D	IR	T
	Water Supply				+/-	L	D	IR	T

Table 17.2: Demolition and Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Telecommunications				+/-	L	D	IR	T
	Surface Water Infrastructure	Risks of contamination from increased run-off, machinery on site, concrete activities, and/or accidental spillages.			+/-	L	D	IR	T
Landscape and Visual	**Landscape**								
	Site	Removal of vegetation and dwelling with stripping of soil and change of topography to accommodate proposed development and landscaping	None required	Not significant / Slight	-	L	D	IR	T
	Baldonnel Stream	Disturbance impacts on function and character value.	None required	Not significant / Slight	-	L	D	IR	T
	Newcastle Lowlands LCA	Construction activity within urban fringe area of LCA that has been allocated for development	None required	Not significant / Slight	-	L	I	R	T
	The Grand Canal	Disturbance of linked green infrastructure affecting landscape context and setting	None required	Not significant / Slight	-	L	I	R	T
	NIAH Listed features	Disturbance and impacts on character amenity and tranquillity	None required	Not significant / Slight	-	L	I	R	T
	Road Corridors	Change to the townscape associated with the road corridors	None required	Imperceptible	-	L	D	R	T
	Visual								
	VP1-11	Disturbance and construction impacts affect the visual amenity for receptors (Low – Medium)	None required	Imperceptible	-	L	I	R	T
Cultural Heritage	On site archaeology	Knowledge gained by preservation by record	Programme of archaeological monitoring of topsoil stripping in the area immediately surrounding the possible prehistoric or early historic ditch and by preservation by record (excavation) of any features exposed prior to construction.	Imperceptible/Not Significant	+	L	D	IR	P
	Built heritage	None identified	None required	Imperceptible	+/-	U	D	R	T

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Operation Residual Effects

17.11 Table 17.3 summarises the residual effects which have been identified by the individual technical assessments as likely to arise upon completion and operation of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

17.12 The following significant positive environmental effects for the operation stage have been identified and are highlighted in green text in Table 17.3.

Landscape and Visual:

- Enhancement of the landscape of the Baldonnel Stream with new riverine planting and features including a wetland meadow and pond

17.13 No significant negative environmental effects have been identified.

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
Population and Human Health	Local Residents and Economy	Creation of Employment (Small area scale)	None required	Not-significant - Slight	+	L	D	IR	Lt - P
	Local Residents and Economy	Creation of Employment (Electoral division and South Dublin County scale)	None required	Imperceptible	+	L	D	IR	Lt - P
	Local residents	Air quality effects	None required	Not significant – Slight	-	L	D/I	IR	Lt - P
	Local residents	Noise effects	None required	Not Significant – Slight	-	L	D	IR	Lt - P
	Local residents	Transport effects	None required	Not Significant – Slight	-	L	D	IR	Lt - P
	Local residents	Amenity	None required	Imperceptible	-	L	D	IR	Lt - P
Transport and Accessibility	Pedestrians	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation	None required	Slight	-	L	R	D	Lt to P
	Road users	Change in Driver Delay	None required	Slight	-	L	R	D	Lt to P
	Road users, pedestrians and cyclists	Change in Accidents and Safety	None required	Slight	-	L	R	D	Lt to P
Air Quality	Existing Off-site Human Health	Change in NO_2, PM_{10} and $PM_{2.5}$ levels due to vehicle emissions	None required	Not significant	-	L	D	IR	Lt to P
	Existing Off-site Human Health	Change in NO_2 levels due to Phase 1 and Phase 2 emergency generators	None required	Imperceptible	-	L	D	IR	Lt to P
	Existing Off-site Human Health	Change in NO_2 levels due to Phase 1 and Phase 2 emergency generators	None required	Imperceptible	-	L	D	IR	Lt to P
Noise and Vibration	Local Residents (All NSRs)	Plant noise under worst case operation conditions (Scenario 1)	None required	Slight	-	L	D	IR	Lt to P
	Local Residents (All NSRs)	Plant noise under vest-case operation conditions (Scenario 2)	None required	Slight	-	L	D	IR	Lt to P
	Local Residents (All NSRs)	Plant noise under emergency operation conditions (Scenario 3)	None required	Slight	-	L	D	IR	Lt to P
Water Resource and Flood Risk	Fluvial Flood Risk	Flood risk from the Baldonnel Stream	Site-Specific Flood Risk Mitigation Plan and associated maintenance regime	Slight to Moderate	+	L	D	IR	LT

