



Environmental Impact Assessment Report (EIAR)

Volume 3 of 6: Environmental Assessment

(Chapter 12) Air Quality

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Acronyms and Abbreviations

Acronym	Full Name
AADT	Annual Average Daily Traffic
ACM	Asbestos-Containing Material
AQLV	Air Quality Limit Value
APIS	Air Pollution Information System
BPS	Booster Pumping Station
BPT	Break Pressure Tank
CAFE	Clean Air For Europe
CC	Construction Compound
CEMP	Construction Environmental Management Plan
CH ₄	Methane
CO	Carbon monoxide
Defra	Department for Environment, Food and Rural Affairs (UK)
DEHLG	Department of the Environment, Heritage and Local Government
EC	European Commission
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EU	European Union
FCV	Flow Control Valve
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
HLPS	High Lift Pumping Station
HSE	Health Service Executive
IAQM	Institute of Air Quality Management (UK)
ICE	Internal combustion engine
IT	Interim Target
LDV	Light Duty Vehicle
LGV	Light Goods Vehicle
m ²	Square metre
m ³	Cubic metre
MI	Million litres
Mld	Million Litres per day
NHA	Natural Heritage Area
NH ₃	Ammonia
NO ₂	Nitrogen dioxide
NO _x	Nitrogen dioxide and nitrogen oxide
PM ₁₀	Particular matter of an aerodynamic diameter equal to or less than 10 micrometres
PM _{2.5}	Particular matter of an aerodynamic diameter equal to or less than 2.5 micrometres
pNHA	Proposed Natural Heritage Area

Acronym	Full Name
pSAC	Proposed Special Area of Conservation
pSPA	Proposed Special Protection Area
REM	Road Emissions Model
RWI&PS	Raw Water Intake and Pumping Station
RWRMs	Raw Water Rising Mains
SAC	Special Area of Conservation
SO ₂	Sulphur Dioxide
SPA	Special Protection Area
TII	Transport Infrastructure Ireland
TPR	Termination Point Reservoir
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
USEPA	United States Environmental Protection Agency
WHO	World Health Organization
WTP	Water Treatment Plant

12. Air Quality

12.1 Introduction

1. This chapter reports the assessment of the likely significant effects of the Proposed Project on air quality, in accordance with the Environmental Impact Assessment (EIA) Directive.
2. This chapter sets out the methodology used, describes the existing air quality environment, examines the predicted effects of the Proposed Project, proposes mitigation measures and identifies residual effects. The assessment has been conducted in accordance with the current relevant standards and guidance.
3. The assessment has considered all potential sources of emissions to air from the Proposed Project. Broadly, these fall into two categories:
 - Emissions from vehicles, including construction vehicles
 - Dust emissions during construction.
4. This chapter should be read in conjunction with the Construction Environmental Management Plan (CEMP) (Appendix A5.1), Dust Management Plan (Annex E of Appendix A5.1) and Appendix A12.1 (Dust Mitigation Measures).
5. The assessment reported in this chapter has considered the mitigation that has been embedded into the design to avoid or reduce environmental effects. Embedded mitigation is an intrinsic part of the Proposed Project design and therefore the assessment of effects assumes all embedded design measures are in place. Embedded mitigation relevant to this topic is included in Section 12.5.1.
6. The potential impact on air quality during the Construction Phase would most likely be from construction dust emissions and the potential for dust soiling and particulate matter (PM₁₀ and PM_{2.5}) emissions. The mitigation measures proposed as part of the air quality assessment include management measures and such measures been incorporated into the CEMP (Appendix A5.1). Once the Proposed Project becomes operational, significant air emissions are not predicted. The pipeline would be buried underground once constructed and there would be no emissions to atmosphere associated with this element. There may be some minor emissions from maintenance vehicles during the Operational Phase, however these would be minor in comparison to Construction Phase traffic and would not be significant. Therefore, the Operational Phase of the Proposed Project is not predicted to have significant effects on air quality.
7. Table 12.1 outlines the principal Proposed Project elements. A full description is provided in Chapter 4 (Proposed Project Description) of this Environmental Impact Assessment Report (EIAR).

Table 12.1: Summary of Principal Project Infrastructure

Proposed Project Infrastructure	Outline Description of Proposed Project Infrastructure*
Permanent Infrastructure	
Raw Water Intake and Pumping Station (RWI&PS) (Infrastructure Site) County Tipperary	<ul style="list-style-type: none"> The RWI&PS would be located on a permanent site of approximately 4ha on the eastern shore of Parteen Basin in the townland of Garrynatineel, County Tipperary. In addition, approximately 1ha of land would be required on a temporary basis during construction. The RWI&PS has been designed to abstract enough raw water from the River Shannon at Parteen Basin to provide up to 300Mld of treated water by 2050. The RWI&PS site would include a bankside Inlet Chamber, the Raw Water Pumping Station Building, two Microfiltration Buildings, an Electricity Substation and Power Distribution Building, and Dewatering Settlement Basins. The tallest building on the RWI&PS site would be the Microfiltration Buildings which would be 10.9m above finished ground level. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. Power for the RWI&PS would be supplied via an underground connection to the existing Birdhill 38 kV electricity substation. A new permanent access road from the R494 would be constructed to access the proposed RWI&PS site. This access road would be 5m in width and 670m in length. The RWI&PS site boundary would be fenced with a stock proof fence and a 2.4m high paladin security fence 5m inside the boundary. The site would be landscaped in line with the surrounding environment to reduce its visual impact.
Raw Water Rising Mains (RWRMs) (Pipeline) County Tipperary	<ul style="list-style-type: none"> The RWRMs would consist of two 1,500mm underground pipelines made from steel that would carry the raw water approximately 2km from the RWI&PS to the Water Treatment Plant (WTP) at Incha Beg, County Tipperary. The water would be pumped from the pumping station at the RWI&PS to the WTP. Twin RWRMs have been proposed so that one RWRM can be taken out of service for cleaning and maintenance while still providing an uninterrupted flow of raw water through the other RWRM. The RWRMs would include Line Valves, a Lay-By, Air Valves and Cathodic Protection. A 20m wide Permanent Wayleave would provide Uisce Éireann with operational access to the RWRMs.
Water Treatment Plant (WTP) (Infrastructure Site) County Tipperary	<ul style="list-style-type: none"> The WTP would be located on a permanent site of approximately 31ha at Incha Beg, County Tipperary, 2.6km north-east of the village of Birdhill, and 2km east of the proposed RWI&PS. In addition, approximately 2.5ha of land would be required on a temporary basis during construction. The WTP would treat the raw water received from the RWI&PS via the RWRMs. Once treated, the High Lift Pumping Station (HLPS) would deliver the treated water onwards from the WTP to the Break Pressure Tank (BPT) at Knockanacree, County Tipperary, via the Treated Water Pipeline. The WTP would comprise of a series of tanks and buildings including the Raw Water Balancing Tanks, Water Treatment Module Buildings, Sludge Dewatering Buildings, Sludge Storage Buildings, Clear Water Storage Tanks and HLPS, an Electricity Substation and Power Distribution Building, and the Control Building. The tallest building on the WTP site would be the Water Treatment Module Buildings which would be up to 15.6m above finished ground level. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. There would also be a potential future water supply connection point at the junction between the permanent access road and the R445. Power for the WTP would be supplied via an underground connection to the existing Birdhill 38 kV electricity substation. Solar panels would be placed on the roofs of the Chemical Dosing Manifold Building, the Water Treatment Module Buildings, Clear Water Storage Tanks and Sludge Storage Buildings, and at a number of locations on the ground to supplement the mains power supply. A new permanent access road from the R445 would be constructed and would be 6m in width and 640m in length. The WTP site boundary would be fenced with a stock proof fence and a 2.4m high palisade security fence 5m inside the boundary. The site would be landscaped in line with the surrounding environment to reduce its visual impact.

