15.5.2.13 Assessment Periods

The weekday AM and PM peak hour flows have been identified in traffic survey as occurring between 07:45 - 08:45 and 17:45 - 18:45 respectively. These peak hour periods form the basis of the network assessments.

15.5.2.14 Network Impact

The Institute of Highways and Transportation document 'Guidelines for Traffic Impact Assessments' states that the impact of a proposed development upon the local road network is considered material when the level of traffic it generates surpasses 10% and 5% on normal and congested networks respectively. When such levels of impact are generated, a more detailed assessment should be undertaken to ascertain the specific impact upon the network's operational performance. These same thresholds are reproduced in the TII document entitled Traffic and Transport Assessment Guidelines (2014).

In accordance with the IHT and NRA guidelines, assessments have been undertaken to establish the potential level of impact upon the key junctions of the local road network. To enable this calculation to be undertaken, the analysis took account of the following:

- 2026 Opening Year (Do Nothing & Do Something);
- 2031 Future Design Year Scenario (Do Nothing & Do Something); and
- 2041 Future Design Year Scenario (Do Nothing & Do Something).

Table 15.15 and **Figure 15.18** detail the percentage impact of the relevant key junctions for the 2026, 2031 and 2041 design years. The following junctions have been included within the transport assessment:

- **Junction 1** – Northern Site Access / R117 Sandford Road / Belmont Avenue;
- **Junction 2** – R117 Sandford Road / R825 St. James's Terrace / R117 Milltown Road / R824 Eglinton Road; and
- **Junction 3** – Southern Site Access / R117 Milltown Road / Mount Sandford.

Figure 15.18: Increase in Vehicle Trips Generated Through Key Site Junctions 2041 Do Something – 636 Units

Table 15.15 Network Impact Assessment

Junction ID	Location	2026		2031		2041	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
1	Northern Site Access / R117 Sandford Road / Belmont Avenue	7.29%	2.67%	6.81%	2.49%	6.48%	2.37%
2	R117 Sandford Road / R825 St. James's Terrace / R117 Milltown Road / R824 Eglinton Road	6.09%	2.72%	5.69%	2.54%	5.42%	2.42%
3	Southern Site Access / R117 Milltown Road / Mount Sandford	15.77%	11.94%	14.71%	11.14%	13.99%	10.60%

The resulting percentage in traffic flows for the 2026, 2031 and 2041 (with full development) is established as exceeding the 10% impact threshold for Junction 3 only. As Junction 3 did exceed the 10% threshold required under the Institution of Highways and Transportation document 'Guidelines for Traffic Impact Assessments', a junction performance analysis has been conducted as required by the guidance document.

During the complete and occupied operational stage of the subject site, a slight long-term traffic impact will be made on the local road environment stemming from residential and employee trips to and from the site. As can be seen from the table above, Junction 1 (Northern Site Access / R117 Sandford Road / Belmont Avenue) and Junction 2 (R117 Sandford Road / R825 St. James's Terrace / R117 Milltown Road / R824 Eglinton Road) are minimally affected throughout the design years considered. Junction 3, Southern Site Access / R117 Milltown Road / Mount Sandford, experiences a marginally higher traffic impact, though it does not indicate any capacity concerns for the junction. Section 15.6.2 below outlines various mitigation measures to be implemented during the operational stage to discourage the use of private vehicles and encourage the uptake and use of active and sustainable modes of transportation.

15.6 Mitigation Measures

15.6.1 Construction Phase

An *Outline Construction and Environmental Management Plan* (CEMP) has been prepared as part of the planning application with an associated *Preliminary Construction Management Plan* (PCMP). The *PCMP* includes an Outline Traffic Management Plan as well as incorporating a range of integrated control measures and associated management activities with the objective of minimising the potential impacts of construction activities associated with the development. The following initiatives will be implemented to avoid, minimise and/or mitigate against the anticipated construction period impacts:

- During the pre-construction phase, the site will be securely fenced off/hoarded off from adjacent properties, public footpaths and roads;
- Appropriate on-site parking (temporary parking for the duration of construction works) and compound area will be provided to prevent overflow onto the local network;
- A large proportion of construction workers are anticipated to arrive in shared transport. It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential;
- Delivery vehicles to and from the site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low;
- Truck wheel washes will be installed at construction entrances;
- Any specific recommendations with regard to construction traffic management made by Dublin City Council will be adhered to;
- Potential localised traffic disruptions during the construction phase will be mitigated through the implementation of industry standard traffic

management measures such as the use of traffic signage. These traffic management measures shall be designed and implemented in accordance with the Department of Transport's Traffic Signs Manual "*Chapter 8 Temporary Traffic Measures and Signs for Roadworks*" and "*Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition*" (2010);

- Site entrance point/s from the public road will be constructed with a bound, durable surface capable of withstanding heavy loads and with a sealed joint between the access and public highway. This durable bound surface will be constructed for a distance of 10m from the public road.

- Material storage zones will be established in the compound area and will include material recycling areas and facilities;

- 'Way finding' signage will be provided to route staff / deliveries into the site and to designated compound / construction areas;

- Dedicated construction haul routes will be identified and agreed with Dublin City Council prior to commencement of activities on-site; and

- On completion of the works, all construction materials, debris, temporary hardstands etc. from the site compound will be removed off-site and the site compound area reinstated in full on completion of the works.

15.6.2 Operational Phase

A package of integrated mitigation measures has been identified to off-set the additional local demand that the proposed residential development at the subject site could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures and associated timescale for their implementation are summarised below.

- **Parking Management Strategy** - A management regime has been set out (and accompanies this planning application) which will be implemented by the development's management company to control access to the on-site car parking spaces thereby actively managing the availability of on-site car parking for residents and visitors to the development. This provision equates to a car parking ratio of approximately 0.51 car parking spaces per residential unit. The purchase of one of the proposed residential apartments will NOT include access to a designated on-site parking space. All potential residents will be notified that the proposed scheme is a 'low car allocation' development with no access (or guarantee thereof) to the limited on-site residents car parking provision. Nevertheless, all residents of the proposed residential apartment scheme will have the opportunity to apply to the on-site management company for a resident's car parking permit (updated weekly, fortnightly, monthly, quarterly or annually) and subsequently access to a dedicated (assigned) on-site basement car parking space. A charge will be applied to obtain a permit with the objective of covering the associated management costs and discouraging long term usage of the car parking space.

- **Management** – A preliminary Mobility Management (MMP) has been compiled (Appendix 15.2) with the aim of guiding the delivery and management of co-ordinated initiatives by the scheme promotor to be implemented upon occupation of the site. The MMP will ultimately seek to encourage sustainable travel practices for all journeys to and from the proposed development.

- **Infrastructure** – Infrastructure measures identified to reduce reliance of private vehicles include the provision of ample secure cycle parking on site, exceeding minimum guidance (DHPLG), and ensuring a design which promotes permeability for pedestrians and cyclists to, through and from the development (DMURS). The lower level of car parking provision for the development will also act as a powerful mobility management measure, ensuring against an overprovision of parking and a resultant over reliance on the private vehicle.

- **Infrastructure** – Junction enhancements have been identified and proposed at the R117 Sandford Road site access junction, including an upgrade to the existing controlled pedestrian crossing to a toucan crossing, with the objective of creating a highly permeable environment for pedestrians and cyclists and the tightening of corner radii on the Belmont Avenue arm, with dropped kerbs and tactile paving providing a safer informal crossing than the existing scenario. A signalised toucan crossing is also proposed at the R117 Milltown Road, adjacent to the site access location, facilitating safe connections for pedestrians and cyclists.

- **Car Sharing** – The provision of 10 No. dedicated car share (GoCar and development-owned) spaces at surface and basement level for the use of the scheme's residents and staff. The availability of these on-site provide a viable alternative to residents needing to own a private vehicle whilst still having access to a car as and when required.

15.7 Residual Impacts

15.7.1 Construction Phase

Provided the above mitigation measures and management procedures are incorporated during the construction phase, the residual impact on the local receiving environment will be temporary in nature and neutral in terms of quality and effect.

The significance of each of the projected impacts are detailed in **Table 15.16** for the following key junctions:

- **Junction 1** – Northern Site Access / R117 Sandford Road / Belmont Avenue;
- **Junction 2** – R117 Sandford Road / R825 St. James's Terrace / R117 Milltown Road / R824 Eglinton Road; and
- **Junction 3** – Southern Site Access / R117 Milltown Road / Mount Sandford.

The significance of the impacts has been determined in accordance with the classifications stipulated within the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022).

Table 15.16 Impact Significance – Construction Phase

Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Low Sensitivity	Neutral	Imperceptible	Temporary
2	Low Sensitivity	Negative - Low	Not Significant	Temporary
3	Low Sensitivity	Negative - Low	Not Significant	Temporary

15.7.2 Operational Phase

15.7.2.1 Network Performance

In order to analyse and assess the impact of the proposed development on the surrounding road network, a traffic model of the junctions was analysed for the schemes following opening, interim and design years:

- 2026 Opening Year (636 residential units, 380 m² creche and 2,189m² community/cultural uses);
- 2031 Interim Year (636 residential units, 380 m² creche and 2,189m² community/cultural uses); and
- 2041 Future Horizon Year (636 residential units, 380 m² creche and 2,189m² community/cultural uses).

The following key junction has been analysed as it exceeded the 10% threshold required under the Institution of Highways and Transportation document 'Guidelines for Traffic Impact Assessments':

- **Junction 3** – Southern Site Access / R117 Milltown Road three-arm priority-controlled junction.

The operational assessment of the junction network has been undertaken using the Transport Research Laboratory (TRL) computer package PICADY for one priority junction.

When considering priority-controlled and roundabout junctions, a Ratio of Flow to Capacity (RFC) of greater than 85% (0.85) would indicate a junction to be approaching capacity, as operation above this RFC value is poor and deteriorates quickly.

For the PICADY analyses a 90-minute AM and PM period has been simulated, from 07:30 to 09:00 and 17:30 to 19:00, respectively. The traffic flows were entered using an Origin-Destination table for the peak hours.

The evaluation of the operational performance of the key off site junctions following the implementation of the proposed residential scheme is summarised below for the Do Nothing (DN) and the Do Something (DS) scenario.

Existing – Do Nothing (DN): The potential level of traffic generated by committed developments and the existing baseline flows travelling across the network.

Proposed – Do Something (DS): The original development traffic in addition to the Base scenario (Existing – Do Nothing).

The evaluation of the operational performance of the key junctions across the local road network both prior to and following the implementation of the proposed residential development are summarised below in **Table 15.17** based upon the findings of the PICADY and TRANSYT based junction assessments.

Table 15.17 Junction Operational Performance Evaluation (RFC values)

Scenario		Junction 3		
		2026	2031	2041
Do Something	AM	17%	17%	17%
	PM	17%	18%	19%

For Junction 3, the southern site access, the results of the PICADY assessment indicate that the priority-controlled junction will operate within capacity for all "Do Something" scenarios, with a maximum RFC value of 19% for the 2041 Do Something PM peak hour.

15.7.2.2 Impact Significance

The implementation of the mitigation measures outlined above, including the MMP, will ensure that the residual effect on the local receiving environment is both managed and minimised. In reference to **Table 15.15**, the analysis predicts the scale of residual impact, during both the 2026 and 2041 design years, as being below 5% on the surrounding links, with the exception of following links as shown in **Table 15.18**.

Table 15.18 Links with Impact >5%

	Link	Peak Hour	2026 Do Something	2041 Do Something
1	Northern Site Access / R117 Sandford Road / Belmont Avenue	AM	7.29%	6.48%
2	R117 Sandford Road / R825 St. James's Terrace / R117 Milltown Road / R824 Eglinton Road	AM	6.09%	5.42%
3	Southern Site Access / R117 Milltown Road / Mount Sandford	AM	15.77%	13.99%
		PM	11.94%	10.60%

With regards to the TII thresholds, the 2026 and the 2041 analysis, the principal site access junction at Milltown Road demonstrates that the proposed development will generate an impact greater than 5%. As a result, the junction's 2041 Design Year scenario as well as that of Junction 1 and 2's AM scenarios have been subject to detailed analysis as discussed above in the previous paragraphs and in line with the criteria set out within the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – (EPA, 2022).

The significance of each of the projected impacts at each of the key nodes following the introduction of the identified mitigation works is detailed within the following table for the adopted worst case (e.g. peak hours) 2041 Future Year scenarios.

Table 15.19 Impact Significance – 2041 Design Year

Ref	Peak Hour	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	AM	Low Sensitivity	Negative - Low	Not Significant	Short-term
2	AM	Low Sensitivity	Negative - Low	Not Significant	Short-term
3	AM	Low Sensitivity	Negative - Low	Not Significant	Short-term
	PM	Low Sensitivity	Negative - Low	Not Significant	Short-term

As shown in **Table 15.19** above, the impact significance for both the AM and PM peak hours of the 2041 design year scenario is 'Not Significant' with the proposed development resulting in an environmental impact of only a 'Short-term' duration.

15.8 Monitoring

15.8.1 Construction Phase

During the construction stage, the following monitoring exercises are proposed:

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- Internal and external road conditions; and
- Timing of construction activities.

15.8.2 Operational Phase

As part of the Mobility Management Plan (MMP) process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document. The information obtained from the monitoring surveys will be used to identify ways in which the MMP measures and initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics.

15.9 Reinstatement

15.9.1 Construction Phase

The construction works areas will be reinstated following completion of development with landscaped areas provided where proposed. The majority of works will be restricted to the footprint of the site for the proposed development with upgrades required to public road to construct the proposed site access junctions including toucan crossings as well as service connections . Excavated topsoil and subsoil will be reused in reinstatement and landscaping where appropriate or dealt with in the appropriate manner i.e. sent for soil recovery as appropriate.

15.9.2 Operational Phase

No reinstatement requirements have been identified in relation to the operational phase of the proposed development.

15.10 Interactions

The following summaries briefly outline the interaction between each factor discussed in this EIAR and transportation. Further reference should be made to Chapter 20 'Interactions and Cumulative Impacts' for a detailed account of potential interactions and resulting impacts.

15.10.1 Air Quality

Overall, the impact of the interaction between air quality and traffic is considered long-term, imperceptible and neutral. Refer to the relevant chapters for additional information.

15.10.2 Noise and Vibration

The noise emission sources from the proposed development during the construction and operational phases will be from traffic. The noise impact assessment has been prepared in consultation with the design team and traffic engineers. Refer to the relevant chapters for additional information.

With the implementation of mitigation measures the interaction between construction noise and vibration and transportation will be short-term, slight to significant and neutral. In the operation stage, the interaction will be permanent, imperceptible and neutral.

15.10.3 Population and Human Health

Construction and operational stage traffic and traffic management measures have the potential to affect journey amenity or economic activity as a result of increased congestion or access restrictions.

The increased infrastructure for sustainable travel modes can contribute towards modal shift in travel patterns and increased physical activity. Employment and economic activity will be generated during the construction stage of the project. Refer to the relevant chapters for additional information.

Provided that mitigation measures and management procedures detailed in Chapter 15 are implemented, the residual impact on the local receiving environment during the construction stage will be short-term, imperceptible and neutral.

The implementation of mitigation measures such as the implementation of the Mobility Management Plan will ensure that the residual effect on the local receiving environment is both managed and minimised. The promotion of sustainable modes of transport from the site, the large quantum of bicycle parking provided and the incorporation of permeable links through the site will contribute towards a modal shift in travel patterns and increased physical activity, which will have a positive, significant and long-term effect on the area.

15.10.4 Land and Soils

The volumes of surplus soils generated by the scheme and the earthworks import requirement will affect construction stage traffic generation. Measures to optimise design and minimise material generation are detailed in the relevant chapters.

Mitigation measures proposed will ensure that the potential impacts of the proposed development on land, soils and the geological environment do not occur during the construction phase and that any residual impacts will be short term, imperceptible and neutral.

15.10.5 Water and Hydrology

Construction and operational stage traffic have the potential to impact on water quality via hydrocarbon spills and leaks and via increased sediment/particle loading on trafficked surfaces. Measures to mitigate against impacts are detailed in Chapter 11 and the impact of the interaction is considered to be short-term, imperceptible and neutral.