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Surface Water Flood Risk	Changes to flood risk as a result of changes to the surface water runoff regime of the site	None Required	Slight to Moderate	+	L	D	IR	LT
	Groundwater	Potential to alter local groundwater flow paths and levels	None Required	Imperceptible/Not Significant	-	L	D	IR	LT
	Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Operation	None Required	Imperceptible	+/-	L	D	IR	LT
Ecology	South Dublin Bay and River Tolka SPA	Pollution Ecological enhancement	None required	Imperceptible	+/-	L	I	IR	P
	Grand Canal pNHA and Liffey Valley pNHA	Pollution Ecological enhancement	None required	Imperceptible to Not-Significant	+/-	L	I	IR	P
	Baldonnel stream	Ecological enhancement	None required	Slight	+	L	D	R	P
	Terrestrial habitats	Ecological enhancement	None required	Imperceptible	+	L	D	R	P
	Bats	Disturbance through lighting	None required	Imperceptible	+	L	D	R	P
	Badger	Foraging habitat enhancement	None required	Imperceptible	+	L	D	R	P
	Birds	Foraging habitat enhancement	None required	Imperceptible	+	L	D	R	P
Ground Conditions	Adjacent site users	Impact to human health from exposure to residual contaminated soils / dust / ground gases / water.	None required	Imperceptible	-	U	I	IR	Lt to P
	Future site users		None required	Imperceptible	-	U	D	IR	Lt to P
	Water environment (Baldonnel Stream)	Contaminants released by operation activities through leakages/spillages.	None required	Imperceptible/Not significant	-	U	D	IR	Lt to P
	Groundwater beneath the site (aquifers)		None required	Imperceptible/Not significant	-	U	D	IR	Lt to P
Climate Change	**CCR**								
	Buildings and Infrastructure	Extreme rainfall events and increased frequency of intense rainfall events could result in the overwhelming of drainage assets.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure	Extreme rainfall events could lead to flooding of the underground foundations or services (electrical cables)	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure	Extreme rainfall events could lead to fluvial flooding, including of the Baldonnel stream high-lighted within the FRA; culvert has potential blockages	None required	Imperceptible to Not Significant	-	U	D	R	Lt

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Buildings and Infrastructure	Extreme rainfall events could lead to flooding of the drainage assets	None required	Imperceptible to Not Significant	-	U	I	R	Lt
	Human Health	Increased frequency of intense rainfall events could result in wet pavement surfaces leading to reduced skid resistance and unsafe conditions for site personnel.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Environment	Increased frequency and severity of extreme heat events (i.e., heat waves) could result in the landscape design being compromised (e.g., tree and shrubs die).	None required	Imperceptible to Not Significant	-	U	I	R	Lt
	Buildings and Infrastructure	Increased frequency and severity of extreme heat events could result in overheating of the electrical equipment (e.g. data servers).	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure	Transformers affected by urban heat islands and coincident air conditioning demand leading to overloading in summer months.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure	High temperatures and heatwaves could result in overheating and unsuitable conditions e.g., discomfort for occupants in ancillary buildings and office spaces	None required	Imperceptible to Not Significant	-	U	D	IR	Lt
	Buildings and Infrastructure	Heatwaves, higher temperatures could damage the building structure	None required	Imperceptible to Not Significant	-	U	D	IR	Lt
	Buildings and Infrastructure	Heatwaves, high temperatures and increased humidity could lead to lightning striking the data centre resulting in damage to infrastructure or loss of power.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Infrastructure and Human Health	Prolonged periods of drought could lead to vegetation drying, increasing risk of grassland fires near the Data centre. Secondary impacts include infrastructure damage and vegetation	None required	Imperceptible to Not Significant	-	U	I	IR	Lt
	Human Health	Prolonged periods of drought could affect water and potable water availability.	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Buildings and Infrastructure and human health	Freeze-thaw could damage the proposed development, e.g. cracking, deformation, that reduces the proposed development's service life.	None required	Imperceptible to Not Significant	-	U	D	IR	Lt
	ICCI								
	Population and Human Health Sensitive Receptors	Potential interactions of climate change with the identified Population and Human Health effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Transport Sensitive Receptors	Potential interactions of climate change with the identified transport effects.	None required	Imperceptible to Not Significant	-	U	D	R	Lt