Proposed Project Infrastructure	Outline Description of Proposed Project Infrastructure*
<p>Treated Water Pipeline from the WTP to the BPT (Pipeline) County Tipperary</p>	<ul style="list-style-type: none"> The Treated Water Pipeline from the WTP to the BPT would consist of a single 1,600mm underground steel pipeline which would be approximately 37km long. The water would be pumped through this section of the Treated Water Pipeline by the HLPS. The Treated Water Pipeline would include Line Valves, Washout Valves, Air Valves, Manways, Cathodic Protection and Lay-Bys. A 20m wide Permanent Wayleave would provide Uisce Éireann with operational access to the pipeline (this Wayleave has been extended to approximately 30m at some Line Valves to provide access between the Lay-Bys and Line Valves). There would be an additional 10m wide Permanent Wayleave at certain locations for operational access to smaller pipes connecting Washout Valves with permanent discharge locations.
<p>Break Pressure Tank (BPT) (Infrastructure Site) County Tipperary</p>	<ul style="list-style-type: none"> The BPT would be located on a permanent site of approximately 7ha in the townland of Knockanacree, County Tipperary. In addition, approximately 0.8ha of land would be required on a temporary basis during construction. The BPT would be located at the highest point of the pipeline. It marks the end of the Treated Water Pipeline from the WTP to the BPT and the start of the Treated Water Pipeline from the BPT to the Termination Point Reservoir (TPR) in the townland of Loughtown Upper, at Peamount, County Dublin. It would act as a balancing tank and would be required to manage the water pressures in the entire Treated Water Pipeline during flow changes, particularly during start-up and shut-down. The BPT site would include the BPT and a Control Building. The BPT would be a concrete tank divided into three cells covered with an earth embankment. The BPT tanks would be 5m in height and partially buried below finished ground levels. The Control Building would be 7.5m over finished ground level. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. Access to the BPT site would be via a new permanent access road from the L1064 which would be 5m wide and 794m in length. Power for the BPT would be supplied via an underground connection from the existing overhead power line. Solar panels would be placed on the south facing side of the control building roof, on the BPT and at ground level to the south of the site to supplement the mains power supply. The BPT site boundary would be bounded by the existing hedgerow / tree line with a 2.4m high palisade security fence around the permanent infrastructure. The site would be landscaped in line with the surrounding environment to reduce its visual impact.
<p>Treated Water Pipeline from the BPT to the TPR (Pipeline) Counties Tipperary, Offaly, Kildare and Dublin (within the administrative area of South Dublin County Council)</p>	<ul style="list-style-type: none"> The Treated Water Pipeline from the BPT to the TPR would consist of a single 1,600mm underground steel pipeline, approximately 133km long. The water would normally travel through the Treated Water Pipeline by gravity; however, flows greater than approximately 165Mld would require additional pumping from the Booster Pumping Station (BPS) in the townland of Coagh Upper, County Offaly. The Treated Water Pipeline would include Line Valves, Washout Valves, Air Valves, Manways, Cathodic Protection, Lay-Bys and potential future connection points. A 20m wide Permanent Wayleave would provide Uisce Éireann with operational access to the pipeline (this Wayleave has been extended to approximately 30m at some Line Valves to provide access between the Lay-Bys and Line Valves). There would be an additional 10m wide Permanent Wayleave at certain locations for operational access to smaller pipes connecting Washout Valves with permanent discharge locations.
<p>Booster Pumping Station (BPS) (Infrastructure Site) County Offaly</p>	<ul style="list-style-type: none"> The BPS would be located on a permanent site of approximately 2.6ha in the townland of Coagh Upper, County Offaly. It would be located approximately 30km downstream from the BPT. In addition, approximately 3ha of land would be required on a temporary basis during construction. The BPS would be required when the demand for water causes the flow through the pipeline to exceed approximately 165Mld. The BPS site would consist of a single-storey Control Building with a basement below. It would have a finished height of 7.6m above finished ground level. There would also be a separate Electricity Substation and Power Distribution Building. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. Power to the BPS would be supplied from an existing 38 kV electricity substation at Birr, through cable ducting laid within the public road network. There would be ground mounted solar panels on the southern side of the BPS site to supplement the mains power supply. The site would be accessed directly from the L3003. The BPS site boundary would be fenced with a stock proof fence and a 2.4m high palisade security fence between 5m -12m inside the boundary. The site itself would be landscaped in line with the surrounding environment to reduce its visual impact.

Proposed Project Infrastructure	Outline Description of Proposed Project Infrastructure*
<p>Flow Control Valve (FCV) (Infrastructure Site) County Kildare</p>	<ul style="list-style-type: none"> The FCV controls the flows in the Treated Water Pipeline from the BPT to the TPR. It would be a small permanent site of approximately 0.5ha in the townland of Commons Upper in County Kildare. In addition, approximately 0.6ha of land would be required on a temporary basis during construction. It would consist of three 700mm diameter FCVs and three flow meters installed in parallel with the Line Valve and housed within an underground chamber. Access to the FCV site would be directly off the L1016 Commons Road Upper. Power supply to the FCV site would be provided from the existing low voltage network via a combination of overhead lines and buried cables. There would be ground mounted solar panels on the north-eastern side of the site to supplement the mains power supply. Kiosks at the FCV site would house the Programmable Logic Controller, telemetry and power supply for the Line Valve. There would also be a telemetry mast, the top of which would be 14m above finished ground level. The site boundary would be fenced with a stock proof fence and a 2.4m high palisade security fence 5m inside the boundary.
<p>Termination Point Reservoir (TPR) (Infrastructure Site) County Dublin (within the administrative area of South Dublin County Council)</p>	<ul style="list-style-type: none"> The TPR would be located on a permanent site of approximately 8.3ha adjacent to an existing treated water reservoir in the townland of Loughtown Upper, at Peamount, County Dublin (within the administrative area of South Dublin County Council) and would have capacity for 75ML of treated water supply. In addition, approximately 1.1ha of land would be required on a temporary basis during construction. It would be located at the downstream end of the Treated Water Pipeline from the BPT to the TPR and would be the termination point for the Proposed Project. It would be at this location that the Proposed Project would connect to the existing water supply network of the Greater Dublin Area Water Resource Zone (GDA WRZ). The TPR would consist of an above-ground storage structure, associated underground Scour Water and Overflow Water tanks and a Chlorine Dosing Control Building. The TPR would be a concrete tank divided into three cells and covered with an earth embankment. The top of the TPR would be 11.2m above finished ground level. The Chlorine Dosing Control Building would be 8.4m over finished ground level. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. Power for the TPR would be supplied via an underground connection to the existing electricity substation at Peamount Reservoir. There would be solar panels on top of a portion of the northern cell of the TPR to supplement the mains power supply. A new permanent access road from the R120 would be constructed and would be 5m wide and 342m in length. The TPR site would be bounded by the existing hedgerow to the west and existing fence to the east with a 2.4m high palisade security fence around the permanent infrastructure. The site itself would be landscaped in line with the surrounding environment to reduce its visual impact.
Proposed 38 kV Uprate Works – Power Supply to RWI&PS and WTP	
<p>Proposed 38 kV Uprate Works Ardnacrusha – Birdhill (Power Supply) Counties Clare, Limerick and Tipperary</p>	<ul style="list-style-type: none"> The proposed 38 kV Uprate Works would be necessary to deliver adequate electrical power to the RWI&PS and WTP. The proposed works would include the uprating of the existing Ardnacrusha – Birdhill Line and the replacement of polesets/structures with an underground cable along a section of the Ardnacrusha – Birdhill – Nenagh Line. There would also be works at the existing Birdhill 38 kV electricity substation including the provision of a new 38 kV modular Gas Insulated Switchgear Modular Building, new electrical equipment and lighting, together with new fencing and associated works.
Temporary Infrastructure – Required for Construction Phase Only	
<p>Construction Working Width Counties Tipperary, Offaly, Kildare and Dublin (within the administrative area of South Dublin County Council)</p>	<ul style="list-style-type: none"> A Construction Working Width would be temporarily required for the construction of the RWRMs and the Treated Water Pipeline, and the subsequent reinstatement of the land. The Construction Working Width would generally be 50m in width but would be locally wider near features such as crossings, access and egress points from the public road network, Construction Compounds and Pipe Storage Depots.

Proposed Project Infrastructure	Outline Description of Proposed Project Infrastructure*
<p>Construction Compounds Counties Tipperary, Offaly, Kildare and Dublin (within the administrative area of South Dublin County Council)</p>	<ul style="list-style-type: none"> • Eight Construction Compounds would be temporarily required to facilitate the works to construct the Proposed Project. Five Construction Compounds would be located along the route of the Treated Water Pipeline at the following Infrastructure Sites: RWI&PS, WTP, BPT, BPS and TPR, with an additional three Construction Compounds located at Lisgarraff (County Tipperary), Killananny (County Offaly) and Drummond (County Kildare). Construction Compounds would act as a hub for managing the works including plant/material/worker movement, general storage, administration and logistical support. • The Principal Construction Compound at the WTP would require 30ha of land during construction. • The other three Principal Construction Compounds would require land temporarily during construction ranging between approximately 12ha and 16ha. • The four Satellite Construction Compounds at the other permanent Infrastructure Sites (excluding the FCV) would require land during construction ranging between approximately 3ha and 12ha.
<p>Pipe Storage Depots Counties Tipperary, Offaly and Kildare</p>	<ul style="list-style-type: none"> • Nine Pipe Storage Depots would be temporarily required to supplement the Construction Compounds and would serve the installation of pipe between the WTP and the TPR. • Pipe Storage Depots would take direct delivery of the pipe for storage before onward journey to the required location along the Construction Working Width. • The Pipe Storage Depots would vary in size and require land temporarily during construction generally ranging between approximately 2ha and 7ha but with one site being larger at 11ha.

* Note all land take numbers in this table are affected by rounding to one decimal place.

8. The construction of the Proposed Project is anticipated to run from 2028 through 2032, with the first operational year anticipated to be 2033.
9. This chapter should be read in conjunction with the following EIAR chapters and their appendices, which expand upon aspects of the Proposed Project:
 - Chapter 5 (Construction & Commissioning)
 - Chapter 7 (Traffic & Transport)
 - Chapter 8 (Biodiversity)
 - Chapter 14 (Population)
 - Chapter 15 (Human Health).
10. This chapter is also supported by the following documents:
 - Appendix A12.1 (Dust Mitigation Measures).
11. Figures which are referenced in the text are provided in Volume 5 of this EIAR.
12. This assessment has been undertaken and reported by a team of competent experts. Refer to Chapter 2 (The Environmental Impact Assessment Process) for a description of the qualifications and expertise of the specialists that have inputted to this chapter.