15.10.6 Waste Management

It is important that construction and operational impacts in relation to issues that may arise along the local road network, in addition to increases in vehicle emissions and waste attributable to the proposed scheme, are addressed. Suitable mitigation measures aimed at reducing these impacts are identified below and further detailed in Chapter 14. Provided the mitigation measures are implemented, the interaction will be short to long-term, imperceptible and neutral.

15.10.6.1Construction & Demolition Waste Management

The principle of 'Duty of Care' in Waste Management Act 1996-2008 states that the waste producer is responsible for waste from the time it is generated through to its legal disposal (including its method of disposal). Waste materials generated by earthworks, demolition and construction activities will be managed according to the Department of the Environment, Heritage and Local Government's 2006 Publication – Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects.
Waste minimisation and prevention shall be the main responsibility of the Contractor who will ensure the following:

- Use of precast / prefabricated materials where possible;
- "Cut" materials generated by the construction works to be re-used onsite where possible, through various works resulting in a;
    - Reduction in the requirement for virgin aggregate materials from quarries;
    - Reduction in energy required to extract, process and transport virgin aggregates; and
    - Reduced HGV movements associated with the delivery of imported aggregates to the site.
- Materials will be ordered on a 'just in time' basis to prevent over supply and site congestion;

- Materials will be correctly stored and handled to minimise the generation of damaged materials;
- Materials will be ordered in appropriate sequence to minimise materials stored on site; and
- Sub-contractors will be responsible for similarly managing their wastes.

The minimisation and prevention of wastes will reduce the total number of HGVs accessing and egressing the site through the appointed haulage routes and thereby reduce the potential impact on the site's surrounding traffic network.

Construction and demolition waste will be managed in accordance with a Construction & Demolition Waste Management Plan which outlines the planning, prevention, management, duty of care and tracking of all construction and demolition waste.

Construction and demolition will be planned to identify and implement ways to prevent, reduce, reuse and recycle waste. Work will be planned with waste minimisation in mind.

15.10.6.2 Operational Waste Management

The typical non-hazardous and hazardous wastes that will be generated at the proposed development will include the following: Dry Mixed Recyclables (DMR), organic waste, glass and Mixed Non-Recyclable (MNR) / general waste. Wastes will be segregated into the above waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling and recovery of waste with diversion from landfill wherever possible.

Waste storage and collection arrangements at the proposed development have been prepared with due consideration of the proposed site layout and location as well as best practice standards, local and national waste management requirements including those of DCC. In particular, consideration has been given to the following documents:

- BS 5906:2005 Waste Management in Buildings – Code of Practice;
- EMR Waste Management Plan 2015 – 2021;
- Dublin City Council Development Plan 2022-2028 (Appendix 7);
- DCC, Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste (2013); and
- DoHLGH, Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2022).

There are numerous private contractors that provide household and commercial waste collection in the Dublin City area. All waste contractors servicing the proposed development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered, permitted and / or licensed facilities only.

It is recommended that waste collection times / days are staggered for the different waste types to reduce the number of bins required to be presented for collection / emptying at the collection points within and outside the site at any one time. In accordance with the DCC Waste Bye-Laws waste collections can only take place between 6am and 9pm on a given collection day and waste cannot be presented for collection before 6pm on the day before collection.

Waste will be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

15.11 Cumulative Impacts

The analysis detailed above represents an appraisal in terms of potential cumulative impacts for a typical weekday as it is focused upon the key two busiest periods of the day (e.g. AM and PM peak hours). During the other 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods.

Furthermore, if any of the adjacent zoned lands in the area were to be developed, aside from those included as a committed development, this would have an effect on the local road network. However, the scale of any potential impact would be fully assessed during the planning procedures for any of these individual third-party developments (which currently do not benefit from planning permission).

Nevertheless, the utilisation of TII's growth rates does take some account of the potential additional traffic that such third party sites could generate. The TII Project Appraisal Guidelines (PAG) have been utilised to determine the traffic growth forecast rates for the Dublin Metropolitan Area as outlined in Section 15.5.2.7 of this chapter. The traffic growth forecast rates within the PAG ensures local and regional variations and demographic patterns are accounted for.

In reference to the findings of the network simulation and associated junction modelling analysis undertaken and detailed in the previous section, the proposed priority-controlled site access junctions will have sufficient reserve capacity to accommodate the associated future increases in additional traffic movements.

Table 15.20 Summary of Construction Phase Likely Significant Effects with and without out Mitigation / Monitoring

		Impact Without Mitigation					Mitigation Measures	Monitoring	Impact With Mitigation / Monitoring				
Likely Significant Effect	**Extent**	**Quality**	**Significance**	**Duration**	**Type**	**Probability**			**Quality**	**Significance**	**Duration**	**Type**	**Probability**
Congestion on the local road network as a result of HGVs during the Construction Stage.	Local	Negative	Significant	Short-Term	Direct	Likely	An appropriate control and routing strategy for HGVs and the phasing of construction vehicles throughout the day.	Compliance with construction vehicle routing practices.	Neutral	Slight	Short-Term	Direct	Un-Likely
Additional HGVs required due to improper storage, material damage or lack of reuse of construction materials.	Local	Negative	Moderate	Short-Term	Direct	Likely	Material storage zones will be in use as well as the conducting of regular inventory checks to ensure reuse of available material.	Compliance with construction waste management practices.	Neutral	Not Significant	Short-Term	Direct	Un-Likely

Table 15.21 Summary of Operational Phase Likely Significant Effects with and without out Mitigation / Monitoring

		Impact Without Mitigation					Mitigation Measures	Monitoring	Impact With Mitigation / Monitoring				
Likely Significant Effect	**Extent**	**Quality**	**Significance**	**Duration**	**Type**	**Probability**			**Quality**	**Significance**	**Duration**	**Type**	**Probability**

An increase in traffic flow causes capacity issues at local junctions	Local	Negative	Significant	Medium-term	Direct	Un-Likely	A detailed parking management strategy and MMP have outlined the various methods with which private car ownership will be deterred and sustainable transport options promoted.	Bi-annual occupancy surveys as part of the MMP process will be conducted to determine efficacy of measures and to further encourage a modal shift.	Neutral	Slight	Medium-term	Direct	Un-Likely

15.12 'Do-Nothing' Impacts

In the absence of the proposed development, the overall operational performance of the existing junctions on the surrounding road network will be impacted by the forecast background network traffic growth (should that growth arise) and the following committed developments:

- 148-Unit Residential Development at Eglinton Road (ABP Ref. PL29S.307267)
- 36-Unit Residential Development at Sandford Close (ABP Ref. PL29S.307375)
- 4-Unit Residential Development at Belmont Avenue (Reg. Ref. 2582/16)
- 63-BTR Unit Residential Development at Rydalmount (Reg. Ref. 4578/22)
- 116-Unit Residential Development at Clonskeagh Road (ABP Ref. 300024-17)
- 100-BTR Unit Shared Accommodation at Kiely's Pub (Reg. Ref. 3301/20)
- 203-Bed Student Accommodation at Alexandra College (Reg. Ref. 2115/19)
- Mixed Use Development of 49-BTR units, and 231 m^2 retail space at Donnybrook Road (Reg. Ref. 3513/20)
- Archive and Office Development of 765m^2 at Milltown Road (Reg. Ref. 3116/22)
- 6-Unit Residential Development at Sandford Road (Reg. Ref. 3930/21)

15.13 Difficulties Encountered in Compiling the Chapter

There were no material difficulties encountered in compiling and assessing the data for this EIAR sufficient to prevent modelling of the likely transport effects of the proposed development. The analysis reported within this chapter is based upon the traffic survey data specifically commissioned for this appraisal and undertaken in October 2022, subsequent to any traffic flow impact as a result of the Covid-19 pandemic.

15.14 Conclusion

The purpose of this EIAR chapter was to quantify the existing transport environment and to detail the results of assessment work undertaken to identify the potential level of transport impact generated as a result of the construction and operational phases of the proposed residential development.

It is concluded that there are no traffic or transportation related reasons that should prevent the granting of planning permission for the proposed residential development.

15.15 References

- 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (Department of Housing, Planning & Local Government, 2018);
- 'Guidance on the preparation of the Environmental Impact Assessment Report' (European Commission, 2022);
- 'Guidelines on the information to be contained in Environmental Impact Statements' (EPA, 2002);
- 'Draft Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, 2022);
- Transport Infrastructure Ireland's (TII's) 'Traffic & Transport Assessment Guidelines' (2014);
- 'Guidelines for the Environmental Assessment of Road Traffic' (Institute of Environmental Management & Assessment, 2003);
- 'The Dublin City Development Plan 2022 – 2028' (DCC, 2022);
- 'Transport Strategy for the Greater Dublin Area 2022 – 2042' (NTA, 2022);
- 'Design Manual for Urban Roads and Streets' (DTTAS & DHPLG, 2019);
- 'National Cycle Manual' (NTA, 2011);
- Bus Connects website (www.busconnects.ie);
- Traffic Signs Manual 'Chapter 8 Temporary Traffic Measures and Signs for Roadworks', Department of Transport;
- 'Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition' (Department of Transport, 2010);
- Dublin Bus website (www.dublinbus.ie);
- 'Greater Dublin Area Cycle Network Plan' (National Transport Authority, 2013);
- Ordnance Survey Ireland (www.osi.ie);
- 'Guidelines for Traffic Impact Assessments', (The Institution of Highways and Transportation, 1994);
- Transport for Ireland (www.transportforireland.ie); and
- Transport Infrastructure Ireland (www.tii.ie).

16.0 MATERIAL ASSETS – SITE SERVICES

16.1 Introduction

The Material Assets – Site Services Chapter of this EIAR has been prepared by Brendan Keogh (BA BAI PGradDip CEng MIEI) of DBFL Consulting Engineers. Brendan Keogh is a Chartered Professional Engineer with over 15 years' experience in the design and construction of civil engineering projects. Projects have included works associated with the commercial, industrial, energy, residential and public infrastructure sectors.

This chapter of the EIAR comprises of an assessment of the likely impact of the proposed development on existing utility services in the vicinity of the site as well as identifying proposed mitigation measures to minimise any impacts.

The material assets considered in this chapter of the EIAR include Power, Gas and Telecommunications. Note that Surface Water Drainage, Foul Drainage and Water Supply are addressed in Chapter 11 (Water & Hydrology).

In summary, the proposed development ("the site") comprises of 636 No. residential dwellings, refurbishment of Tabor House and the Chapel to provide cultural/community space and the provision of a creche within Block F (with an outdoor play area) on a c. 4.26 Ha site (developable area).

The proposed development will also include the following associated engineering infrastructure:

- Provision of a new vehicle access off Milltown Road (primary vehicle access to the proposed development facilitating access to the basement carpark as well as serving pedestrians and cyclists). This new site access shall be a priority junction. A Toucan Crossing is also proposed in the vicinity of the Milltown Road access to improve facilities for vulnerable road users.

- Retain existing entrance on Sandford Road (facilitates pedestrian and cycle access as well as limited vehicle access to the northern end of the site). Improvements to existing pedestrian crossing point in the vicinity of the Sandford Road entrance is also proposed. There is no vehicular access from Sandford Road to the basement carpark, the forecourt area adjacent to Tabor House and the duplex units along the western boundary (which are all served exclusively from Milltown Road).

- Provision of an additional access points for pedestrians and cyclists adjacent to the junction of Sandford Road / Milltown Road.

- Provision of internal site roads including associated footpaths.

- Provision of on-site surface water drainage infrastructure which will discharge from the site along its south-eastern boundary via Milltown Road and the junction of Milltown Road / Sandford Road prior to discharging to the existing public surface water drainage network in Eglinton Road (proposed 300mm diameter pipe extending approximately 300m from the proposed development site boundary to the outfall location which

includes replacement of approx. 160m of the existing 225mm diameter drainage network along Eglinton Road).

- Provision of foul drainage and water supply infrastructure and connections.

16.2 Methodology

Assessment of the likely impact of the proposed development on existing utility services in the vicinity of the site included a desktop review of the following information and has been informed by the EPA "Guidelines on the Information to be Contained in Environmental Impact Assessment Reports", 2022.

- ESB Networks Utility Plans (refer to Appendix 16.1)
- Gas Networks Ireland Service Plans (refer to Appendix 16.1)
- Eir E-Maps (refer to Appendix 16.1)

A GPR Utility Survey has also been carried out along Sandford Road, Milltown Road and Eglinton Road (refer to Appendix 16.2).

Assessment of the likely impact of the proposed development on existing utility services in the vicinity of the site has been informed by the EPA "Guidelines on the Information to be Contained in Environmental Impact Assessment Reports", 2022.

16.3 Receiving Environment

16.3.1 Power

An ESB Networks Utility Plan is included in Appendix 16.1 showing the location of existing electrical services in the vicinity of the site.

Existing MV/LV underground cables are located adjacent to the site's northern-eastern boundary (Sandford Road) and south-eastern boundary (Milltown Road). Existing HV underground cables are also located along Milltown Road.

Existing LV overhead lines (public lighting) are located adjacent to the site's south-eastern boundary (Milltown Road).

16.3.2 Gas

Gas Networks Ireland Service Plans are included in Appendix 16.1 showing the location of gas distribution pipes in the vicinity of the site.

Low pressure and medium pressure Gas Networks Ireland distribution pipelines are located adjacent to the site (along Sandford Road and Milltown Road).

The Gas Networks Ireland Service Plans shows a low-pressure service pipe entering the site along Milltown Road. This pipe formerly served the Jesuit's lands to the west of the site.

Service separation works have been carried out to cap this gas supply within the site (an alternative gas supply route has been established for the Jesuit's lands).

16.3.3 Telecoms

Eir E-Maps are included in Appendix 16.1 showing the location of telecommunications infrastructure in the vicinity of the site.

Telecommunications infrastructure is located along Sandford Road and Milltown Road (immediately adjacent to the site's northern-eastern boundary and south-eastern boundary).

Information obtained from National Broadband Ireland's website (www.nbi.ie/map) indicate that broadband speeds of 30mbps or greater are available in the locality of the site.

16.4 Characteristics of the Proposed Development

16.4.1 Power

Power supply for the proposed development will be taken from the existing ESB Network located along the site's northern-eastern boundary (Sandford Road) and south-eastern boundary (Milltown Road).

Existing LV overhead lines (public lighting) located in the immediate vicinity of the proposed site entrance off Milltown Road may need to be undergrounded as part of the proposed development if required by the ESB.

16.4.2 Gas

Gas supply for the proposed development will be taken from the existing Gas Networks Ireland network located along the site's northern-eastern boundary (Sandford Road) and south-eastern boundary (Milltown Road).

16.4.3 Telecoms

Communications connections for the proposed development will be taken from the existing Eir network located along the site's northern-eastern boundary (Sandford Road) and south-eastern boundary (Milltown Road).

16.5 Identification of Potential Impacts

16.5.1 Construction Phase

There is potential for interruption to power, public lighting, gas and telecoms infrastructure while carrying out road works along Sandford Road and Milltown Road (e.g. formation of site access, provision of utility connections for the proposed development or construction of boundary treatment) and while constructing the surface water drainage outfall (Milltown Road, the junction of Milltown Road / Sandford Road and Eglinton Road).

Similarly, undergrounding of the existing LV overhead lines (public lighting) in the immediate vicinity of the proposed site entrance off Milltown Road (if required by the ESB) may lead to interruption to public lighting.

These impacts without mitigation are considered to have a negative / significant / short-term.

16.5.2 Operational Phase

On completion of the construction phase, there will be no further impact on electrical, gas or telecommunications supplies.

16.5.3 'Do Nothing' Scenario

There are no predicted impacts should the proposed development not proceed.

16.6 Ameliorative, Remedial or Reductive Measures

16.6.1 Construction Phase

The following measures are proposed in order to avoid interruption to power, public lighting, gas and telecoms infrastructure while carrying out road works along Sandford Road and Milltown Road and while constructing the surface water drainage outfall (Milltown Road, the junction of Milltown Road / Sandford Road and Eglinton Road)

Once the measures noted below are implemented, the impact on power, gas and telecoms infrastructure is considered to be neutral / non-significant / short-term.