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Noise and Vibration Sensitive Receptors	Potential interactions of climate change with the identified Noise and Vibration effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Water Resources and Flood Risk Sensitive Receptors	Exposure of sensitive receptors to water from operational stage	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Ecology Sensitive Receptors	Potential interactions of climate change with the identified Ecological effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Ground Conditions Sensitive Receptors	Potential interactions of climate change with the identified Ground Conditions effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Waste Sensitive Receptors	Potential interactions of climate change with the identified Waste effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	Material Assets Sensitive Receptors	Potential interactions of climate change with the identified Material effects	None required	Imperceptible to Not Significant	-	U	D	R	Lt
	GHG Emissions								
	Global Climate	GHG Emissions	None required	Slight to Not Significant	-	IR	D	L	LT
Waste	Landfill Sites	Effect on void space	None required	Not significant to slight	-	L	D	IR	P
Material Assets	Power and Electrical Supply	Increased demand on the surrounding network	None required	Imperceptible	+/-	L	D	IR	P
	Gas Supply				+/-	L	D	IR	P
	Foul Water Infrastructure				+/-	L	D	IR	P
	Water Supply				+/-	L	D	IR	P
	Telecommunications				+/-	L	D	IR	P
	Surface Water Infrastructure	Risk of contamination to surrounding water environment.			+/-	L	D	IR	P
Landscape and Visual	**Landscape – Operation Year 5**								
	Site	Creation of new topography and habitat types with increased tree planting and connection with the Baldonnel stream landscape feature	None required	Imperceptible	+	L	D	IR	Lt to P
	Baldonnel Steam	Enhancement with new riverine planting and features including wetland meadow and pond	None required	Moderate	+	L	D	R	Lt to P
	Newcastle Lowlands LCA	Additional data centre development within a business park on the urban fringe with extensive boundary treatments that soften and assimilate the building into the landscape	None required	Imperceptible	-	L	ID	IR	Lt to P

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	The Grand Canal	Enhancement of linked green infrastructure features and increased commercial development within setting.	None required	Not Significant / Slight	-	L	ID	IR	Lt to P
	NIAH Listed features	Increased commercial development within setting.	None required	Not Significant / Slight	-	L	ID	IR	Lt to P
	Road Corridors	New commercial element within the transition from townscape to land-scape.	None required	Imperceptible	+	L	ID	IR	Lt to P
	Visual – Operation Year 5								
	VP: 03, 05, 10	Not visible	None required	Imperceptible	-	L	ID	IR	Lt to P
	VP04	A small addition to the view, in context with surrounding character	None required	Not Significant / Slight	-	L	ID	IR	Lt to P
	VP: 01; 02; 06; 08; 09, 11	A small addition to the view, in context with surrounding character	None required	Imperceptible	-	L	ID	IR	Lt to P
	VP: 07	A notable change within the view in keeping with the character of the area.	None required	Not Significant / Slight	-	L	ID	IR	Lt to P
Cultural Heritage	On site archaeology	None identified	None required	Imperceptible	+/-	U	D	IR	P
	Built heritage (TOR2-4)	Change to visual qualities of setting	None required	Imperceptible/ not significant	-	L	D	IR	P
	Built heritage (TOR8, 16, 17, 18-22)	None identified	None required	Imperceptible	+/-	U	D	IR	P