12.2 Methodology

13. An overview of the methodology utilised for the air quality impact assessment is outlined below:
 - A review of the most applicable standards and guidelines
 - Establishment of the baseline for existing air quality using published Environmental Protection Agency (EPA) monitoring data
 - Undertaking predictive calculations and impact assessments relating to the Construction Phase
 - Undertaking predictive calculations to assess the likely significant effects on air quality associated with the Operational Phase

- Identifying mitigation and monitoring measures to reduce the air quality effects associated with the Proposed Project.

14. The assessment has been undertaken with reference to the most applicable guidance documents relating to air quality which are set out in Section 12.2.3. These documents are best practice documents for undertaking air quality assessments and are deemed to be the most appropriate documents to determine the scope and methodology of the assessment based on professional judgement.

12.2.1 Scope of the Assessment

12.2.1.1 Emissions From Plant and Machinery

15. The Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (hereafter referred to as the IAQM Guidance) (IAQM 2024) states that exhaust emissions from on-site plant (also known as non-road mobile machinery) are unlikely to make a significant impact on local air quality, and therefore in the vast majority of cases they do not need to be quantitatively assessed. This IAQM Guidance recommendation in combination with the background air quality (see Section 12.3.2), which is significantly below limit values (Section 12.2.3.1), were used to determine that no significant effect would be likely due to on-site plant and machinery for the Proposed Project and therefore this has not been assessed further in this chapter.

12.2.1.2 Emissions From Vehicles

16. The scope of the road traffic emissions modelling required for the Proposed Project was determined according to the following criteria set out in the TII guidance Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII 2022). These are the appropriate guidance industry-standard documents for assessment of impacts from vehicle emissions on air quality in Ireland. The TII PE-ENV-01106 guidance (2022) states that the following scoping criteria shall be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the Do-Something traffic (i.e. with the Proposed Project) compared to the Do-Minimum (hereafter referred to as the Do-Nothing scenario) traffic (i.e. without the Proposed Project):

- Annual Average Daily Traffic (AADT) changes by 1,000 or more
- Heavy duty vehicle (HDV) AADT changes by 200 or more
- Daily average speed change by 10kph or more
- Peak hour speed change by 20kph or more
- A change in road alignment by 5m or greater.

17. The above scoping criteria were used for determining the requirement for an air quality assessment of traffic emissions for both human and ecological sensitive designated sites in accordance with the requirements of the TII PE-ENV-01106 guidance (2022). The Operational Phase traffic was reviewed (see Chapter 7: Traffic & Transport for further details). Using the scoping criteria above, no Operational Phase road links were classed as 'affected' by the Proposed Project and, therefore, a local air quality assessment was not required as effects would be Imperceptible which is not characterised as a significant impact in accordance with EIA methodology. These were therefore scoped out of the assessment with respect to human and ecological sensitive receptors.

18. The Construction Phase traffic (see Chapter 7: Traffic & Transport for further detail) was also reviewed in line with the above criteria and the potential for impacts to human and ecological receptors. The Construction Phase traffic would increase by over 200 HDV AADT on a number of road links, and therefore the Construction Phase was included within the air quality assessment for both human health and ecological sensitive receptors.

12.2.1.3 Dust Emissions

19. The scope of the dust assessment is set by the IAQM Guidance (2024) and is limited to the Construction Phase only. The Operational Phase has been scoped out of the assessment on the basis that the operation of the pipeline and the permanent Infrastructure Sites would not produce dust or other emissions affecting air quality.

12.2.1.4 Decommissioning Phase

20. The Proposed Project would deliver nationally important strategic infrastructure with individual elements designed with a lifespan of 80 to 100 years. The strategic importance of the Proposed Project for water supply in the Eastern and Midlands Region is such that there is no plan to decommission these structures and Uisce Éireann is committed to maintaining and repairing them into the future. On this basis it is not likely that the structures would be decommissioned, and therefore decommissioning of the Proposed Project has not been considered further in this assessment.

12.2.2 Study Area

21. The Proposed Project extends from the proposed 38 kV Uprate Works, beginning in Clare, to the Termination Point Reservoir (TPR) in Peamount, Dublin. It consists of the elements outlined in Table 12.1. Full details of the Proposed Project can be found in Chapter 4 (Proposed Project Description). The main receptors for emissions to air are people or relevant sensitive ecological habitats. The study area for air quality includes both urban and rural areas containing sensitive residential receptors, as well as designated ecologically sensitive areas.

12.2.2.1 Dust Emissions During Construction

22. For the Construction Phase dust assessment, the study area focused on air quality sensitive receptors within and adjacent to the Planning Application Boundary. The extent of the overall study area was typically up to 250m from the Planning Application Boundary, in relation to dust soiling effects and dust-related human health effects, as per the IAQM Guidance (2024). The study area was extended up to 250m on public roads from the construction site entrance due to the risk of trackout (trackout is the spread of dust from the wheels of vehicles from non-paved site areas to public roads). In relation to dust effects on ecology, the study area was limited to sensitive ecological habitats that are within 50m of the Planning Application Boundary; this is in line with the IAQM Guidance (2024).

12.2.2.2 Emissions From Vehicles

23. The study area with respect to impacts from air quality emissions from vehicle and HDV movements was limited to sensitive receptors and relevant sensitive ecological habitats within 200m from road links, which would be affected by significant changes in traffic flows above the thresholds set out in Section 12.2.1.2 (i.e. above 1,000 AADT or 200 HDVs per day as per the TII PE-ENV-01106 guidance (TII 2022)). Both the Construction and Operational Phases were reviewed with respect to a potential impact from vehicle emissions. Only the Construction Phase traffic met the TII scoping criteria set out in Section 12.2.1.2 and thus a detailed air quality assessment of the Construction Phase traffic was conducted as part of this assessment. The Operational Phase traffic has been scoped out of further assessment as it did not meet the TII scoping criteria.

12.2.3 Relevant Guidelines, Policy and Legislation

24. This chapter has been prepared with regard to the guidance outlined in the following EPA, European Commission (EC) and national guidance documents:
 - Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) (hereafter referred to as the EPA EIAR Guidelines)

- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (EC 2017)
 - Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government 2018).
25. The statutory ambient air quality standards in Ireland are outlined in S.I. No. 739 of 2022 Ambient Air Quality Standards Regulations 2022 (hereafter referred to as the Air Quality Standards Regulations 2022), which incorporate the ambient air quality limits for a range of air pollutants set out in Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (hereafter referred to as the CAFE Directive). Any references to legislation include any amendments thereto.
26. In addition to the specific statutory air quality standards, the assessment has been conducted in accordance with national guidelines, where available, in addition to international standards and guidelines relating to the assessment of ambient air quality impact from road schemes. These include:
- Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2) (IAQM 2024)
 - A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.1) (IAQM 2020)
 - PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (TII 2022)
 - GE-ENV-01107: TII Road Emissions Model (REM): Model Development Report (TII 2025)
 - World Health Organization (WHO) 2021 Air Quality Guidelines (hereafter referred to as the WHO Air Quality Guidelines) (WHO 2021).

12.2.3.1 Ambient Air Quality Standards

27. Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast). This Directive supersedes EU Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (CAFE Directive). It sets out air quality standards for pollutants to be reached by 2030 which are more closely aligned with the WHO Air Quality Guidelines and also includes limit values applicable until 2030.
28. The Ambient Air Quality Standards Regulations 2022 (S.I. 739 of 2022) (the Air Quality Standards Regulations 2022) further transposed the CAFE Directive and revoked the Air Quality Standards Regulations 2011, as amended. With the adoption of Directive (EU) 2024/2881, Ireland must similarly transpose this directive into national law, i.e. update the Air Quality Standards Regulations, before December 2026.
29. The ambient air quality limit values for pollutants are set out in Annex I of Directive (EU) 2024/2881. Table 1 of Annex I in Directive (EU) 2024/2881 sets out the updated air quality limit values for pollutants to be achieved by 1 January 2030; these are more closely aligned with the WHO Air Quality Guidelines. Table 2 of Annex I in Directive (EU) 2024/2881 sets out the limit values for air pollutants which are to be achieved by 11 December 2026 and are also applicable up to 2030. The limit values in Table 2 of Annex I are the same as the limits set under Directive 2008/50/EC and the Air Quality Standards Regulations 2022.
30. The ambient air quality standards applicable for nitrogen dioxide (NO₂) and particulate matter (as PM₁₀ and PM_{2.5}) are outlined in Table 12.2. The limit values set out in Table 1 of Annex I of Directive (EU) 2024/2881 will need to be achieved by 2030, with the limit values set out Table 2 of Annex I of Directive (EU) 2024/2881 applicable until 2030.

31. Air quality significance criteria have been set on the basis of compliance with the appropriate limit values. These standards have been used in the assessment to determine the potential impact of NO₂, PM₁₀ and PM_{2.5} emissions associated with the Proposed Project on ambient air quality.