- Contractor to prepare Method Statement detailing proposals for works in the vicinity of existing utilities including detail of process to minimise potential for interruption to power, gas and telecoms infrastructure. Contractor's method statement to be agreed with PSDP (Project Supervisor for the Design Process).

- Contractor to locate and record all services on site prior to commencement of excavations.

- A GPR utility survey has been carried out along Sandford Road, Milltown Road and Eglinton Road to confirm the location of power, gas and telecommunications infrastructure. This survey is to be supplemented with slit trench investigation as required by the contractor in advance of commencing works along Sandford Road, Milltown Road and Eglinton Road.

- Contractor to obtain utility company network plans and arrange observation as required.

- Connections to the existing power, gas and telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.

- Contractor to comply with HSA Code of Practice for Avoiding Danger from Underground Services (refer to Appendix 16.3).

- Contractor to prepare and implement a Construction Traffic Management Plan that will be agreed with the Design Team and Local Authority and which will ensure the safety of the public during construction (note, an outline TMP is included in the *Preliminary Construction Management Plan*).

- All personnel using machinery/plant to have undergone training on the use of said machinery/plant. Ongoing site supervision to be undertaken to ensure all use of machinery/plant is in accordance with the training undertaken.

16.6.2 Operational Phase

On completion of the construction phase there will be no further impact on electrical, gas or telecommunications supplies. No mitigation measures are proposed in relation to the site services described in this chapter.

16.7 Predicted Impact of the Proposed Development

16.7.1 Construction Phase

Implementation of measures outlined in Section 16.6.1 will ensure that the potential impacts of the proposed development on site services do not occur during the construction phase and that any residual impacts will be short term.

16.7.2 Operational Phase

Demand from the proposed development during the operational phase is not predicted to impact on the existing power, gas and telecoms networks.

16.7.3 'Do Nothing' Scenario

There are no predicted impacts should the proposed development not proceed.

16.8 Monitoring

No specific monitoring is proposed in relation to electrical, gas and telecommunications infrastructure.

16.9 Reinstatement

Reinstatement of any excavations, trenches etc. relating to the provision of electrical, gas and telecommunications connections is to be carried out in accordance with the relevant utility provider's requirements.

16.10 Interactions and Potential Cumulative Impacts

16.10.1 Interactions

Soils and Geology

Trench excavations to facilitate site service installation will result in exposure of subsoils to potential erosion. Mitigation measures are outlined in Chapter 10 Land & Soils, Section 10.6 (i.e. service trenches to be backfilled as soon as practicable to minimise potential erosion of subsoils).

The impact of the interaction is considered to be short-term, imperceptible and neutral.

16.10.2 Potential Cumulative Impacts

Other development in the vicinity of the site is likely to have similar impacts during the construction phase in relation to Material Assets – Site Services.

Should the construction phase of the developments coincide with development of the site, potential cumulative impacts are not anticipated once similar ameliorative, remedial and reductive measures are implemented.

16.11 Difficulties Encountered

There were no difficulties encountered in compiling the information for this chapter.

		Impact Without Mitigation					Mitigation Measures	Monitoring	Impact With Mitigation / Monitoring				
Likely Significant Effect	Extent	Quality	Significance	Duration	Type	Probability			Quality	Significance	Duration	Type	Probability
Interruption to power, gas and telecoms infrastructure	Adjacent Utility Network	Negative	Significant	Short-Term	Direct	Likely	Contractor to locate all services prior to commencement of excavations. GPR survey to be supplemented with slit trenches as required.	Monitor compliance with HSA Code of Practice for Avoiding Danger from Underground Services	Neutral	Not Significant	Short-Term	Direct	Un-Likely

Table 16.1: Material Assets – Site Services – Summary of Construction Phase Likely Significant Effects With and Without Mitigation / Monitoring

17.0 MICROCLIMATE - WIND

17.1 Introduction

The purpose of this chapter is to outline the predicted microclimate wind conditions experienced within and surrounding the proposed Sandford Road development located in Dublin 6.

The proposed method for compliance validation is via the industry best practice standard for pedestrian comfort (Lawson Criteria). The Lawson Criteria sets acceptable levels of wind speed and velocity for various human activities.

Given the specific location of the buildings and recorded metrological data available for the area, and standard interpolation calculation procedures, it is possible to predict the expected wind speeds and their annual occurrence.

This chapter was completed by:

- Matthew Theloke, a Senior Energy Engineer with OCSC (M&E). He has a B.Eng (Hons) in Sustainable Energy Engineering and over 10 years' experience in the design and supervision of sustainability and energy services for a wide range of projects within the residential , healthcare, commercial, residential and educational Sectors.

- John Shortt, an Energy Engineer with OCSC (M&E). He has an Msc. (Hons) in Sustainable Building Design and Performance and over 4 years' experience working as an Energy & Sustainability Engineer. He has worked on a range of projects focusing on Part L, overheating, wind, daylight and life cycle assessment.

17.2 Study Methodology

The section outlines the methodology used in the assessment of the pedestrian wind comfort conditions within and surrounding the proposed development.

17.2.1 Pedestrian Comfort Compliance

The Lawson criteria gives guidance to quantify the effect of wind velocity on pedestrian comfort and safety. The Lawson recommended guidance indicates that for the comfort and safety assessment of the wind environment, it is not only the velocity of wind that is considered but also the frequency of occurrence of these velocities. The frequency of occurrences is used here as an indicator of the likely duration of certain wind speeds. The Lawson criteria indicates that the threshold mean hourly wind speed for each pedestrian activity should not be exceeded for more than 5% of the time to maintain pedestrian comfort as outlined in Table 17.1.

Pedestrian activity	Threshold mean hourly wind speed not to be exceeded for more than 5% of the time [m/s]
Business Walking	10
Leisurely Walking	8
Standing	6
Sitting	4

Table 17.1: Lawson Criteria for Pedestrian Comfort

There are 2 No. additional classes to quantify the safety conditions for typical or sensitive (e.g. frail or a cyclist) pedestrians which are summarised in Table 17.2.

Pedestrian activity	Threshold mean hourly wind speed not to be exceeded for more than 0.023% of the time [m/s]
Typical Pedestrian	20
Sensitive Pedestrian	15

Table 17.2: Lawson Criteria for Safety Assessment

17.2.2 Assessment Methodology

The methodology adopted for the study combines the use of Computational Fluid Dynamics (CFD) to predict air flow patterns and wind velocities around the proposed development, the use of wind data from the nearest suitable meteorological station and the recommended comfort and safety standards (The Lawson Criteria).

The study considered the following factors:

- The effect of the geometry, height and massing of the proposed development and existing surroundings on local wind speed and direction;
- The wind speed as a function of the local environment such as topography, ground roughness and nearby obstacles (buildings, bridges, etc.);
- The effects of site location (open field, inner city, etc.);
- Orientation of the buildings relative to the prevailing wind direction; and
- The pedestrian activity to be expected (long-term sitting, standing or short term sitting, leisure and business walking).

17.2.2.1 Extent of CFD Study Area

The extent of the built area that is represented in the computational domain is dependent on the influence of the features on the region of interest which includes the site and its nearby surroundings. The analytical CFD model analyses the proposed development. It also includes existing buildings surrounding the development with the extent of the buildings included in the study area illustrated in Figure 17.1. The analytical CFD model is assessed against the full Lawson Criteria to identify the pedestrian comfort and safety conditions within and surrounding the development.

The analytical CFD model has been constructed based on the information provided below:

- 3D Revit model and drawings received from OMP Architects;
- Landscape drawings received from Cameo & Partners;
- Available aerial photographic data via Google Maps;
- Meteorological wind data for Dublin Airport.

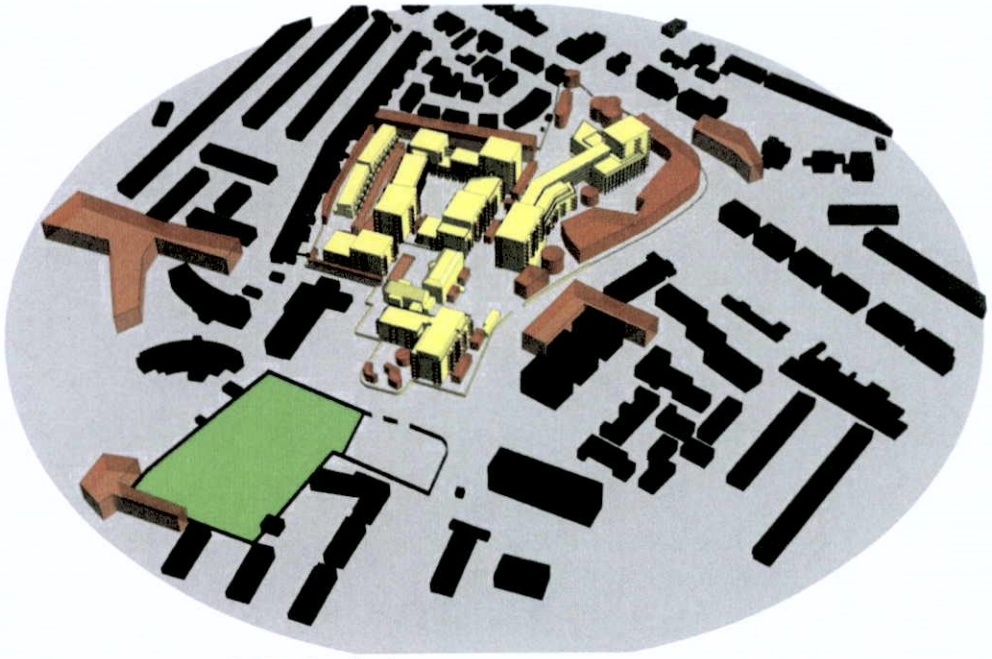


Figure 17.1: Extent of CFD Study Area

17.2.3 Wind Profile

A rectangular computational domain was created to simulate the effect of the atmospheric boundary layer surrounding the region of interest. The extents of the computational domain are illustrated in Figure 17.2, where H is the height of the highest tower within the proposed development. The dimensions of the domain, e.g. 5H are typical values for a CFD wind study with a larger distance downstream of the project site, i.e. 15H which ensures that the boundary layer does not create any artificial blockages.

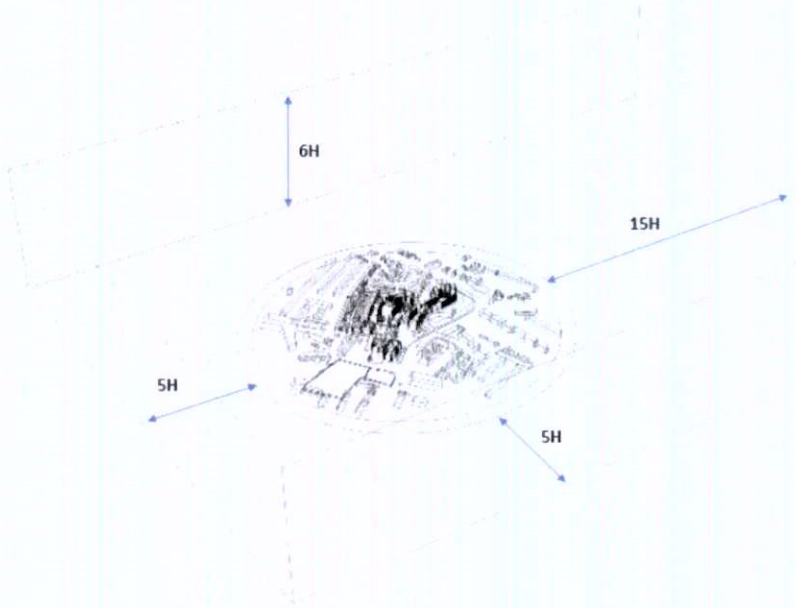


Figure 17.2: Computational Domain Surrounding the Region of Interest

An atmospheric boundary layer wind profile (v_{wind}) is applied to the boundaries of the computational model. To incorporate the effect of small height differences and small objects at street level, which are not explicitly included in the model, a roughness has been applied to the ground surface of the detailed CFD model. For the wind profile a roughness length (z_0) of 0.4 m has been estimated.

Based on the reference velocity, reference height, and roughness length, a wind profile can be defined. The wind profile v_{wind} is defined as follows.

$$v_{wind} = v_{ref} \cdot \left(\frac{\ln\left(\frac{z}{z_0}\right)}{\ln\left(\frac{z_{ref}}{z_0}\right)} \right)$$

Where

v_{wind}	Wind velocity	[m/s]
v_{ref}	Reference velocity	[m/s]
z	Height above the ground	[m]
z_0	Roughness length	[m]
z_{ref}	Reference height	[m]

17.2.4 Wind Factor

The CFD simulations are used to calculate the wind factor. The wind factor is a factor which indicates if the wind speed is locally increased (wind factor > 1.0) or decreased (wind factor < 1.0) due to buildings (or other geometry), relative to the applied reference wind speed at 10m height. The wind factor is independent of the magnitude of the reference wind speed at 10m

height, making the obtained wind factor valid for all wind speeds in a specific wind direction range. Hence, one simulation can be applied per wind direction covering all wind speeds in this direction.

To explain the wind factor in more detail, the wind factor results for the 0-degree wind direction (i.e. North) are illustrated in Figure 17.3. The wind factor vectors that are coloured green, cyan or dark blue indicate that the local wind speed has been reduced (wind factor < 1.0), while wind factor arrows which are coloured yellow, orange or red indicate the local wind speed has increased (wind factor > 1.0). Using the wind factors, the quantity of hours that a wind speed is exceeded can be calculated (per wind direction) which is then used to assess compliance against the Lawson Criteria.

The wind factor results for all 12 No. wind directions are included in Section 17.4.2.4.

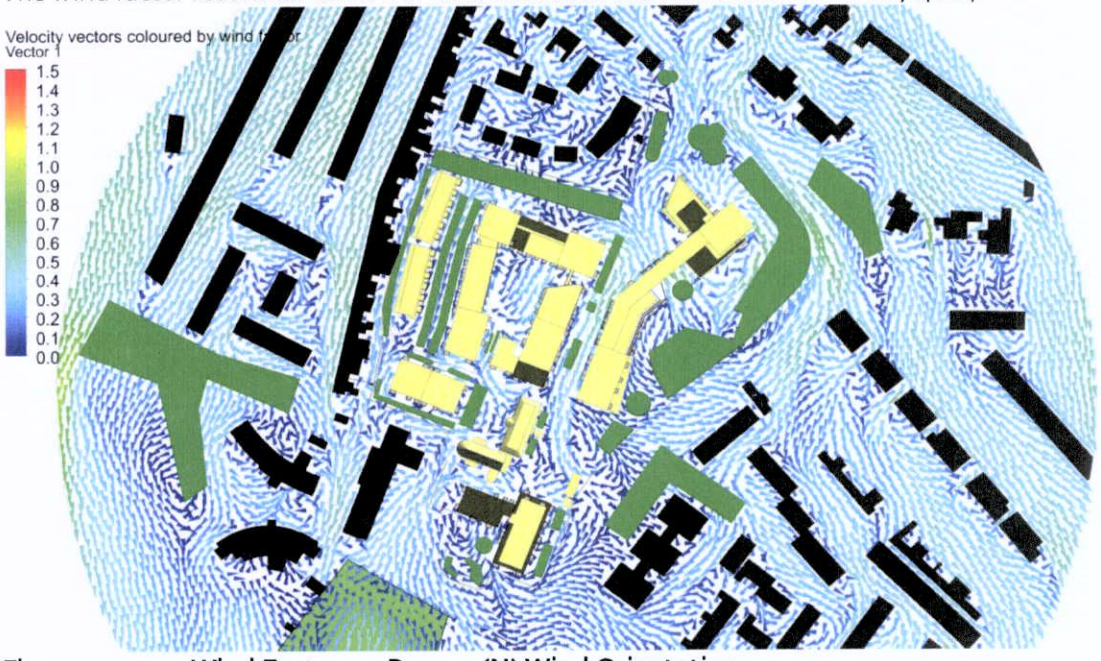


Figure 17.3: Wind Factor – 0 Degree (N) Wind Orientation

17.2.5 CFD Modelling

The CFD simulation has been performed using the software package ANSYS CFX version 2022. This software package can be used for a large range of applications and has been extensively validated.