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

GLOSSARY OF TERMS

Accurate Visual Representations	A static or moving image which shows the location of a proposed development as accurately as possible; it may also illustrate the degree to which the development will be visible, its detailed form or the proposed use of materials. AVRs are produced by accurately combining images of the proposed building with a representation of its context.
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near (LAFeq,T).
Amenity	A pleasant or advantageous aspect of the environment.
An Bord Pleanála	Ireland's national independent planning body.
Annual Probable Sunlight Hours	The Annual Probable Sunlight Hours (APSH) is a measure of sunlight that a given window may expect over the period of a year, and where there is no obstruction, equates to a maximum of 1,486 hours. Sunlight is measured using a sun indicator which contains 100 spots, each representing 1 % of APSH (i.e. 14.86 hours of the total APSH).
Applicant	Vantage Data Centers DUB11 Limited
Application	Means the full planning application, for the proposed development on the site.
A-weighting Sound Pressure Level	The sound pressure level with the A-weighting applied. The A-weighting is used for most environmental noise measurements and is used to weight a spectrum of sound to match the sensitivity of the human ear.
Background Sound/Noise Level	These are amongst the lowest noise levels measured over a given period of time and exclude short term, intermittent noise sources. The background noise level is quantified by the LA90 descriptor and is therefore the level which is exceeded for 90% of a given period of time.
Baseline Studies	Studies of existing environmental conditions which are designed to establish the baseline conditions against which any future changes can be measured or predicted.
Biodiversity	The diversity, or variety of plants and animals and other living things in a particular area of region. It encompasses landscape diversity, ecosystem diversity, species diversity and genetic diversity.
Brief Effects	Effects lasting less than a day
Climate Change Resilience	An assessment of the vulnerability of the proposed development to extreme weather and projected climate change.
Completed Development	A development scheme which has been build out and is operational.
Construction Environmental Management Plan	A documented management system with environmental procedures to monitor residual effects of the demolition and construction stage of a development.
Construction Logistics Plan	A documented travel plan specific for a construction site.
Construction Method Statement	A document which addresses the health and safety risks to workers and other personnel on-site during the demolition and construction stage of the development.
Cumulative Effects	Effects that result from incremental changes caused by other past, present or reasonably foreseeable actions.
Cumulative Developments	Developments that have received a resolution to grant planning permission or have a signed legal agreement in place. They are likely to be delivered concurrently with the Proposed Development assessed in the EIA.
Decibel	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
Desk Study	A non-intrusive study and review of all available information pertaining to a site, including historical records, collated and monitored data, and consultation with relevant stakeholders.
Diffusion Tube	A passive sampler used for collecting NO_2 in the air.
Directive	European Union (EU) Directives impose legal obligations on European Member States. They are binding as to the results to be achieved but allow individual states the right to decide the form and methods used to achieve the results.
EIA Scoping	An initial stage in determining the nature and potential scale of the environmental impacts arising from a proposed development and assessing what further studies are required to establish their significance.
EIA Scoping Opinion	A written statement of the opinion of the relevant planning authority as to the information to be provided in the Environmental Statement.
EIA Screening	An initial stage in which the need for EIA is considered in respect of a development. Some developments are automatically subject to EIA by means of their inevitable size, nature and effects (Annex I developments). Other projects are made subject to EIA because it is anticipated that they are likely to have significant environmental effects (Annex II Developments).
Emission	A material that is expelled or released to the environment. Usually applied to gaseous or odorous discharges to the atmosphere.
Environmental Impact Assessment	A process by which information about the environmental effects of a development is collected and taken into account by the relevant decision-making body before a decision is given on whether the development should go ahead.
Environmental Impact Assessment Report	A statement that includes such information that is reasonably required to assess the environmental effects of a development.
Environmental Protection Agency	An independent public body established under the Environmental Protection Agency Act , 1992, responsible for protecting and improving the environment.
Equivalent Continuous A-Weighted Sound Pressure Level	The L_{Aeq} is an energy average and defined as the level of sound which, over a given period of time, would equate to the same A-weighted sound energy as the actual fluctuating sound.