Table 12.2: Air Quality Limit Values

Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)	Directive (EU) 2024/2881 Limit Type	Limit Value (to be attained by 2030)
Nitrogen Dioxide (NO ₂)	Hourly limit for protection of human health – not to be exceeded more than 18 times/year	200µg/m ³	Hourly limit for protection of human health – not to be exceeded more than 3 times/year	200µg/m ³
	n/a	n/a	24-hour limit for protection of human health – not to be exceeded more than 18 times/year	50µg/m ³
	Annual limit for protection of human health	40µg/m ³	Annual limit for protection of human health	20µg/m ³
Nitrogen Oxides (NO _x)	Critical level for protection of vegetation (Annual)	30µg/m ³	Critical level for protection of vegetation (Annual)	30µg/m ³
Particulate Matter (as PM ₁₀)	24-hour limit for protection of human health – not to be exceeded more than 35 times/year	50µg/m ³	24-hour limit for protection of human health – not to be exceeded more than 18 times/year	45µg/m ³
	Annual limit for protection of human health	40µg/m ³	Annual limit for protection of human health	20µg/m ³
Particulate Matter (as PM _{2.5})	n/a	n/a	24-hour limit for protection of human health – not to be exceeded more than 18 times/year	25µg/m ³
	Annual limit for protection of human health	25µg/m ³	Annual limit for protection of human health	10µg/m ³

32. Ambient air quality limit values for ammonia (NH₃) are not included within Directive (EU) 2024/2881. Ammonia emissions have the potential to impact vegetation and sensitive ecology. The United Nations Economic Commission for Europe (UNECE) Report on the Workshop on Atmospheric Ammonia: Detecting Emission Changes and Environmental Impacts (UNECE 2007) has set annual mean limit values for ammonia as shown in Table 12.3. The limit value ranges from 1µg/m³ for lichens and bryophytes to 3µg/m³ for higher plants.

Table 12.3: Air Quality Limit Values for Ammonia

Pollutant	Regulation ^{Note 1}	Limit Type	Value
Ammonia (NH ₃)	United Nations Economic Commission for Europe (UNECE) Report on the Workshop on Atmospheric Ammonia: Detecting Emission Changes and Environmental Impacts	Annual mean for the protection of vegetation	1 – 3µg/m ³ ^{Note 1}

Note 1: Established by the Working Group on Effects of the UNECE Report on the Workshop on Atmospheric Ammonia: Detecting Emission Changes and Environmental Impacts (2007). Annual, long-term, critical levels have been set to 1µg/m³ for lichens and bryophytes, and 3µg/m³ for higher plants.

12.2.3.2 WHO Air Quality Guidelines and Clean Air Strategy

33. In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland (Government of Ireland 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target (IT) 3 by 2026, the IT4 targets by 2030 and the final targets by 2040 (shown in Table 12.4). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final PM_{2.5} target of 5µg/m³. The strategy also acknowledges that *'meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both PM_{2.5} and NO₂'*.
34. Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that *'Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II.'*
35. These assessment thresholds relate to monitoring of ambient air quality by Member States, where *'exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years.'*

Table 12.4: WHO Air Quality Guidelines

Pollutant	Regulation	Limit Type	IT3 (2026) (µg/m ³)	IT4 (2030) (µg/m ³)	Final Target (2040) (µg/m ³)
NO ₂	WHO Air Quality Guidelines	24-hour limit for protection of human health	-	-	25
		Annual limit for protection of human health	20	-	10
PM (as PM ₁₀)	WHO Air Quality Guidelines	24-hour limit for protection of human health	75	50	45
		Annual limit for protection of human health	30	20	15
PM (as PM _{2.5})	WHO Air Quality Guidelines	24-hour limit for protection of human health	37.5	25	15
		Annual limit for protection of human health	15	10	5

36. The appropriate limits for the Construction Phase and Operational Phase assessments of air quality impacts of the Proposed Project are those outlined in Table 12.2. The post-2030 limit values stipulated in Table 1 of Annex I in Directive (EU) 2024/2881 have been used in the Construction Phase and Operational Phase assessments for the Proposed Project. While the Construction Phase is anticipated to run over a c.5-year period, some of which will be prior to 2030, the use of the more stringent post-2030 limit values set out in Directive (EU) 2024/2881 ensures a conservative approach to the air quality assessment.

12.2.3.3 Dust Deposition Limits

37. With regards to larger dust particles that can give rise to dust soiling, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction of a development in Ireland. The German TA Luft standard for dust deposition (German Federal Government 2002) (non-hazardous dust) sets a maximum permissible emission level for dust deposition of 350mg/m²/day averaged over a one-year period at any receptors outside the site boundary.

38. Recommendations from the Department of the Environment, Heritage and Local Government (DEHLG) (2004) apply the TA Luft limit of 350mg/m²/day to the site boundary of quarries. This guidance value can be implemented with regard to dust impacts from the construction of the Proposed Project. In addition, Dublin City Council has published a guidance document titled Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition (2018); however, this guidance does not specify a guideline value.

12.2.3.4 Policy – County Development Plans

39. Air quality is a focus of the various local authority areas the Proposed Project would pass through: Clare County Council, Limerick City and County Council, Tipperary County Council, Offaly County Council, Kildare County Council and South Dublin County Council. The county development plans for these councils were reviewed in order to determine specific policies or objectives in relation to air quality within the local authority areas. The development plans reviewed are:

- Clare County Development Plan 2023 – 2029 (Clare County Council 2023)
- Limerick Development Plan 2022 – 2028 (Limerick City and County Council 2022)
- Tipperary County Development Plan 2022 – 2028 (Tipperary County Council 2022)
- Offaly County Development Plan 2021-2027 (Offaly County Council 2021)
- Kildare County Development Plan 2023 – 2029 (Kildare County Council 2023)
- South Dublin County Development Plan 2022 – 2028 (South Dublin County Council 2022).

40. The county development plans for all six councils discuss how air quality is essential in ensuring a high-quality environment for the wellbeing of the population. Each development plan sets out broadly similar policies and objectives in relation to air quality which focus on maintaining good air quality within the local authority area to help prevent harmful effects on human health and the environment. The development plans also set out how it is an objective of the councils to improve air quality within the local authority area through, for example, the support of sustainable modes of transport, renewable energy, promotion of energy efficient buildings and homes and urban greening.

41. The air quality assessment for the Proposed Project has been undertaken to determine the potential for significant impacts. The Proposed Project would not result in a significant increase in ambient pollutant concentrations as outlined in Sections 12.4 and 12.6 and no significant air quality impacts are predicted. Therefore, the Proposed Project is aligned with and complies with the county development plan objectives in relation to air quality.

12.2.4 Data Collection Methods

12.2.4.1 Desk Study

42. A desk-based air quality assessment was carried out following TII PE-ENV-01106 guidance (2022). TII states that, wherever possible, use should be made of existing quality assured air quality monitoring data such as that undertaken by the EPA. Air quality monitoring programmes have been undertaken in recent years by the EPA and local authorities. The most recent annual report, Air Quality in Ireland 2024 (EPA 2025), details the range and scope of monitoring undertaken throughout Ireland. The baseline air quality data collected through the desk study is detailed in Section 12.3.
43. As part of the air quality assessment, digital maps, including those provided by the EPA, National Parks and Wildlife Service and Google Earth®, were used to determine the relevant land use in the region of the Proposed Project.

12.2.4.2 Field Surveys

44. The EPA and local authority data referred to in Section 12.2.4.1 and Section 12.3 are based on ongoing monitoring programmes. This background data was sufficient for the purpose of the assessment of the Proposed Project. No further field surveys or monitoring were therefore required.

12.2.5 Consultations

45. Consultation responses from key stakeholders, landowners and the public were reviewed and considered in compiling this chapter. Chapter 2 (The Environmental Impact Assessment Process) of the EIAR sets out the approach the Proposed Project has taken with regard to environmental scoping, in particular the EIAR Scoping Methodology Report (Uisce Éireann 2023) in respect of the Proposed Project and also the Environmental Impact Statement Scoping Report¹ (Irish Water 2016) relating to a previous iteration of the project.

46. The scoping consultation responses relevant to air quality received from stakeholders are provided in Table 12.5. Further detail on the Proposed Project consultation is included in Chapter 2 (The Environmental Impact Assessment Process) and responses received are in the Water Supply Project: Eastern and Midlands Region – Consultation Report, which forms part of the Strategic Infrastructure Development planning application for the Proposed Project.

Table 12.5: Principal Air Quality Issues Raised During Scoping Consultation

Consultee	Comment	Relevant EIAR Section
Laois County Council	It is the Council's view that the air quality impact assessment must include assessments of the impact of the proposal on climate change. No mention is made of fuel/power, chemical and other material requirements (concrete, quarried materials etc.) and associated emissions to air for the Construction or Operational Phases.	Chapter 13 (Climate) (Section 13.4) includes an embodied carbon assessment for the Construction Phase which includes both materials and fuel/power.
Health Service Executive (HSE)	The EIA should identify food premises within 500m of construction which are sensitive to dust deposition. Mitigation to negate impacts on food should be included.	Construction Phase dust impacts are limited to locations (including food premises) within 250m of the Planning Application Boundary, as per the IAQM Guidance (2024). The assessment within this chapter has focused on this study area. Section 12.5 discusses dust mitigation measures put in place to negate impacts. The measures will be put in place across the Proposed Project and are focused on dust soiling and human health effects but are also applicable to impacts on food premises. Human Health effects due to air quality and pollutant emissions are addressed in Chapter 15 (Human Health).
HSE	If averaging dust deposition standards are used to evaluate the significance of dust then a maximum daily limit should be included in the assessment.	The TA Luft limit of 350mg/m ² /day is the standard good practice limit applied in relation to dust deposition from construction works. Compliance with the limit is based on monthly sampling, with the maximum permissible emission level for dust deposition averaged over a one-year period. This standard good practice approach will be used for the Proposed Project. There is no guidance stipulating a maximum daily limit for dust deposition and the monitoring methodology is based on monthly sampling, therefore, a daily limit would not be feasible.
Laois County Council	No mention is made of the effects of greenhouse gas emissions arising from the Construction or Operational Phases and the impact of the proposal on climate change.	Chapter 13 (Climate) (Section 13.4) includes an assessment of the predicted emissions of greenhouse gases which addresses the queries of Laois County Council.