A full 3D CFD model of the proposed development and surrounding buildings was created and split into a large number of control volumes or cells. The standard equations for fluid motion and energy transport are applied to each cell. The equations are then solved using numerical techniques. The CFD settings used for the analysis are summarised in Table 17.3.

CFD Settings	Description
Grid type	Hybrid, mixture of tetrahedrons, pyramids and prisms
Cell size	Dynamic, ranging from 0.025 up to 2 m at the building surfaces and streets, growing with a factor of 1.05 to a maximum of 10 m in the volume

Number of cells	75 million
Simulation type	Steady state
Convergence	RMS maximum 1·10-4
Timestep	2.5 s
Number of Iterations	1000
Fluid	Air fixed properties
Turbulence model	RANS, RNG Kappa-Epsilon model
Walls	Smooth, no slip
Ground Surface	Rough, no slip
Wind volume	Profile for velocity and turbulence
Roughness	Volumetric sources for momentum and turbulence
Vegetation	Volumetric loss coefficient

Table 17.3: Summary of CFD Model Settings

17.2.6 Assumptions and Limitations

Computational Fluid Dynamic (CFD) is a widely recognised method for modelling airflow problems and as computer power develops, it increasingly improves its applicability. However, there are some limitations with CFD in relation to the modelling of wind environments. The method uses mean hourly wind values and presents a limitation to capture gusts.

The Lawson criteria for pedestrian comfort focuses on the effect of wind and do not factor in other environmental variables such as air temperature, solar radiation and relative humidity. However, overlaying all these factors would be a complex process and Lawson's simplified method presents the best available methodology for anticipating wind effects in the built environment on pedestrian comfort.

The buildings were modelled as blocks, i.e. with smooth surfaces and sharp corners, which is generally sufficient detail to represent buildings in airflow modelling. This assumption is industry accepted as further detail to the model such as the window reveals and façade texture would add an impractical and unnecessary complexity to the model without adding greater quality in the results. Furthermore, the large existing and proposed trees which would have an impact on the assessment have been modelled with a different loss coefficient assigned to the deciduous trees which takes account of the loss of foliage during the winter months. Landscaping features such as pergolas and trellis structures were not modelled within the simulation as they would provide an extra level of complexity to an otherwise large and complex CFD model.

17.3 Existing Receiving Environment

This section examines the wind conditions on the existing receiving environment prior to the construction of the proposed development. Wind climate data over a 30 year period has been analysed to provide a statistical assessment of the expected wind conditions and resultant pedestrian comfort conditions within the existing site.

17.3.1 Site Location

The proposed site is located at Milltown Park, Sandford Road, Dublin 6 and is illustrated in Figure 17.4. It is evident from the image the site is located in a predominantly residential area with varying densities and a mix of retail, educational and commercial buildings. With the predominant wind direction being from the South-West, there are a number of large open sports fields to the South-West of the site which are part of Gonzaga College. However, even though the site is predominantly open, it can be considered quite sheltered due to the density of buildings surrounding the site. The site is located approximately 2.6 km from the coast, however, due the density of development between the site and the coast, coastal winds are not expected to impact on the site.

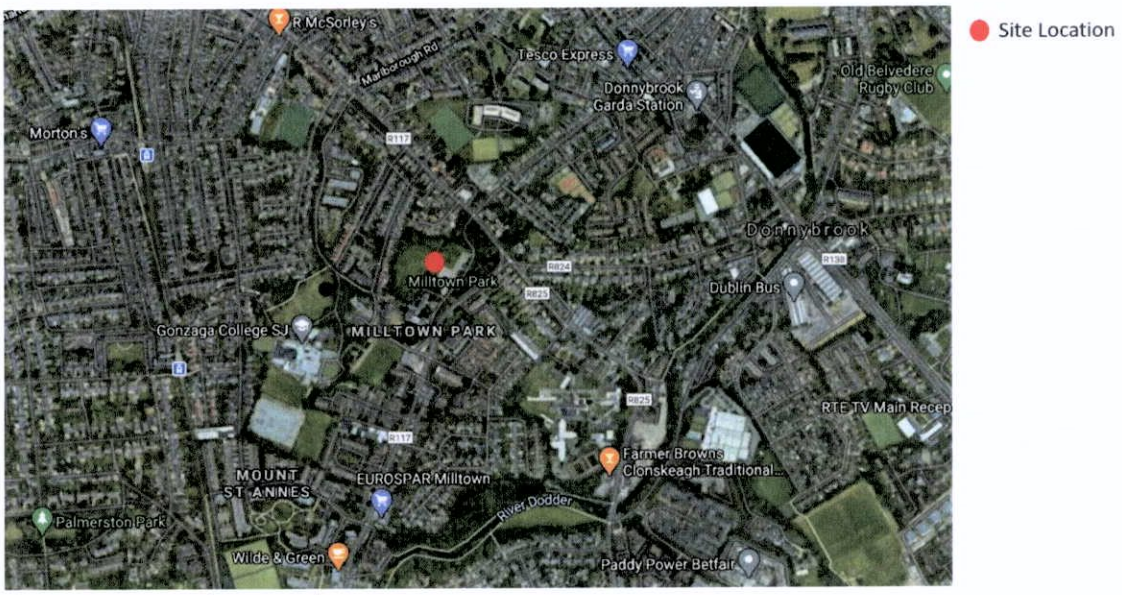


Figure 17.4: Site Location

(Source: Google Maps)

17.3.2 Existing Site

The existing site is illustrated in Figure 17.5 with the approximate site boundary outlined in red. The existing site is predominantly open with a large number of mature trees and hedging surrounding the site. There are a number of existing buildings to the South of the site. Two (2) of these buildings will be retained and refurbished as part of the proposed development, i.e. Tabor House and the Chapel. The site can be considered well sheltered due to the extent of existing trees surrounding the site and the high stone wall that is present along the majority of Milltown Road and Sandford Road.

Figure 17.5: Existing Site

(Source: Google Maps)

17.3.3 Wind Climate

The wind climate analysis is based on the wind data obtained from the Dublin Airport weather station (approximately 12 km from the proposed site) which incorporates hourly wind data over a 30-year period (1989 to 2019).

Wind dir. / Speed [m/s]	N 0 [hrs]	NNE 30 [hrs]	ENE 60 [hrs]	E 90 [hrs]	ESE 120 [hrs]	SSE 150 [hrs]	S 170 [hrs]	SSW 210 [hrs]	WSW 240 [hrs]	W 270 [hrs]	WNW 300 [hrs]	NNW 330 [hrs]
0-1	24	19	12	23	31	26	16	17	23	30	30	26
1-2	52	41	25	53	74	64	34	47	63	70	63	49
2-3	51	54	50	87	122	108	51	94	130	143	102	63
3-4	43	48	67	92	132	121	49	124	191	194	133	66
4-5	32	45	66	75	109	121	43	140	224	219	121	62
5-6	24	38	51	53	85	107	42	148	234	211	94	47
6-7	16	30	37	37	57	84	38	130	228	169	63	33
7-8	10	21	24	25	36	60	30	111	195	134	41	24
8-9	6	11	17	18	22	41	22	85	159	105	25	14
9-10	4	7	11	12	12	27	17	59	121	80	14	7
10-11	2	4	4	8	9	16	11	39	82	56	7	3
11-12	1	3	2	5	5	10	6	23	52	36	5	1
12-13	0	2	1	2	2	5	3	13	32	21	2	1
13-14	0	0	1	1	2	4	1	8	19	11	1	0
14-15	0	0	0	1	1	1	0	5	11	7	1	0

15-16	0	0	0	1	0	1	0	2	6	4	0	0
16-17	0	0	0	0	0	0	0	1	3	2	0	0
17-17	0	0	0	0	0	0	0	0	1	1	0	0
17-19	0	0	0	0	0	0	0	0	1	0	0	0
19-20	0	0	0	0	0	0	0	0	1	0	0	0

Table 17.4: Frequency of Wind Velocity Occurrence per Wind Direction

Figure 17.6 graphically illustrates the data in Table 17.4 above and illustrates the percentage of hours per wind direction over the 30-year period (1989– 2019) for the 12 no. wind directions. It is evident from the figure below the predominant wind directions are SSW, WSW and W.

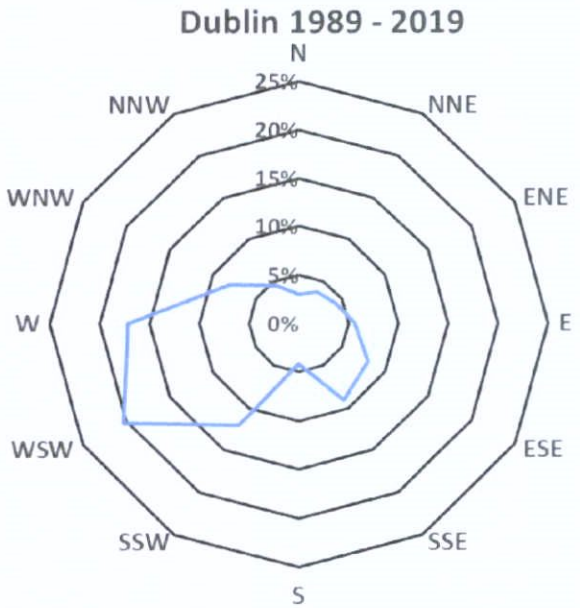


Figure 17.6: Percentage of Hours per Wind Direction (Dublin Airport 1989 – 2019)

The hourly wind data is the basis for the wind climate analysis. The number of hours that wind occurs from a given wind direction and velocity influences the local wind climate. The CFD simulation is used to calculate the wind-factor (local wind velocity relative to reference wind velocity). The wind-factor is a measure to calculate the number of hours that a given threshold wind velocity is exceeded based on statistical wind data.

17.3.4 Summary

Based on the assessment carried out on the existing site and the statistical analysis of 30 years of climate data from the nearby Dublin airport, the existing site can be considered well sheltered from the prevailing wind directions and is considered a comfortable environment for pedestrians with wind speeds not exceeding the business walking class as per the Lawson criteria.

17.4 Potential Impact of the Proposed Development

This section summarises the impact the proposed development will have on the existing receiving environment during both the construction and operational phases.

17.4.1 Construction Phase

The assessment of the wind microclimate during the construction phase has been based on professional judgement by reviewing the existing site conditions and the expected conditions once the development is in place via the CFD modelling. It is expected the wind microclimate will gradually adjust from the existing conditions to the final modelled scenario as construction progress develops.

17.4.2 Operational Phase

The impact during the operational phase has been determined using CFD modelling with the methodology used in the assessment outlined in Section 17.2.

The number of hours for all wind directions are summed to calculate the total number of hours that a given pedestrian activity class exceeds the 5% yearly threshold with the Lawson results presented in the following sections.

17.4.2.1 Ground/Street Level

The pedestrian wind comfort results at ground/street level (1.5m above ground level) are included in this section and are summarised as follows:

- As illustrated in Figure 17.7, most areas at street level are suitable for sitting (areas highlighted in grey). Note, the areas under the trees (hatched in dark brown) will also comply with the "Sitting" class.
- The majority of the remaining areas that do not comply with the "Sitting" class are suitable for "Standing" (areas highlighted in blue).
- The pedestrian comfort at ground/street level is excellent throughout the development with the layout of the buildings and the existing and proposed trees having a significant positive effect in terms of mitigating excessive wind speeds.
- Based on the results presented, the proposed development will have an imperceptible impact on the pedestrian wind comfort at street level.

Figure 17.7: Pedestrian Wind Comfort Results – Ground/Street Level
(Areas under Trees Hatched in Dark Brown, Adjacent Buildings Hatched in Black)

17.4.2.2 Shared Amenity Spaces

As amenity terraces are not considered common pedestrian areas, they have not been assessed against the typical comfort classes for pedestrian comfort. However, they have been assessed based on the safety criteria with the most stringent condition being considered, i.e. "sensitive". Based on the sensitive class, all amenity spaces are currently considered safe as illustrated in Figure 17.8.

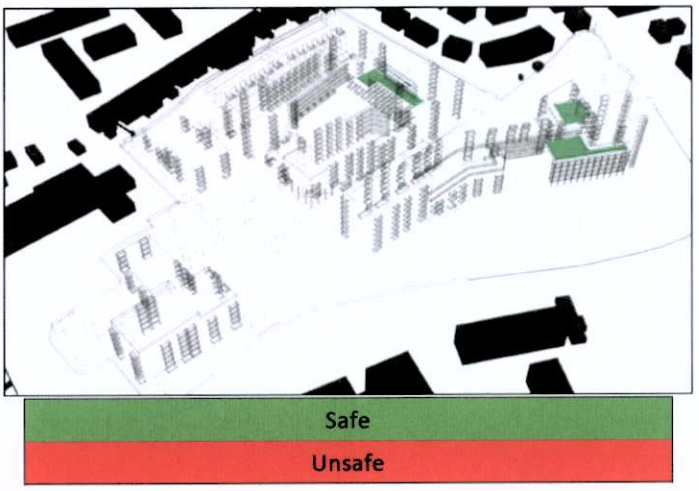


Figure 17.8: Pedestrian Wind Comfort Results – Shared Amenity Spaces

17.4.2.3 Private Balconies & Terraces

Similar to amenity spaces, private balconies are not considered common pedestrian areas. As such, they have not been assessed against the typical comfort classes for pedestrian comfort. However, they have been assessed based on the safety criteria with the most stringent condition being considered, i.e. "sensitive". Based on the sensitive class, all terraces and private balconies are currently considered safe as illustrated in Figure 17.9

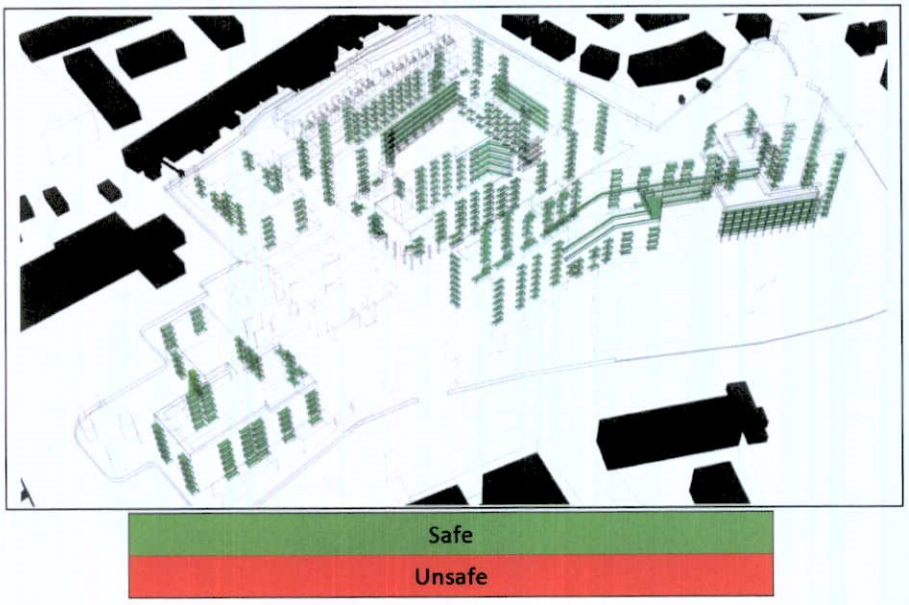
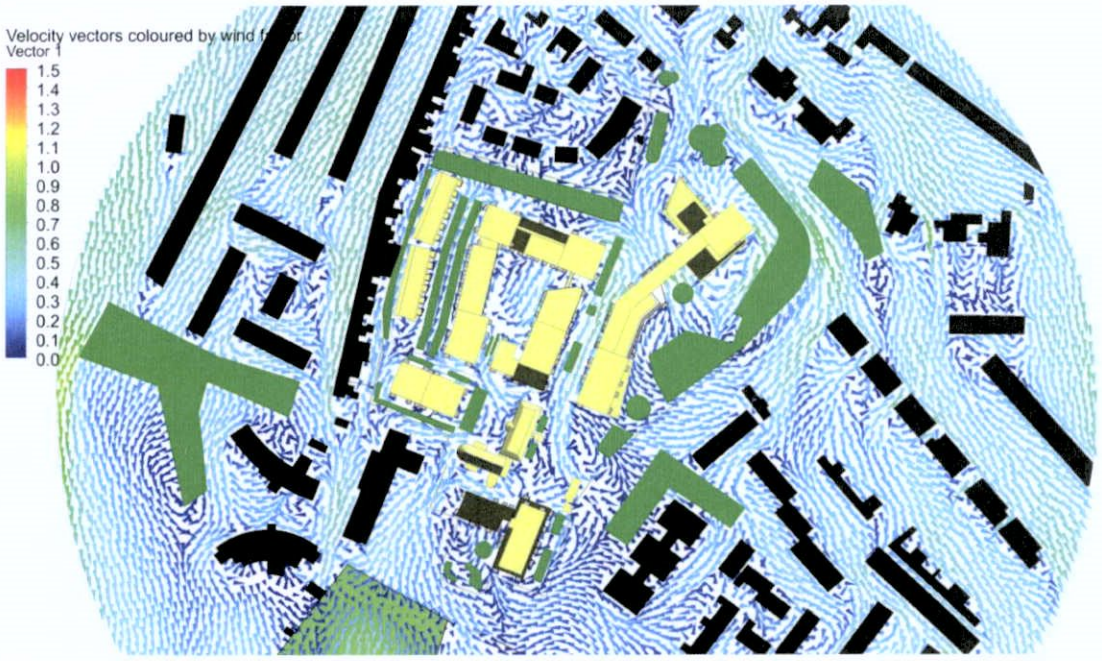


Figure 17.9: Pedestrian Wind Comfort Results – Private Balconies & Terraces

17.4.2.4 CFD Wind Factor Results

The CFD wind factor (WF) velocity vectors and contours for each wind direction, which the Lawson results are based upon, are illustrated in this section. Refer to Section 17.2.4 on how to interpret the images. Note, the contours (bottom image) is a graphical representation of the velocity vectors (top image).