Façade	The front or face of a building.
Fit-out	Installation of all non-substructure and non-superstructure items such as electrical water services, as well as final internal finishings.
Frequency	In sound, the number of cycles per second of a pressure fluctuation and frequency in sound is proportional to its pitch. Different frequencies are divided into octave and one third octave bands.
Frequency of Effects	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Frequency Weightings	Weightings can be applied to a spectrum of sound and act as a filter to account for different sensitivities and conditions.
Gross External Area	A measure of area of a building measured externally at each floor level.
Heavy Goods Vehicle	A vehicle with a gross vehicle weight greater than 3.5 tonnes.
Hydrotreated Vegetable Oil	A paraffinic bio-based liquid fuel originating from many kinds of vegetable oils.
Imperceptible Effect	An effect capable of measurement but without significant consequences
In-Combination Climate Change Impacts	An assessment of the additive impact that climate and climate change may have on impacts identified by other environmental topics as a result of the proposed development, now and in future years.
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Long-term Effects	Effects lasting fifteen to sixty years.
Maximum Noise Level	The maximum instantaneous noise level measured during a given period of time. The time weighting to which the meter is set for this measurement parameter is always indicated by either an F or S.
Medium-term Effects	Effects lasting seven to fifteen years.
Minimum Noise Level	The minimum instantaneous noise level measured during a given period of time. The time weighting to which the meter is set for this measurement parameter is always indicated by either an F or S.
Mitigation	Any process, activity of thing designed to avoid, reduce or remedy adverse environmental effects likely to be caused by a development project.
Mitigation Measure	Measure aiming at reducing an adverse environmental effect.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Momentary Effects	Effects lasting from seconds to minutes
Multifuel Generation Plant	A power generation plant with the ability to operate on natural gas and HVO.
National Planning Framework (2018)	At the national level, planning policy is contained within the National Planning Framework (NPF) 2018. The Department of Housing Planning and Local Government, on behalf of the Government of Ireland, published the NPF in February 2018 and is the Government's high-level strategic plan for shaping the future growth and development of our country out to the year 2040.
National Development Plan 2021-2030	The National Development Plan 2021-2030 (NDP) sets out the investment priorities that will underpin the implementation of the NPF, through a total investment of approximately €165 billion. Finalisation of the NPF alongside the ten-year NDP will culminate one plan to guide strategic development and the infrastructure investment at the national level.
Negative/adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Nitrogen dioxide	Road transport and the burning of fossil fuels for power are the main sources of Nitrogen dioxide. In addition to being a greenhouse gas it also contributes to photochemical smog formation. It is an irritant to the respiratory system.
Noise Rating Level	This is a single figure value derived by plotting a noise spectrum against a set of curves. The curve under which the spectrum fits is the resulting Noise Rating Level.
Non-Technical Summary	A summary of the Environmental Statement in 'non-technical language'.
Normalised Element Level Difference	The normalised difference in sound level between a pair of rooms via a small element such as a trickle ventilator. The level difference in octave bands is normalised to a reference amount of absorption.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Objective EE	A classification under the South Dublin County Development Plan 2022-2028: to provide for enterprise and employment uses.
Ordnance Datum	Land levels are measured relative to the average sea level at Newlyn, Cornwall. This average level is referred to as 'Ordnance Datum'.
Particulate Matter	Discrete particles in ambient air, sizes ranging between nanometres (nm, billionths of a metre) to tens of micrometres (µm, millionths of a metre).
Pathways	The routes by which impacts are transmitted through air, water, soils or plants and organisms to their receptors.
Percentile Level	A-weighted sound pressure level obtained using time-weighting F, which is exceeded for N% of a specified time interval. An example of this is background noise which is quantified with the LA90 descriptor, which is the A-weighted level which is exceeded for 90% of the measurement period.
Permeant Effects	Effects lasting over sixty years.
Plant	A building's generator, heating, ventilation, and/or electricity-production system.
Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Profound Effects	An effect which obliterates sensitive characteristics.
Quality of Effects	An effect that is positive, neutral, or negative.
Receptor (Sensitive)	A component of the natural, created, or built environment such as human being, water, air, a building, or a plant that is affected by an impact.