¹ As set out in Chapter 2 (The Environmental Impact Process), the Environmental Impact Statement Scoping Report (Irish Water 2016) was based on a previous iteration of the project, however, feedback received from stakeholders informed future scoping and design development and has been considered in this chapter where relevant to the Proposed Project.

12.2.6 Appraisal Method for the Assessment of Impacts

12.2.6.1 Local Air Quality Assessment – Emissions from Vehicles – Human Receptors

47. The assessment of air quality effects from emissions from vehicles has been carried out using the methodology outlined in the TII PE-ENV-01106 guidance (2022). This approach recommends that the assessment should be based on the risk of failing to achieve the air quality standards. The more likely a project is to result in a breach of the air quality standards, the more complex or detailed the assessment needs to be. The following steps were taken in the process used to determine the assessment approach and the level of modelling required for the roads that met the scoping criteria set out in Section 12.2.1.2:

- Define the study area
- Determine whether simple or detailed modelling was required
- Determine the outputs needed from the modelling
- Identify the inputs to the model
- Define the modelling approach
- Identify any limitations or assumptions
- Determine the significance criteria.

48. The above steps are described in the following sections.

12.2.6.1.1 Study Area

49. The study area and scope of assessment was determined using the criteria in Section 12.2.1. The TII criteria state that receptors within 200m of impacted road links should be assessed; roads which are greater than 200m from receptors would not impact pollutant concentrations at that receptor (TII 2022).

50. Within the study area, high-sensitivity receptors with respect to human health are any locations that people spend extended periods of time such as residential properties. Schools, hospitals and nursing homes are also considered receptors of high sensitivity. Other sensitive receptor locations include places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present. Commercially-sensitive horticultural areas are also considered as receptors as per the IAQM Guidance (2024).

12.2.6.1.2 Simple or Detailed Modelling

51. The complexity of the modelling required for the Proposed Project was determined according to the following criteria set out in the TII PE-ENV-01106 guidance (2022).

52. The TII PE-ENV-01106 guidance (2022) states that either detailed dispersion modelling or screening modelling using the TII Roads Emissions Model (REM) is required and the decision on the most appropriate software to use is based on the existing air quality and the complexity of the scheme. The following criteria are used to determine the most appropriate modelling software for the air quality assessment:

- Detailed dispersion modelling: if the existing air quality exceeds 90% of the air quality limit values or sensitive receptors exist within 50m of a complex road layout (e.g. grade-separated junctions, hills)
- TII REM: if the existing air quality is less than 90% of the air quality limit values or for simple schemes (e.g. small junction improvements, junction changes).

53. The existing air quality in the region of the Proposed Project is not in exceedance of 90% of the air quality limit values (Section 12.3.2). Additionally, the Proposed Project does not create complex road layouts, as construction and operational traffic would utilise the existing road network. Therefore, an assessment of traffic emissions using the TII REM model was deemed the most appropriate approach for this assessment.

12.2.6.1.3 *Model Outputs*

54. The TII PE-ENV-01106 guidance (2022) states that modelling should be conducted for NO₂, PM₁₀ and PM_{2.5} for the Do-Nothing (i.e. without the Proposed Project in place) and Do-Something (i.e. with the Proposed Project in place) scenarios. Modelling of NO₂, PM₁₀ and PM_{2.5} concentrations has been conducted for the Do-Nothing and Do-Something scenarios using the TII REM online calculator tool (TII 2025).
55. Therefore, the modelling outputs consisted of calculated concentrations of key pollutants (NO₂, PM₁₀ and PM_{2.5}) at representative sensitive receptors which have the potential to be affected by the Proposed Project.

12.2.6.1.4 *Model Inputs*

56. The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) AADT, HDV AADT, annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The Default fleet mix option was selected along with the Intermediate Case fleet data for cars, internal combustion engine (ICE) Sales Ban for Light Goods Vehicles (LGVs) and EU target projections for Heavy Goods Vehicles (HGVs), as per TII Guidance (TII 2022, TII 2025). The Intermediate Case assumes a linear interpolation between the Business as Usual case – where current trends in vehicle ownership continue – and the Climate Action Plan (CAP) case – where adoption of low emission light duty vehicles occurs. The ICE Sales Ban 2035 option for LGVs presents a sales ban on new combustion engine vehicles to be implemented by 2035. The EU Targets option for HGVs represents interim targets for emissions from sales of new HGVs.
57. Modelling of traffic emissions from the Operational Phase of the Proposed Project was scoped out of the assessment as none of the road links affected by the Proposed Project meet the air quality assessment scoping criteria outlined in Section 12.2.1.2.
58. Construction Phase traffic emissions were scoped in for assessment as there would be a greater than 200 HDV AADT change on 20 no. road links as a result of the Proposed Project (see Figure 12.1 to Figure 12.9). Due to the large scale of the Proposed Project, the peak construction year is anticipated to range from 2028 to 2032 depending on the area of the Proposed Project under construction. Traffic data for the peak construction years for the impacted road links was supplied by TOBIN Consulting Engineers. The traffic data used in the air quality assessment is detailed in Table 12.6. The network analysis of the Haul Roads is provided in Section 7.4 of Chapter 7 (Traffic & Transport).

Table 12.6: Traffic Data Used in Construction Phase Air Quality Modelling Assessment

Road Name	Link ID	Speed (kph)	Peak Construction Year		Link Length (km)	Road Type	County
			Do-Nothing	Do-Something			
			LDV AADT (HDV AADT)	LDV AADT (HDV AADT)			
R445	C	69	3303 (438)	3553 (755)	2.00	Rural	Tipperary
N52	H	74	5726 (890)	5740 (1546)	2.10	Rural	Tipperary
N52N Main Street	I	74	9226 (851)	9580 (1491)	0.41	Urban	Tipperary
N52	N	74	15563 (1400)	16027 (1842)	0.44	Urban	Offaly
N52 Wilmer Road	O	74	16576 (1305)	16822 (1601)	0.68	Urban	Offaly
N62	P	74	9417 (316)	9491 (742)	3.06	Urban	Tipperary
N52 Bridge Street	V	74	7514 (853)	7980 (1136)	9.45	Rural	Offaly
R421	Y	69	1107 (144)	1398 (549)	3.90	Rural	Offaly
N80	AB	74	7281 (1798)	7712 (2031)	1.39	Urban	Offaly
N80 S	AE	74	13467 (1347)	13898 (1581)	0.74	Urban	Laois
R422 Lord Edward Street	AF	69	10259 (699)	12844 (932)	0.62	Urban	Laois
R420 W	AI	69	12815 (743)	12897 (948)	0.98	Urban	Laois
R419 Spa Street	AJ	69	6804 (367)	7290 (660)	0.52	Urban	Laois
R420 Link Road	AK	69	11915 (642)	11996 (1133)	0.28	Urban	Laois
R400 SW	AL	69	964 (56)	1045 (536)	10.85	Rural	Offaly
R402 Father Kearns Street	AN	69	16263 (951)	16436 (1264)	0.33	Urban	Offaly
R402	AR	69	7131 (1176)	7182 (1625)	1.98	Rural	Kildare
R403 E	AS	69	7788 (612)	8460 (817)	4.06	Rural	Kildare
R407 S	AV	69	14597 (1438)	14721 (1662)	3.59	Rural	Kildare
R407	AY	69	17412 (2566)	17809 (3032)	1.59	Rural	Kildare

12.2.6.1.5 Model Approach

59. Using this input data, the model predicts the road traffic contribution to ambient ground level concentrations at the identified sensitive receptors using generic meteorological data. The TII REM uses county-based Irish fleet composition for different road types, for different European emission standards from pre-Euro to Euro 6/VI with scaling factors to reflect improvements in fuel quality, retrofitting, and technology conversions. The TII REM also includes emission factors for PM₁₀ emissions associated with brake and tyre wear (TII 2025). The predicted road contributions are then added to the existing background concentrations to give the predicted ambient concentrations. The ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the Proposed Project with these ambient air quality standards.
60. The impacts from Haul Road links which exceeded the TII Guidance (2022) scoping criteria in Section 12.2.1.2 were modelled using the TII REM. The sensitive receptors within 200m of the impacted road links were reviewed. A representative receptor in closest proximity to the road link was selected for the modelling. The receptors in closest proximity to the impacted road links would experience the greatest pollutant concentrations with concentrations decreasing with increasing distance from the road. Therefore, the selection of the closest receptor ensured the worst-case impact was assessed. Other receptors within 200m of the impacted road links would experience similar or lesser changes in pollutant concentrations. The sensitive receptors included in the modelling are detailed in Table 12.7 and shown in Figure 12.1 to Figure 12.9.