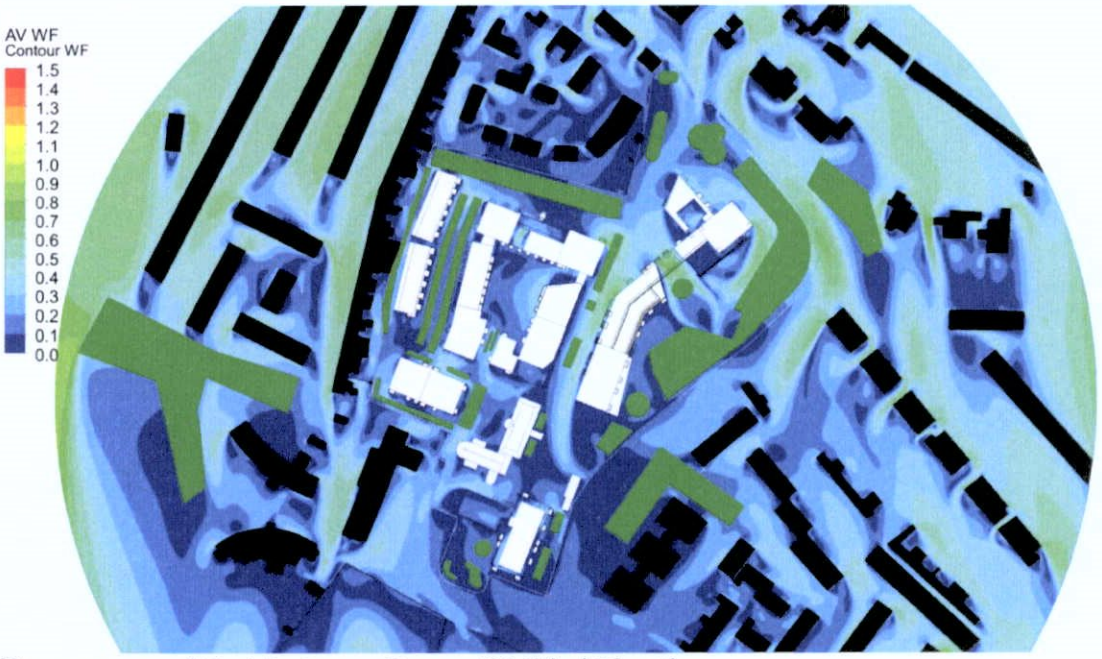


Figure 17.13: Wind Factor – 0 Degree (N) Wind Direction

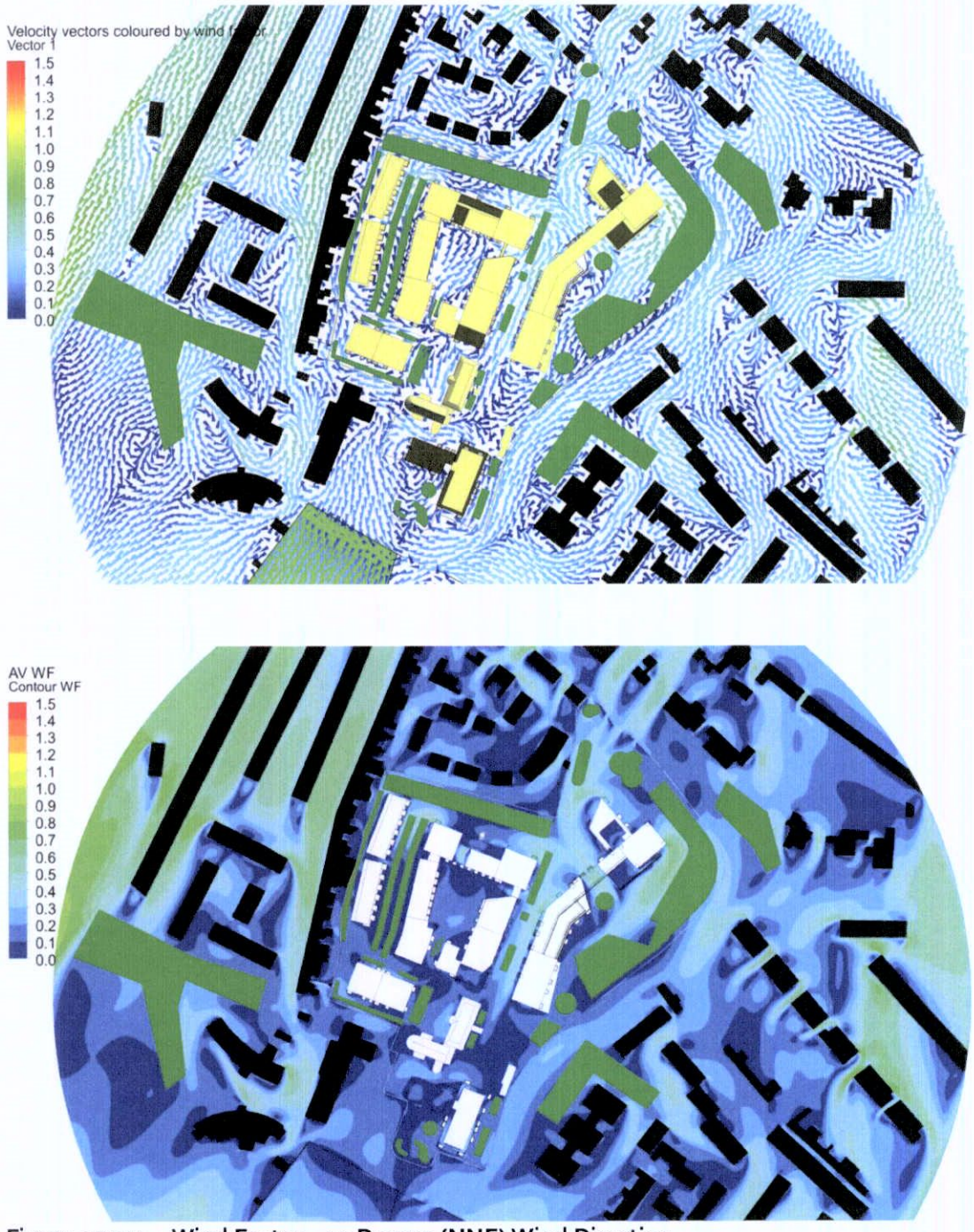


Figure 17.14: Wind Factor – 30 Degree (NNE) Wind Direction

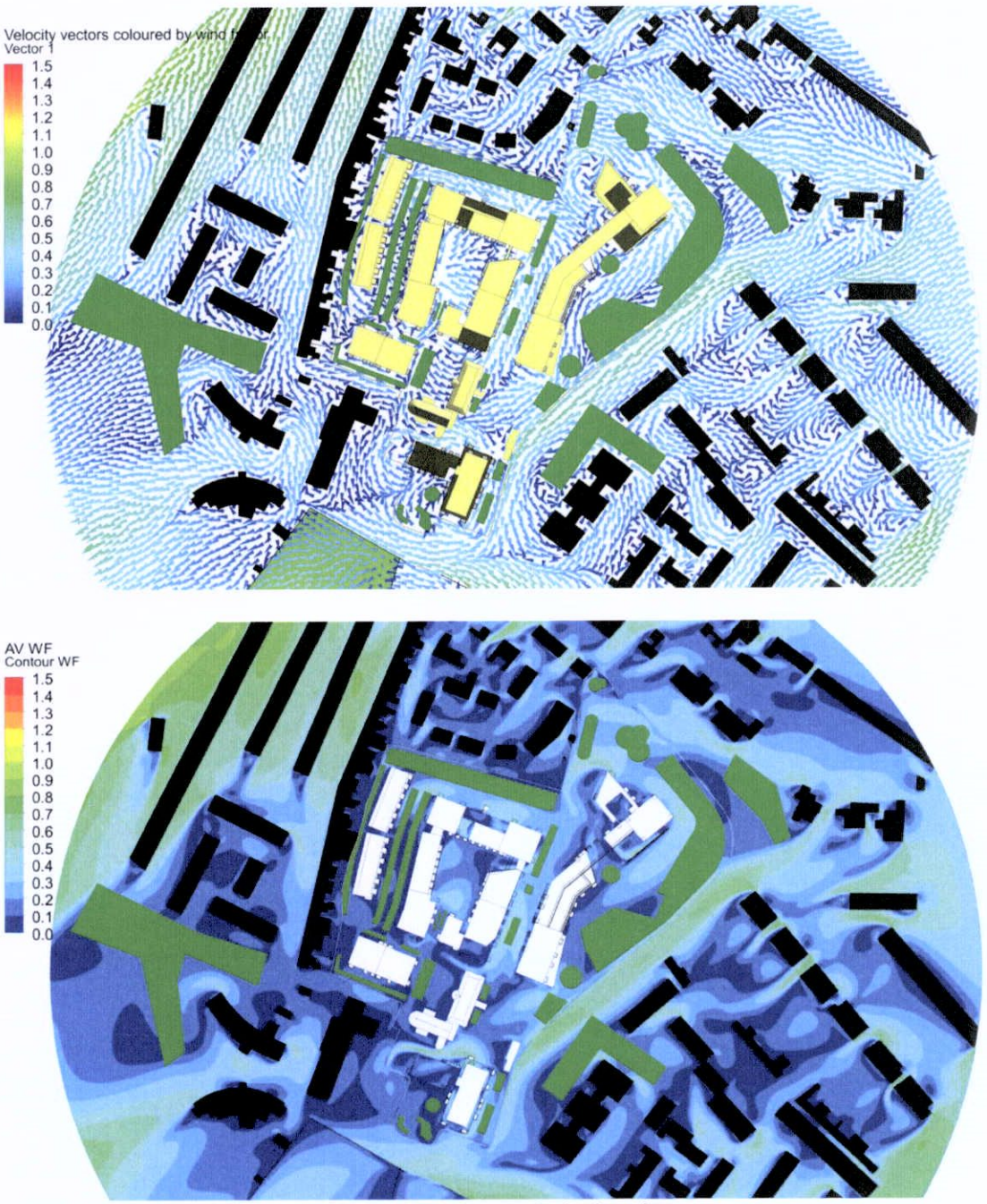


Figure 17.15: Wind Factor – 60 Degree (ENE) Wind Direction

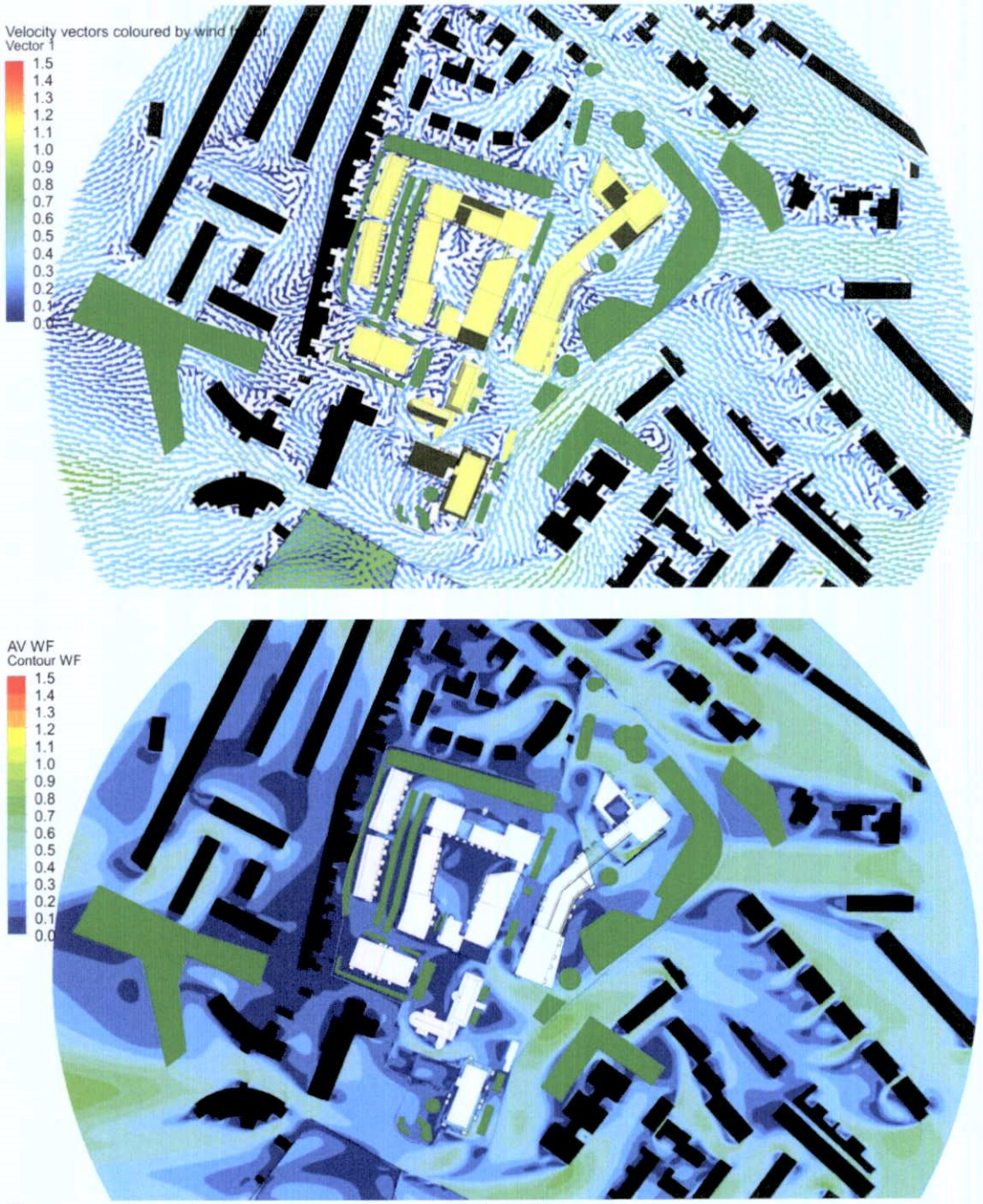


Figure 17.16: Wind Factor – 90 Degree (E) Wind Direction

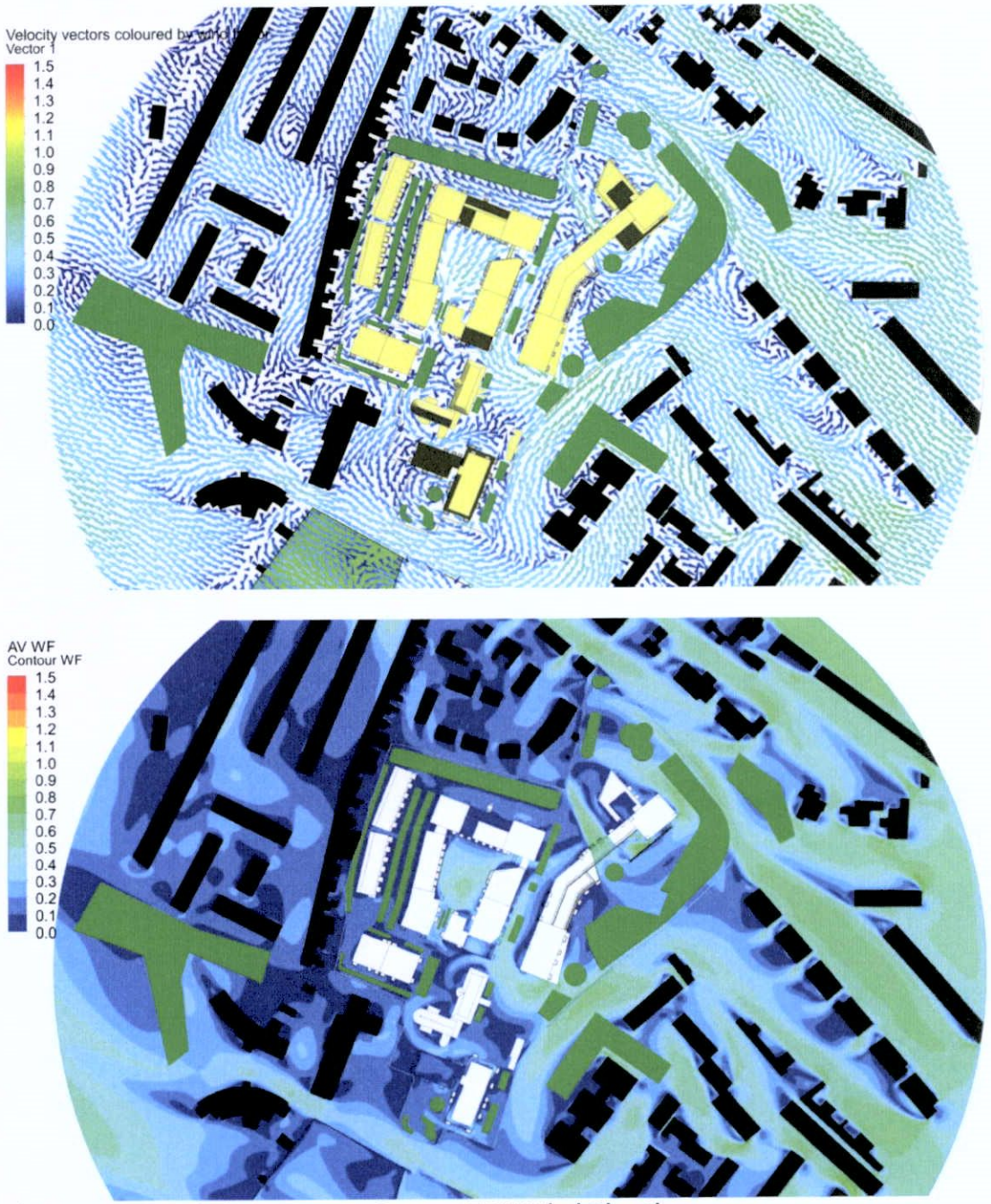


Figure 17.17: Wind Factor – 120 Degree (ESE) Wind Direction

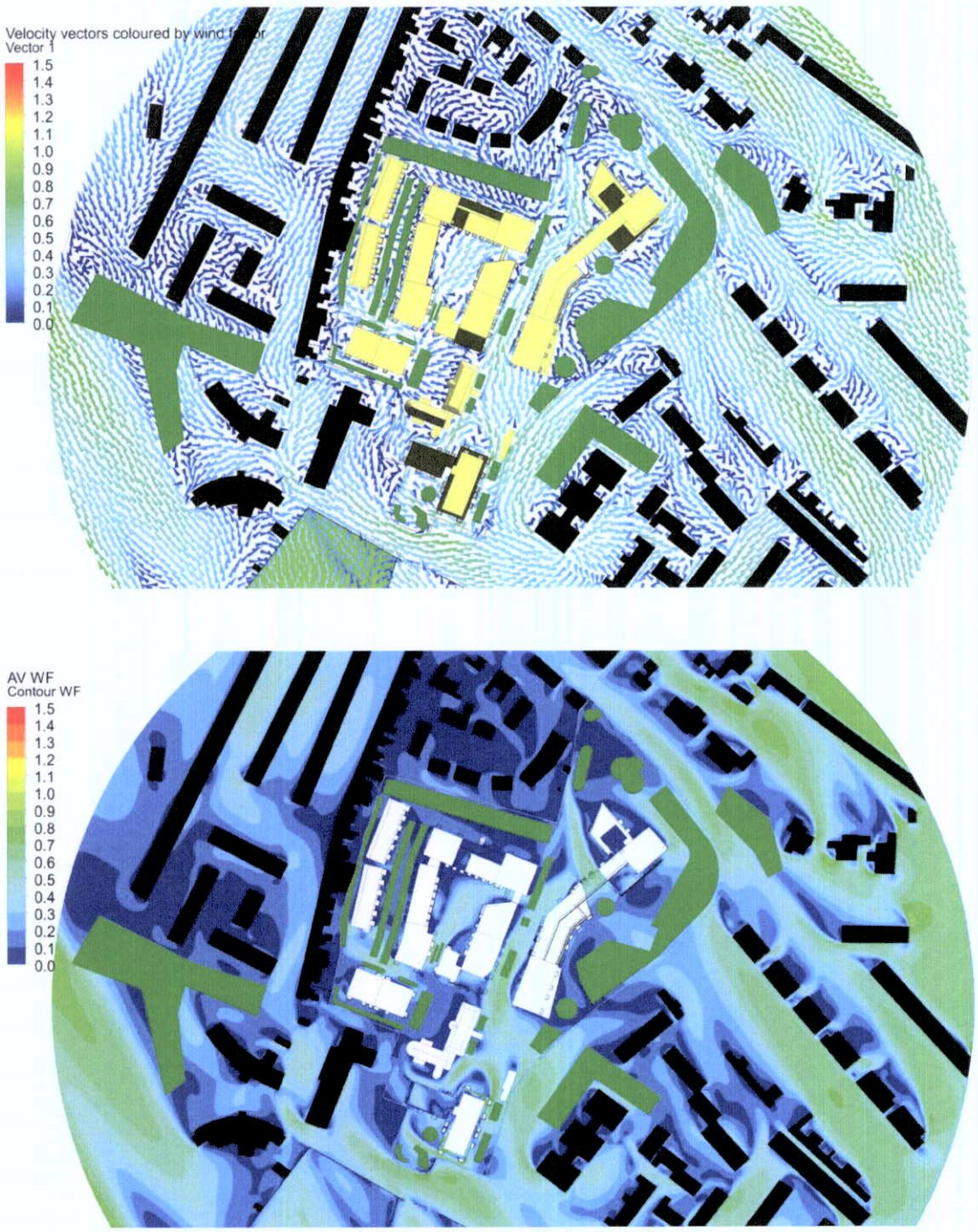


Figure 17.18: Wind Factor – 150 Degree (SSE) Wind Direction

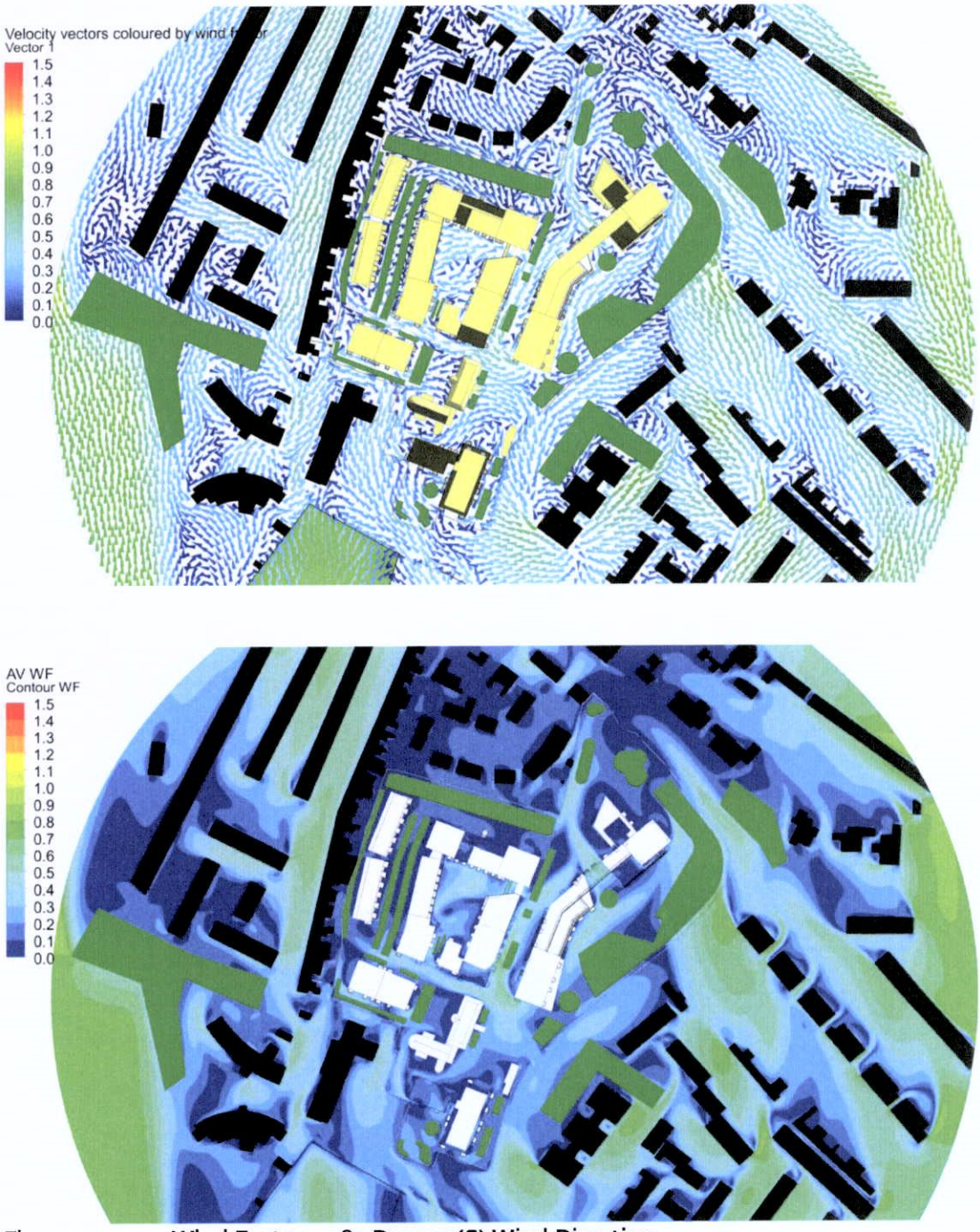