Table 12.7: Sensitive Receptors Modelled

Receptor ID	Link ID	Road Name	Distance to Road (m)
R1	C	R445	40.9
R2	H	N52	41.2
R3	I	N52N Main Street	14.4
R4	N	N52	10.0
R5	O	N52 Wilmer Road	30.3
R6	P	N62	18.5
R7	V	N52 Bridge Street	34.4
R8	Y	R421	17.0
R9	AB	N80	21.5
R10	AE	N80 S	15.0
R11	AF	R422 Lord Edward Street	13.0
R12	AI	R420 W	9.4
R13	AJ	R419 Spa Street	8.1
R14	AK	R420 Link Road	22.0
R15	AL	R400 SW	16.9
R16	AN	R402 Father Kearns Street	24.1
R17	AR	R402	29.2
R18	AS	R403 E	18.4
R19	AV	R407 S	18.0
R20	AY	R407	21.5

12.2.6.1.6 Limitations and Assumptions

61. For the purposes of this assessment the following assumptions have been made:

- The peak Construction Phase traffic was modelled as occurring over a full one-year period (assessment year of 2030), whereas in reality the peak traffic would occur for shorter durations (weeks/months) at individual locations
- The assessment year of 2030 was selected for the purposes of the air quality modelling of traffic emissions. 2030 would be the predominant peak construction year based on the traffic data. While the Construction Phase would occur over a 5-year period beginning in 2028 and concluding in 2032. The use of the most common year of 2030 was considered appropriate. Additionally, this aligns with assessment of predicted pollutant concentrations against the more stringent post-2030 air quality limit values as per Table 12.2
- The current background concentrations, as established in Section 12.3.2, were used in the air quality assessment of traffic emissions for the peak construction year of 2030 as a conservative approach in order to predict pollutant concentrations in future years. This is in line with the TII methodology (TII 2022)
- Where average speeds were measured within the traffic survey, this value has been used for modelling. In the absence of this data, for some links the average speed across similar road types (i.e. local roads, regional roads or national roads) has been used.

62. The above assumptions have not prevented a full and comprehensive assessment of the potential effects to air quality as a result of the Proposed Project. The conclusions and significance ratings determined are considered reasonable and appropriate.

12.2.6.1.7 Air Quality Effect Significance Criteria – Human Receptors

63. The TII PE-ENV-01106 guidance (2022) details a methodology for determining air quality effect significance criteria for road schemes which can be applied to any project that causes a change in traffic. The TII criteria follow the EPA criteria (as outlined in Chapter 2: The Environmental Impact Assessment Process) which include determining the quality, extent, context, probability, duration, frequency and significance of effects. TII (2022) state that for a construction phase the effects align with the duration of works and any associated changes in traffic. These effects are considered reversible once works cease. Additionally, in relation to the duration of effects, only durations of time that impact on annual averages are considered to be potentially significant in most incidences according to TII (2022). Therefore, impacts lasting less than a year are generally not significant.
64. The TII PE-ENV-01106 (2022) significance criteria are based on a two stepped approach. Step 1 involves describing the impact at the receptors assessed (as per the criteria in Table 12.8). Step 2 is then to determine the overall significance in terms of air quality. For Step 1, the degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do-Nothing scenario. The TII impact descriptor criteria are outlined in Table 4.9 of PE-ENV-01106 (TII 2022) and are reproduced in Table 12.8. These criteria have been adopted for the Proposed Project to predict the effect of NO₂, PM₁₀ and PM_{2.5} emissions as a result of traffic from the Proposed Project.

Table 12.8: TII Air Quality Impact Descriptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Limit Value (AQLV)			
	1%	2–5%	6–10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Source: TII (2022) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106

65. As per Table 12.8 a neutral effect is one where a change in concentration at a receptor is:
- 5% or less where the opening year, without the proposed development, annual mean concentration is 75% or less of the standard; or
 - 1% or less where the opening year, without the proposed development, annual mean concentration is 94% or less of the standard.
66. Where an effect does not meet the criteria for neutral, as described above, the effect can either be positive or negative. The TII guidance (2022) states that *‘the evaluation of significance of effects for the operational phase should be undertaken for the opening year only as the design year is likely to show lower total pollutant concentrations and changes in concentration’* (TII 2022).
67. Step 2 is determining the significance of effects. Non-significant effects (i.e. of local importance only as per the TII guidance (2022)) are ‘neutral’ or ‘slight’ changes in concentrations while significant effects can be changes in pollutant concentrations that are either ‘moderate’ or ‘substantial’. However, the TII guidance (2022) states that these must be considered in the context of the project and ‘moderate’ or ‘substantial’ increases are not necessarily always significant effects.

68. Whilst it may be determined that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors (as per the criteria in Table 12.8), an overall judgement is required to be made of whether the Proposed Project is likely to have a 'significant' or 'not significant' effect on air quality. The TII PE-ENV-01106 guidance has a number of factors to be considered when determining the significance of changes in pollutant concentrations:
- The number of people affected by increases and/or decreases in concentrations and a judgement on the overall balance
 - The number of people exposed to levels above the air quality limit values (Table 12.2)
 - Whether or not the exceedance of an air quality limit value is predicted to arise in the study area where none existed before, or the size of an exceedance area is substantially increased
 - Whether or not the study area exceeds an air quality limit value and this exceedance is removed, or the size of the exceedance study area is reduced
 - Uncertainty, including the extent to which worst-case assumptions have been made
 - The extent to which an air quality limit value is exceeded e.g. an annual mean NO₂ of 41 µg/m³ should attract less weight in the determination of significance than an annual mean of 51 µg/m³.
69. The impact descriptors in Table 12.8 have been used to describe the impact at the modelled receptor locations, and the significance of the impacts was then determined, aligning with the terminology in the EPA EIAR guidelines (EPA 2022). In the context of the Proposed Project, where the changes in traffic result in Neutral to Slight Adverse increases (see Table 12.8) in pollutant concentrations at the worst-case receptors assessed, the air quality in the area is predicted to remain in compliance with the ambient air quality limit values, and the effect is considered Not Significant.

12.2.6.2 Local Air Quality Assessment – Emissions From Vehicles – Ecological Receptors

70. In addition to assessing the impact to people as a result of air quality, the impact to sensitive ecosystems has also been assessed as per the TII PE-ENV-01106 guidance (2022). Sensitive ecological habitats include internationally, nationally and locally designated sites of ecological importance, referred to as 'designated habitats' within the TII PE-ENV-01106 guidance (2022). According to TII PE-ENV-01106 guidance, designated habitats may include: Ramsar sites, Special Protection Areas (SPAs) and proposed sites (pSPAs), Special Areas of Conservation (SACs) and proposed sites (pSACs), Natural Heritage Areas (NHAs), and proposed NHAs (pNHAs), ancient woodland, veteran trees, Nature Reserves, National Parks, Refuge for Fauna and Flora, Wildfowl Sanctuaries, Biogenetic Reserves and United Nations Educational, Scientific and Cultural Organization Biosphere Reserves.
71. The assessment requires the air quality specialist to liaise with an ecologist on schemes where there is a designated site within 2km of the route. However, as the potential impact of a scheme is limited to local level, detailed consideration need only be given to roads where there is a significant change to traffic flows (>1,000 AADT or >200 HDV AADT) and the designated site lies within 200m of the road centre line. Where these two requirements are fulfilled, the assessment involves a calculation of nitrogen oxides (NO_x) and ammonia (NH₃) concentrations in order to determine the nitrogen (N) deposition and acid deposition rates using the methodology set out in TII PE-ENV-01106 guidance (2022).
72. The following steps were taken in the process used to determine the assessment approach for ecological receptors:
- Determine whether modelling was required
 - Determine the outputs needed from the modelling
 - Define the modelling approach
 - Determine the method for calculating deposition levels from emissions
 - Determine the significance criteria.

73. The above steps are described in the following sections.

12.2.6.2.1 Determining the Need for Modelling

74. The need for the modelling of ecological receptors was determined using the criteria in Section 12.2.1.2. Where there were relevant designated ecological sites within 200m of road links experiencing a greater than 1,000 AADT change or greater than 200 HDV AADT change in traffic as a result of the Proposed Project then there is the potential for impacts to sensitive ecology due to NO_x, NH₃, N deposition and acid deposition and thus an assessment is then undertaken. There are five sites of sensitive ecology that required inclusion in the modelling assessment. These are listed in Table 12.9 and shown in Figure 12.1 to Figure 12.9.

Table 12.9: Ecological Sites included in Air Quality Assessment

Site	Site Code	Area/Townland	Road ID	Distance from Eco Site to Road (m)
Lower River Shannon SAC	002165	Birdhill	Link C	6
River Barrow and River Nore SAC	002162	Mountmellick	Link AE	0
River Barrow and River Nore SAC	002162	Mountmellick	Link AF	40
River Barrow and River Nore SAC	002162	Portarlinton	Link AI	0
River Barrow and River Nore SAC	002162	Portarlinton	Link AJ	0
River Barrow and River Nore SAC	002162	Portarlinton	Link AK	90
Grand Canal pNHA	002104	Killina	Link AR	5
Kilcormac Esker pNHA	000906	Blue Ball	Link V	101

75. Further detail on these designated sites can be found in Chapter 8 (Biodiversity).

12.2.6.2.2 Determining the Model Outputs

76. The TII PE-ENV-01106 guidance (2022) states that for sensitive ecology, modelling should include nitrogen oxides (NO_x) and ammonia (NH₃) concentrations in order to determine the N deposition and acid deposition rates as these are relevant with respect to impacts to ecology from traffic emissions. Therefore, the model outputs focused on these parameters.

12.2.6.2.3 Modelling Approach

77. The TII PE-ENV-01106 guidance (2022) states that where pollutant concentrations are less than 90% of the air quality limit values and where there are no unusual or complex features then the TII REM screening model is appropriate. Modelling using the TII REM was conducted for the relevant sensitive habitats. The assessment consisted of modelling individual ecological receptors at the closest distance to the road centreline. Where the affected road links directly cross a section of the designated sites a distance of 0m was selected. The greatest impacts would occur in closest proximity to the source of the emissions (the road) and therefore this represents a precautionary assessment.

78. Road traffic emission rates for NH₃ were generated using the best available method at the time of undertaking the assessment, namely the Calculator for Road Emissions of Ammonia Tool developed by Air Quality Consultants (2025), as recommended by the TII guidance (TII 2022, 2025).

12.2.6.2.4 Determining Deposition Rates

79. The TII PE-ENV-01106 guidance (2022) outlines a methodology to derive the road contribution to dry deposition and thereafter to compare with the published critical loads for the appropriate habitat. The TII REM has the necessary calculation embedded within it to provide N deposition and acid deposition rates based on the calculated NO_x and NH₃ concentrations.
80. The REM uses the conversion factors outlined in Table 12.10 for NO₂ and NH₃ based on the methodology of AQTAG06 – Technical Guidance On Detailed Modelling Approach For An Appropriate Assessment For Emissions To Air (UK Environment Agency 2014) and the IAQM (2020).

Table 12.10: NO₂ and NH₃ N Deposition Conversion Factors (TII 2022)

Habitat Type	NO ₂ Conversion Factor	NH ₃ Conversion Factor
Grassland and similar habitats	1µg/m ³ of NO ₂ = 0.14kgN/ha/yr	1µg/m ³ of NH ₃ = 5.2kgN/ha/yr
Forestry and similar habitats	1µg/m ³ of NO ₂ = 0.29kgN/ha/yr	1µg/m ³ of NH ₃ = 7.8kgN/ha/yr

81. The N deposition is then converted to an acid deposition within the REM software using a conversion factor of 0.071429keqN/ha/yr for all habitat types.
82. N deposition and acid deposition are calculated for both the road contribution of NO₂ and NH₃, and these are then summed along with the background deposition rates in order to calculate the total N deposition and acid deposition at each sensitive designated habitat.
83. Background concentrations for NO_x, NH₃, N deposition and acid deposition at the closest point to the modelled road within each modelled designated habitat were derived from the 1km grid square concentrations provided on the Air Pollution Information System (APIS) website (UK Centre for Ecology and Hydrology 2025), in line with UK Environment Agency (2014) and UK Department for Environment, Food and Rural Affairs (Defra) (2022) Local Air Quality Management guidance, as shown in Section 12.3.2.4 and Table 12.21. These background concentrations were input into the REM to complete the necessary calculations.

12.2.6.2.5 Air Quality Impact Significance Criteria – Ecological Receptors

84. The Air Quality Standards Regulations 2022 (Table 12.2) outline an annual critical level of 30µg/m³ for NO_x for the protection of vegetation and natural ecosystems in general. The CAFE Directive defines 'Critical Levels' as '*a level fixed on the basis of scientific knowledge, above which direct adverse effects may occur on some receptors, such as trees, other plants or natural ecosystems but not on humans*'.
85. The TII PE-ENV-01106 guidance (2022) outlines the assessment of significance of effects at sensitive designated habitats (Section 4.10.2 and Table 4.11 of the guidance), stating that if the total N deposition and acid deposition (due to the Proposed Project plus background concentrations) are more than 1% of the critical loads then the modelled results should be discussed further with the project ecologist.
86. A 'Critical Load' is defined by the UNECE as a quantitative estimate of an exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge (UNECE 2010).
87. To determine if the air quality impacts at a sensitive designated habitat are significant, the project ecologist shall consider:
- Factors such as the nature of site management
 - Other factors such as regular flooding in maintaining a suitable habitat
 - The degree of sensitivity of fauna to relatively subtle changes in botanical composition

- Whether nitrogen or phosphorus is the key limiting nutrient
 - The extent of the sensitive designated site that is negatively affected.
88. The assessment considers the absolute impact of the Proposed Project, i.e. the predicted pollutant concentrations due to the Proposed Project plus background concentrations. The assessment also considers the degree of change in pollutant concentrations between the Do-Nothing and Do-Something scenarios to determine how much the Proposed Project is contributing to predicted concentrations. The degree of change has been taken into consideration when assessing the significance of effects. If significant effects are determined, site survey information is required to determine if the sensitive habitat of relevance is actually present in the affected area and to inform potential mitigation measures that may be required.
89. Critical loads for N deposition and acid deposition were derived from the APIS website (UK Centre for Ecology and Hydrology 2025), as per the TII PE-ENV-01106 guidance (2022). These are only available for internationally designated habitats (SPA and SAC). Critical loads for the nationally designated habitats or proposed designated habitats can be derived by searching APIS for the habitat type, rather than a specific site. The critical loads used for the current assessment are detailed in Table 12.11. Ecological sites are designated for various sensitive species or qualifying interests which each have their own individual critical load ranges to account for the varying sensitivity in the species types. To ensure a conservative approach to the assessment, the results of the modelling assessment of traffic emissions have been compared against the lowest critical load ranges for the most sensitive species within the designated ecological sites regardless of whether that species is present in the impacted area. Where predicted pollutant levels are within the upper threshold of the critical load then the levels are deemed to be in compliance and not in exceedance of the critical load.

Table 12.11: Critical Loads for Nitrogen and Acid Deposition

Designated Site	Pollutant	Potential Sensitive Ecology Present for Determining Critical Load	Critical Load Range
Grand Canal pNHA	N deposition	Calcareous grassland	5–10kgN/ha/yr
	Acid deposition	Calcareous grassland	0.714–5.146keqN/ha/yr
Kilcormac Esker pNHA	N deposition	Old sessile oak woods with Ilex and Blechnum in the British Isles	10–15kgN/ha/yr
	Acid deposition	Old sessile oak woods with Ilex and Blechnum in the British Isles	0.286–5.069keqN/ha/yr
Lower River Shannon SAC	N deposition	Estuaries/Coastal lagoons	5–10kgN/ha/yr
	Acid deposition	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>)	0.714–6.558keqN/ha/yr
River Barrow and River Nore SAC	N deposition	Estuaries/Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>)	5–10kgN/ha/yr
	Acid deposition	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	0.714–6.13keqN/ha/yr

12.2.6.3 Dust Impact Assessment

90. The IAQM Guidance (2024) gives guidance to air quality consultants and environmental health officers on how to assess air quality impacts from construction activities. The IAQM Guidance provides a method for classifying the significance of effect from construction activities based on the ‘dust magnitude’ (high, medium or low) and proximity of the site to the closest receptors. The guidance recommends that once the significance of effect from construction is identified, the appropriate mitigation measures are implemented. The guidance notes that once the appropriate mitigation measures are applied, in most cases the resulting dust impacts can be reduced to negligible levels.

91. Sensitivity to dust depends on the duration of the dust deposition, the dust-generating activity and the nature of the deposit. Therefore, a higher tolerance of dust deposition is likely to be shown if only short periods of dust deposition are expected and the dust-generating activity is either expected to stop or move on. Due to the scale of the Proposed Project, construction activities would take place for extended periods and therefore detailed consideration of potential dust impacts, and how to mitigate them, was appropriate.
92. The IAQM Guidance considers the potential for dust emissions from dust-generating activities including:
- Demolition – any activity involved with the removal of an existing structure (or structures)
 - Earthworks – the processes of soil-stripping, ground-levelling, excavation and landscaping
 - Construction – any activity involved with the provision of a new structure (or structures), its modification or refurbishment
 - Trackout – the transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then resuspended by vehicles using the network.
93. For each of these dust-generating activities, the guidance considers three separate effects:
- Annoyance due to dust soiling
 - The risk of health effects due to a significant increase in PM₁₀ exposure
 - Harm to ecological receptors.
94. The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM₁₀ exposure. The sensitive receptor types are listed in Table 12.14.
95. The methodology takes into account the scale to which the above effects are likely to be generated (classed as small, medium or large), along with the levels of background PM₁₀ concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the site. Suitable mitigation measures are also proposed to reduce the risk of dust emission from the site. TII PE-ENV-01106 guidance (2022) recommends the use of the IAQM Guidance for undertaking a dust assessment. The steps for this assessment are outlined below.