Figure 17.19: Wind Factor – 180 Degree (S) Wind Direction

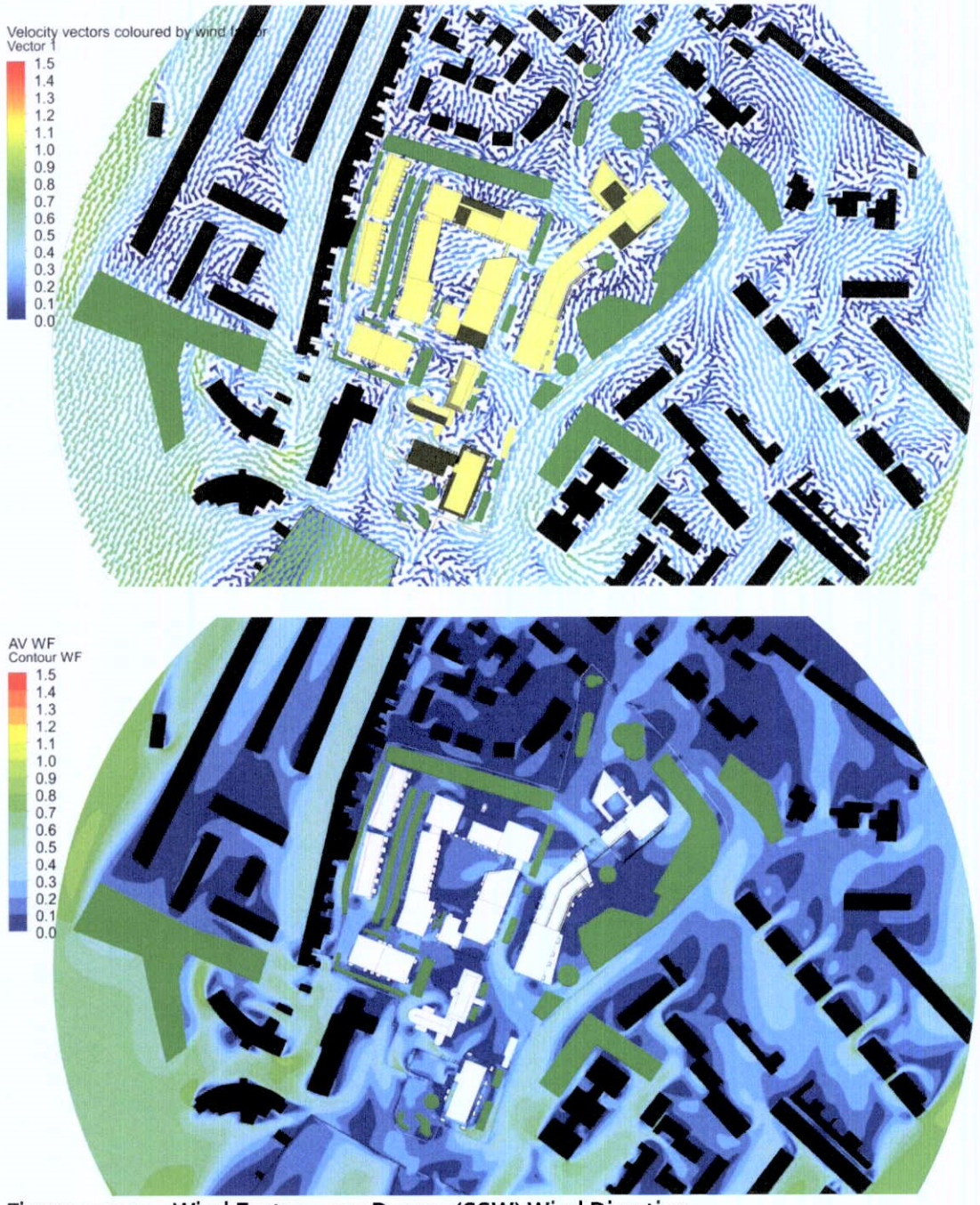


Figure 17.20: Wind Factor – 210 Degree (SSW) Wind Direction

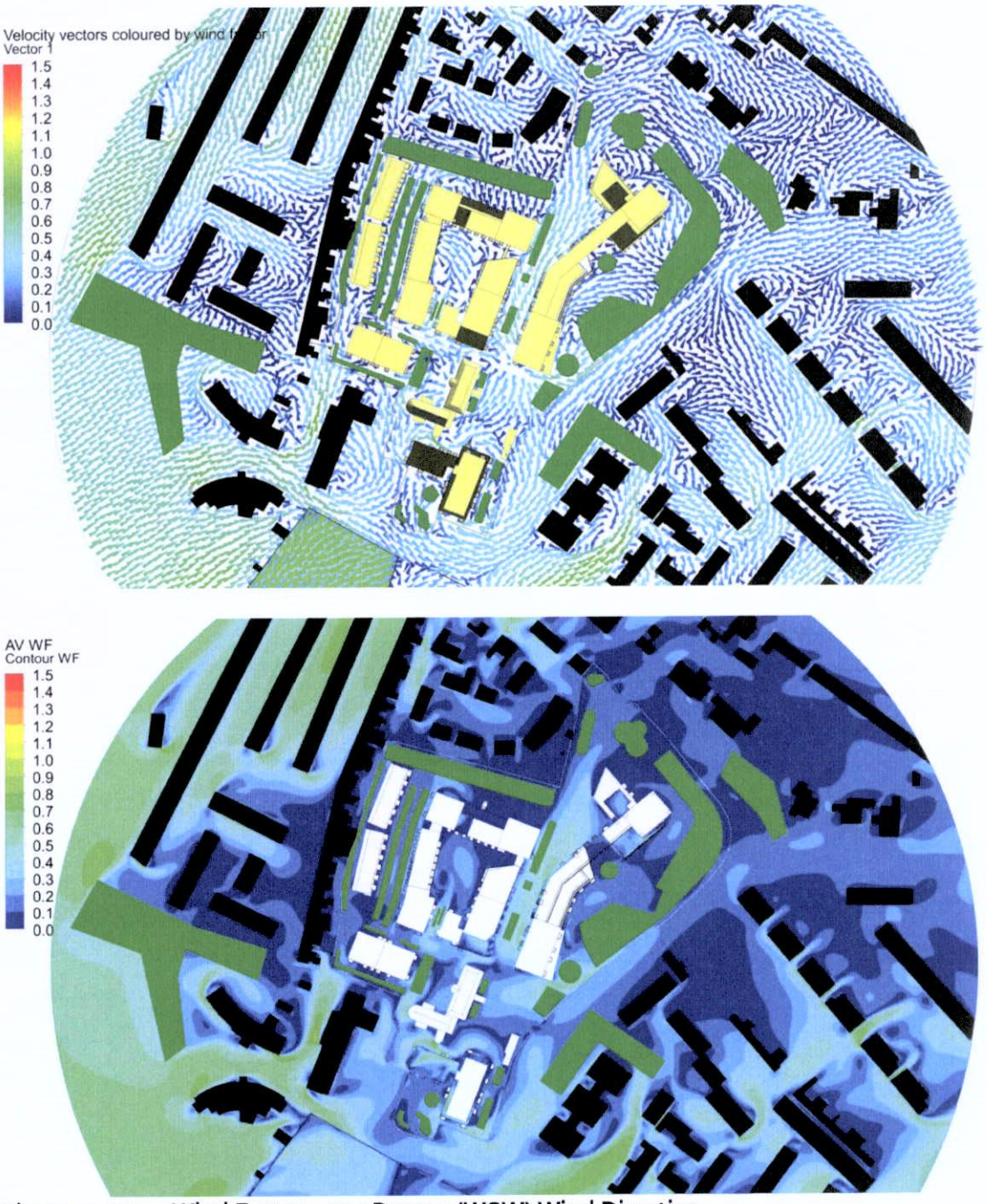


Figure 17.21: Wind Factor – 240 Degree (WSW) Wind Direction

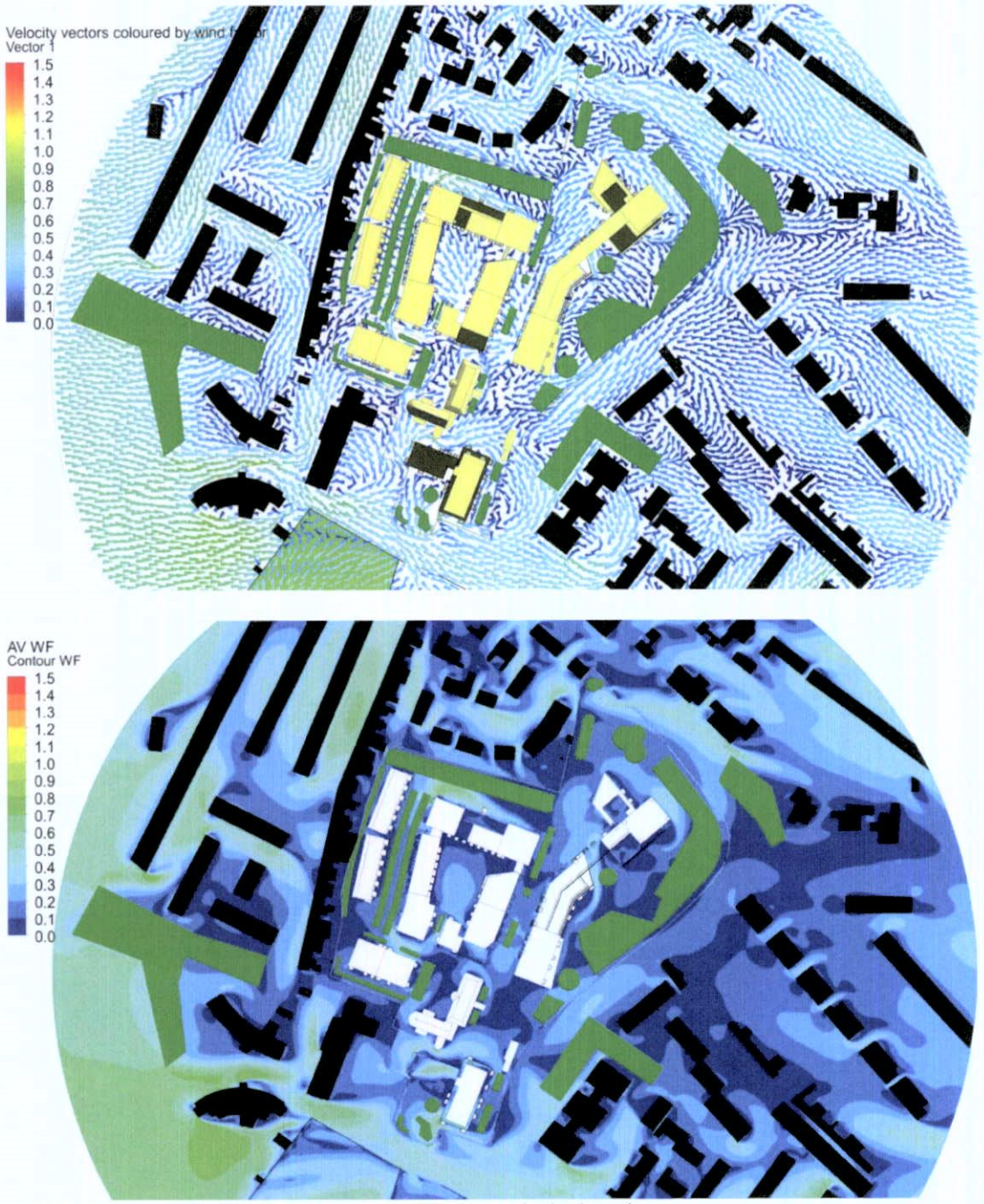


Figure 17.22: Wind Factor – 270 Degree (W) Wind Direction

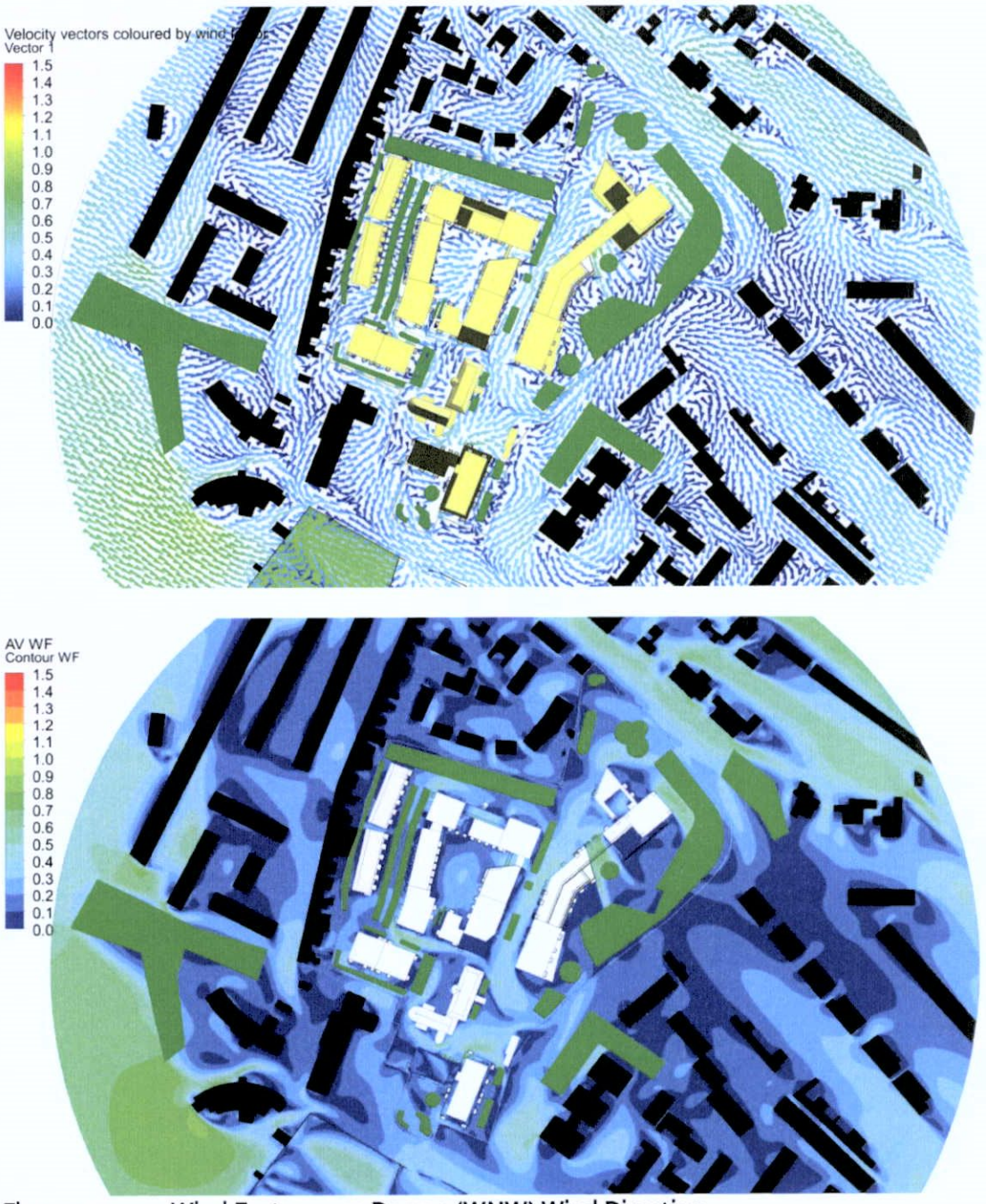


Figure 17.23: Wind Factor – 300 Degree (WNW) Wind Direction

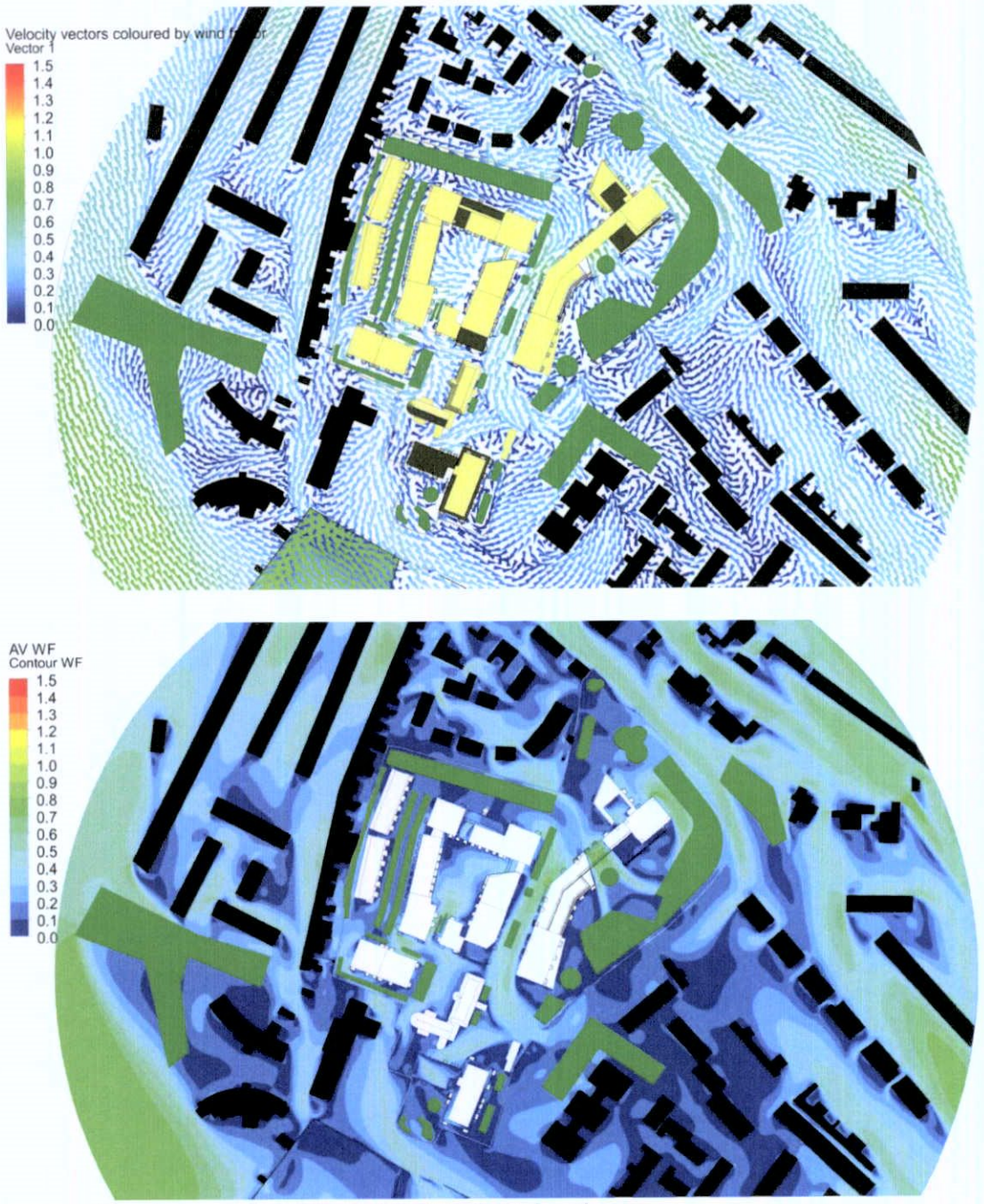


Figure 17.24: Wind Factor – 330 Degree (NNW) Wind Direction

17.4.3 Potential Cumulative Impacts

The CFD assessment has accounted for the cumulative impact associated with the existing site and the proposed development. The analysis has shown that even with the proposed development in place, the wind speeds will still be comfortable for pedestrians with no areas of concern highlighted.

A list of granted developments surrounding the proposed project has been provided by Thornton O'Connor Town Planning. The below table outlines only those applications located in closest proximity to the proposed site. Due to the substantial distance from the proposed

project and the extent of those granted applications, a neutral cumulative impact will be perceived.

Planning Reference	Development	Date Granted
ABP Reg. Ref. PL29S.307267	148-Unit Residential Development at Eglinton Road	**ABP Decision Date:** 31st August 2020
DCC Reg. Ref. 2179/20 **ABP Reg. Ref. PL29S.307375**	36-Unit Residential Development at Sandford Close	**Decision Date:** 11th March 2021 **ABP Grant:** 27th March 2020
DCC Reg. Ref. 3513/20 **ABP Reg. Ref. ABP-309720-21**	Mixed Use Development of 49 No. Build-to-Rent units and 231 sq m retail space at Nos. 25-27 Donnybrook Road and Nos. 1-3 The Crescent, Donnybrook	**Granted:** 24th February 2021 **Final Grant:** 26th May 2021 (Appeals Withdrawn)
DCC Reg. Ref. 2124/20	Single storey extension (c. 120 sq m) to the south of the existing school to provide additional canteen facilities at Muckross Park College	**Granted:** 20th March 2020 **Final Grant:** 29th June 2020
No. 1. DCC Reg. Ref. 2582/16	Demolition of existing sheds (c. 25 sq m) and construction of 4 No. detached houses at No. 91 Belmont Avenue	**Granted:** 8th August 2016 **Final Grant:** 16th September 2016
No. 2. DCC Reg. Ref. 3312/20	Revised ground floor rear extension to include a single storey rear return for a utility room to No. 91 Belmont Avenue	**Granted:** 28th October 2020 **Final Grant:** 9th December 2020
DCC Reg. Ref. WEB1065/19 **ABP Reg. Ref. ABP-304727-19**	New 3g artificial turf pitch capable of accommodating full size rugby and football over the site on an existing natural grass pitch within the playing fields at Gonzaga College	**Granted:** 31st May 2019 **Final Grant:** 9th October 2019
DCC Reg. Ref. 2179/20 **ABP Reg. Ref. ABP-307375-20**	Demolition (c. 392 sq m) of Block 5 (1 storey) and Block 6 (1 storey) (total 4 No. units) and the construction of 36 No. residential units in the form of 2 No. three storey terraces at Sandford Lodge	**Granted:** 27th March 2020 **Final Grant:** 11th March 2021
DCC Reg. Ref. 3312/20	PROTECTED STRUCTURE at a site at Belmont Avenue; revised ground floor rear extension to include a single storey rear return for a utility room to No. 91 Belmont Avenue	**Granted:** 28th October 2020 **Final Grant:** 9th December 2020
DCC Reg. Ref. 3116/22	Planning permission for the development will consist of the construction of a two-storey archive storage and office building with c.765 sq m of combined floorspace.	**Granted:** 18th May 2022 **Final Grant:** 3rd June 2022

DCC Reg. Ref. 4578/22	Planning permission for a Build to Rent residential development on lands at 'Dunelm', Rydalmount, Milltown Road, Dublin 6. The proposed Build to Rent residential development will consist of 63 No. BTR apartments in two No. blocks (Block A and Block B), including resident support and amenity facilities;	**Granted:** 27th January 2023 **Final Grant:** Decision due on 27th June 2023
DCC Reg. Ref. 4115/21	The proposed development will consist of a total combined gross floor area (GFA) of 1,739 sq.m; Construction of a Build-to-Rent (BTR) residential development, comprising 97 No. BTR apartments, ancillary resident support and amenity facilities for the BTR residential units with a total floor area of 302 sq m, including a co-working area, meeting room, coffee dock, lounge and concierge at ground floor level and a gym, shared kitchen, media room and parcel store.	Refused by Dublin City Council on 18th February 2022. First Party Appeal Submitted to An Bord Pleanála - Decision Overdue (ABP-313048-22)
DCC Reg. Ref. 3930/21	Planning permission for the following development:-Demolition of 283 sq m of existing commercial buildings,-Erection of six, two-storey (plus attic) townhouses,-8 car parking spaces, and all associated site works (including drainage).	**Granted:** 4th May 2022 **Final Grant:** 14th June 2022

Table 17.5: Granted Planning Applications in Closest Proximity to the Proposed Project

(Source: Thornton O'Connor Town Planning)

17.4.4 'Do Nothing' Impact

If the proposed development does not go ahead, based on the assessment carried out on the existing site and the statistical analysis of 30 years of climate data from the nearby Dublin airport, the existing site will remain well sheltered from the prevailing wind directions and will continue to be considered a comfortable environment for pedestrians.

17.5 Mitigation Measures

17.5.1 Construction Phase

The assessment of the wind microclimate during the construction phase has been based on professional judgement by reviewing the existing site conditions and the expected conditions once the development is in place via the CFD modelling.

It is expected the wind microclimate will gradually adjust from the existing conditions to the final modelled scenario as construction progress develops. However, the mitigation measures outlined in the following sections will need to be implemented before completion to ensure comfortable conditions once the proposed development becomes operational.

17.5.2 Operational Phase

The following specific mitigation measures have been incorporated into the proposed design to prevent excessive wind speeds during the operational phase of the development.

17.5.2.1 Apartment Block Arrangement

The arrangement of the apartment blocks has been carefully chosen to help mitigate increased wind speeds throughout the site. The central areas within the development are well protected from the predominant South-West wind direction via the buildings located to the south-west. Furthermore, an internal courtyard space has been incorporated within Block B and C which provides a sheltered area for pedestrians to utilise throughout the year.

Figure 17.25: Wind Mitigation Measure – Apartment Block Arrangement

17.5.2.2 Inset Balconies

The Block A1 building, which is most exposed to the wind due to its height, predominantly incorporates inset balconies. Figure 17.26 illustrates a sample of these balconies which are highlighted in red. Inset balconies offer increased wind protection for people utilising the balcony spaces as they provide a natural shelter from the elements.

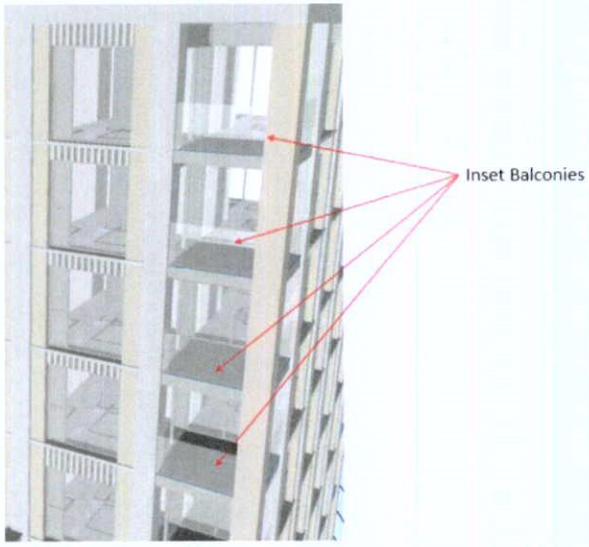


Figure 17.26: Wind Mitigation Measure – Block A1 Inset Balconies

17.5.2.3 Solid Balustrades

All private balconies on the tower element of Block A1 (floors 5 to 9) and the shared rooftop amenity areas will incorporate solid glazed balustrades. Figure 17.27 illustrates a sample of these balconies. Full length solid balustrades block wind directly entering the balcony space, dissipating the wind speed within the balcony area which creates a much more comfortable experience for occupants.

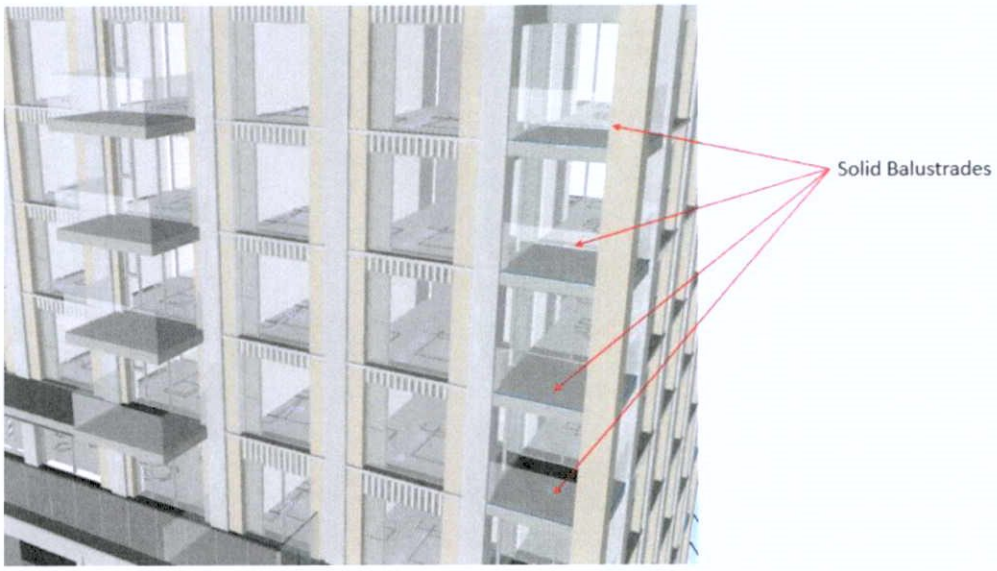


Figure 17.27: Wind Mitigation Measure – Block A1 Solid Balcony Balustrades

17.5.2.5 Landscaping

The landscaping has been strategically designed to mitigate increased wind speeds and to provide shelter for pedestrians at ground level, within the central courtyard spaces and on the rooftop amenity areas. The landscaping design incorporates trees, hedges and raised planters and sheltered seating pockets which all act as wind mitigation measures.

The proposed landscaping design for all levels is illustrated in Figure 17.28 with subsequent images illustrating the landscape design for each rooftop amenity area. Trees are to be planted close to primary entrance ways and along the streetscape, mitigating excessive wind speeds and providing shelter for pedestrians at street level. The use of trees and low-level shrubs all assist in the localised reduction of wind speed.

Figure 17.28: Wind Mitigation Measure – Landscaping Design (All Levels)

(Source: Cameo & Partners)

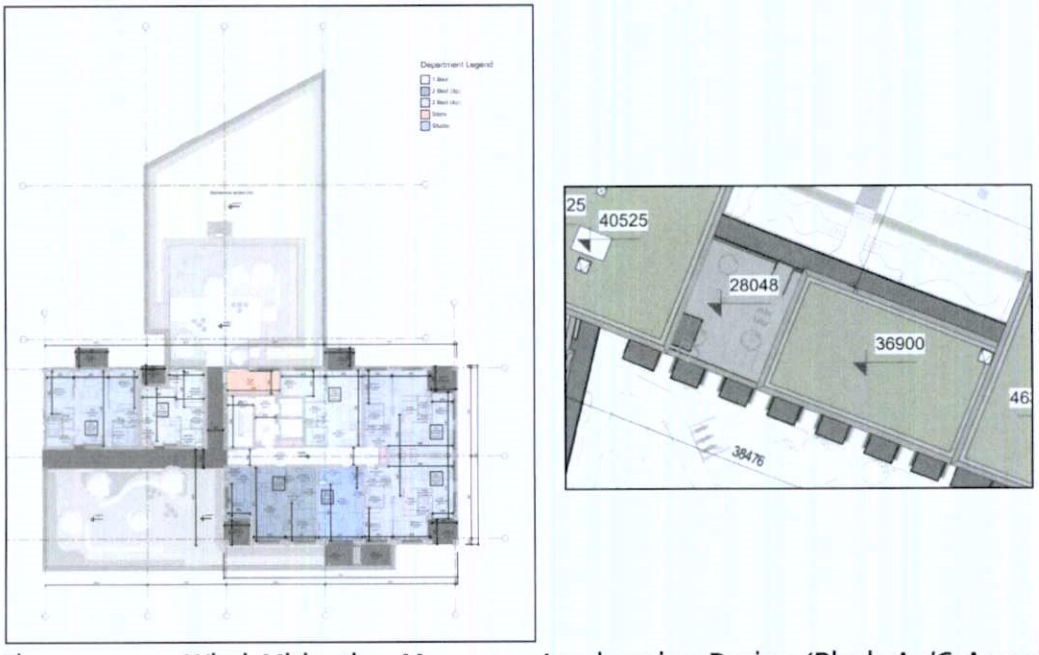


Figure 17.29: Wind Mitigation Measure – Landscaping Design (Block A1/C Amenity Areas)

(Source: O'Mahony Pike Architects)

17.6 Residual Impacts

The trees and planting associated with the landscape design will continue to grow and develop after the proposed mitigation measures have been implemented, thus providing increased protection from the wind resulting in increased pedestrian comfort conditions in these areas which will be a positive impact.

17.7 Monitoring

17.7.1 Construction Phase

During the construction phase the wind conditions will gradually change from the conditions experienced in the existing environment to the conditions experienced during the operational phase. As wind comfort conditions are comfortable in both phases and no issues have been identified, no monitoring is required.

17.7.2 Operational Phase

The proposed development has been designed to have acceptable pedestrian wind comfort conditions during the operational phase, therefore no monitoring is required.

17.8 Reinstatement

17.8.1 Construction Phase

No reinstatement works are required during the construction phase.

17.8.2 Operational Phase

No reinstatement works are required during the operational phase.

17.9 Interactions

The interactions between the proposed development and its environs and human health have been evaluated within the assessment. The modelling has included the proposed design, the proposed landscaping strategy and the existing landscape which will remain, in conjunction with the existing buildings surrounding the development. The combination of all interactions has resulted in a comfortable environment for pedestrians within the proposed development.

17.10 Difficulties Encountered

There were no difficulties encountered during the course of the assessment.

17.11 References

- Lawson, T.V., 2001, 'Building Aerodynamics', Imperial College Press, London

18.0 Risk Management

18.1 Introduction

This chapter of the EIAR sets out the assessment of the vulnerability of the proposed development at Sandford Road to risks of major accidents/ and or disasters. It assesses the expected effects of the project to risk of major accidents and disasters relevant to the project. It includes the methodology used for the assessment. The Interactions and Cumulative Impact and Mitigation and Monitoring Measures are included in chapters 20.0 and 21.0, respectively.

This chapter has been completed by Janet O'Shea of Enviroguide Consulting. Janet is a Technical Director with Enviroguide Consulting and holds a BSc. In Environmental Health and post graduate Diploma in Environmental Impact Assessments. Janet has 15 years' experience as an Environmental Professional and is a Chartered Waste Manager with the CIWM and a Chartered Environmentalist.

This chapter has been updated by Louise Hewitt, Environmental Consultants, Enviroguide Consulting. Louise has a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide since 2021 and has built up experience preparing Environmental Impact Assessment (EIA) Screening Reports, Introduction, Population and Human Health and Archaeology and Cultural Heritage and Risk Management chapters of EIARs for residential developments.

This chapter has been prepared in accordance with the above requirements and by reference to the EIA Directive and implementing legislation, the Seveso III Directive, the Safety Health and Welfare at Work Act, 2005 and the Floods Directive (2007/ 60/EC).

In summary, the proposed development ("the site") comprises of 636 No. residential dwellings, refurbishment of Tabor House and the Chapel to provide cultural/community space and the provision of a creche within Block F (with an outdoor play area) on a c. 4.26 Ha site (developable area).

18.2 Study Methodology

18.2.1 Scope and Context

The relevant legislation that applies to this chapter is the Planning and Development Regulations 2001 as amended, and in particular Schedule 6 - Information to be contained in EIAR. The following paragraph of Schedule 6, Paragraph 2(e)(i)(IV), specifically refers to "*a description of the likely significant effects on the environment of the proposed development resulting from ··· the risks to human health, cultural heritage or the environment (for example, due to accidents or disasters)*".

Paragraph 2(h) further expands with "*a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental*

Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events."

Additionally, the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), which implement the Seveso III Directive (2012/18/EU), and which revoked the 2006 Major Accident Regulations also applies to this chapter.

18.2.2 Guidelines and Reference Material

Cognisance has been taken of the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022). This document follows the requirements laid out in the Directive 2014/52/EU.

Specifically, the EPA Guidelines state that the EIAR must take account of "*the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk)... The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g., the potential effects of floods on sites with sensitive plants. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required. The EIAR should refer to those separate assessments while avoiding duplication of their contents.*"

Reference has also been made to the Department of the Environment, Heritage & Local Government (DoEHLG) Publication 'Guide to Risk Assessment in Major Emergency Management 2010' and the Office of Emergency Planning, Department of Defence (DOD) Publication 'A National Risk Assessment for Ireland 2020. A consolidated list of national hazards for Ireland identified in the DOD document are identified in Table 18-1.

Table 18.1 Consolidated List of National Hazards (Source: A National Risk Assessment forIreland (2017) Department of Defence)

Hazard: Civil	**Hazard: Natural**
• Infections Disease • Terrorist Incident • Animal Disease • Foodborne Outbreaks • Crowd Safety • Civil Disorder • Loss of Critical Infrastructure	• Storm • Flooding • Snow • Low temperatures • High temperatures • Volcanic Ash • Drought • Tsunami • Space weather