12.2.6.3.1 Step 1: Screen the Need for Detailed Assessment

96. The first step is the initial screening to determine whether a detailed assessment is required. According to the IAQM Guidance, an assessment is required where there are sensitive receptors within 250m of the site boundary, and for ecological receptors within 50m of the site boundary and/or within 50m of the route(s) used by the construction vehicles on the public highway up to 250m from the entrance(s) of a large site.
97. There are sensitive dust and human health receptors within 250m of the Planning Application Boundary, an assessment of the air quality effects is therefore required. The criteria for determining the sensitivity of the area to dust soiling and human health, in comparison to distance from the dust source, is described in Table 12.15 and Table 12.16 respectively and the sensitivity of the area is set out in Table 12.18.
98. The following ecological sensitive areas are in close proximity to the Proposed Project (as per above thresholds, within 50m). The criteria for determining sensitivity is in Table 12.17 and the sensitivity of the area is described in Table 12.18. The potential air quality effects on these receptors are screened in for further assessment:
- Lower River Shannon SAC
 - Grand Canal pNHA
 - Annaghmore Lough Fen (Offaly) pNHA.

12.2.6.3.2 Step 2: Assess the Risk of Dust Impacts Arising

99. This step is split into three sections as follows:

- Step 2A: Define the potential dust emission magnitude
- Step 2B: Define the sensitivity of the area
- Step 2C: Define the risk of impacts.

100. Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (Step 2A) based on the criteria shown in Table 12.12.

Table 12.12: Categorisation of Dust Emissions Magnitude (IAQM 2024)

Dust Emission Magnitude		
Small	Medium	Large
Demolition		
<ul style="list-style-type: none"> • Total building volume <12,000m³ • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities <6m above ground • Demolition during wetter months 	<ul style="list-style-type: none"> • Total building volume 12,000 – 75,000m³ • Potentially dusty construction material • Demolition activities 6 – 12m above ground level 	<ul style="list-style-type: none"> • Total building volume >75,000m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities >12m above ground level
Earthworks		
<ul style="list-style-type: none"> • Total site area <18,000m² • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • Formation of bunds <3m in height • Earthworks during wetter months 	<ul style="list-style-type: none"> • Total site area 18,000 – 110,000m² • Moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • Formation of bunds 3 – 6m in height 	<ul style="list-style-type: none"> • Total site area >110,000m² • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >6m in height
Construction		
<ul style="list-style-type: none"> • Total building volume <12,000m³ • Construction material with low potential for dust release (e.g. metal cladding or timber) 	<ul style="list-style-type: none"> • Total building volume 12,000 – 75,000m³ • Potentially dusty construction material (e.g. concrete) • On-site concrete batching 	<ul style="list-style-type: none"> • Total building volume >75,000m³ • On-site concrete batching • Sandblasting
Trackout		
<ul style="list-style-type: none"> • <20 HDV (>3.5t) outward movements in any one day • Surface material with low potential for dust release • Unpaved road length <50m 	<ul style="list-style-type: none"> • 20 – 50 HDV (>3.5t) outward movements in any one day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50 – 100m 	<ul style="list-style-type: none"> • >50 HDV (>3.5t) outward movements in any one day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100m

101. The sensitivity of the surrounding area is then determined (Step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM₁₀ background concentrations and any other site-specific factors. The sensitivity of the area in terms of dust soiling, human health and ecology is described in Table 12.18.

102. The overall risk of the impacts for each activity is then determined (Step 2C) prior to the application of any mitigation measures (defined in Table 12.13) and an overall risk for the site is derived.

Table 12.13: Risk of Dust Impacts (IAQM 2024)

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

103. In order to determine the level of dust mitigation required during the Construction Phase, the potential dust emission magnitude for each dust-generating activity needs to be taken into account, along with the sensitivity of the area.

12.2.6.3.3 Assessment of the Sensitivity of Receptors to Construction Dust

104. An appraisal was carried out to assess the risk to sensitive receptors as a result of dust soiling, health impacts and ecological impacts due to the Construction Phase in accordance with the IAQM Guidance (2024).

105. The sensitivity of the area was determined using the headings as per the IAQM Guidance:

- Dust soiling impacts on people and property
- Human health impacts
- Ecological impacts.

106. Receptor sensitivity was determined using the criteria set out in Table 12.14.

Table 12.14: Receptor Sensitivity to Dust Impacts

Level of Sensitivity	Sensitivity Summary		
	Dust Soiling	Human Health Impacts	Ecology Impacts
High	<ul style="list-style-type: none"> Users can reasonably expect enjoyment of a high level of amenity The appearance, aesthetics or value of their property would be diminished by soiling The people or property would reasonably be expected to be present continuously, or at least regularly, for extended periods, as part of the normal pattern of use of the land Examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms. 	<ul style="list-style-type: none"> Locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment. 	<ul style="list-style-type: none"> Locations with an international or national designation and the designated features may be affected by dust soiling Indicative examples include an SAC designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	<ul style="list-style-type: none"> Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home The appearance, aesthetics or value of their property could be diminished by soiling The people or property would not reasonably be expected to be present continuously or regularly for extended periods as part of the normal pattern of use of the land Indicative examples include parks and places of work. 	<ul style="list-style-type: none"> Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) Indicative examples include office and shop workers but would generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation. 	<ul style="list-style-type: none"> Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown Indicative example is a NHA with dust-sensitive features.
Low	<ul style="list-style-type: none"> The enjoyment of amenity would not reasonably be expected Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short-term car parks and roads. 	<ul style="list-style-type: none"> Locations where human exposure is transient Indicative examples include public footpaths, playing fields, parks and shopping streets. 	<ul style="list-style-type: none"> Locations with a local designation where the features may be affected by dust deposition Indicative example is a local nature reserve with dust-sensitive features.

107. As discussed, dust deposition impacts on ecology can occur within 50m of the boundary of the site or within 50m of the route used by construction vehicles on public highways up to a distance of 250m from a construction site entrance (2024).

108. In terms of the sensitivity of the area to dust soiling effects on people and property, the receptor sensitivity, number of receptors and their distance from the source are considered. Using these criteria as outlined in Table 12.15, the sensitivity of the area to dust soiling can be established. The IAQM Guidance also outlines the criteria for assessing the human health impact from PM₁₀ emissions from construction activities based on the current annual mean PM₁₀ concentration, receptor sensitivity and the number of receptors affected, as per Table 12.16. The sensitivity of ecology to potential impacts is shown in Table 12.17.

109. The sensitivity of the area is considered by combining the sensitive receptors and their distances from the Planning Application Boundary as per the criteria outlined in the IAQM Guidance and as reproduced in Table 12.15, Table 12.16 and Table 12.17.

110. An assessment of the Proposed Project was completed with respect to the sensitivity of the surrounding area to the sites in Table 12.18. Where the number of receptors or the type of receptor was not clear, conservative sensitivities were assumed. In addition, when calculating the sensitivity with respect to human health, the background concentrations of particulates was reviewed. The background air quality in the area of the Proposed Project is discussed in Section 12.3.2.

Table 12.15: Sensitivity of the Area to Dust Soiling Effects on People and Property (IAQM 2024)

Receptor Sensitivity	Number of Receptors	Distance From Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 12.16: Sensitivity of the Area to Human Health Impacts (IAQM 2024)

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration (µg/m ³)	Number of Receptors	Distance From Source (m)			
			<20	<50	<100	<250
High	>32	>100	High	High	High	Medium
		10 – 100	High	High	Medium	Low
		1 – 10	High	Medium	Low	Low
	28 – 32	>100	High	High	Medium	Low
		10 – 100	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low
	24 – 28	>100	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low
		1 – 10	Medium	Low	Low	Low
	<24	>100	Medium	Low	Low	Low
		10 – 100	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low
		1 – 10	Medium	Low	Low	Low
	28 – 32	>10	Medium	Low	Low	Low
		1 – 10	Low	Low	Low	Low
	24 – 28	>10	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low
Low	-	1+	Low	Low	Low	Low

111. The Planning Application Boundary for the Proposed Project is within the Lower River Shannon SAC which is classed as a highly sensitive receptor. In addition, the Planning Application Boundary crosses sections of the Grand Canal pNHA, a medium sensitivity receptor to the east of the Proposed Project. A section of Annaghmore Lough Fen (Offaly) pNHA is within 50m of the Proposed Project which is considered a medium sensitivity receptor with respect to ecology as per the criteria in Table 12.14. As per the criteria in Table 12.17, the worst-case sensitivity of these areas to ecological impacts is considered high for the Lower River Shannon SAC, medium for the Grand Canal pNHA and low for the Annaghmore Lough Fen (Offaly) pNHA under the IAQM (2024) guidance. All other Infrastructure Sites, Construction Compounds and Pipe Storage Depots do not have sensitive ecology within 50m of the Planning Application Boundary or 250m from the site exit onto public roads.

Table 12.17: Sensitivity of the Area to Ecological Impacts (IAQM 2024)

Receptor Sensitivity	Distance From Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

112. An assessment of the sensitivity of the study area with respect to construction dust impacts from the Proposed Project was completed with respect to the criteria shown in Table 12.14, Table 12.15, Table 12.16 and Table 12.17. Table 12.18 details the receptor sensitivity of the main construction sites, proposed 38 kV Uprate Works, Flow Control Valve (FCV) site, and the overall Construction Working Width (including Pipe Storage Depots). There are 148 highly sensitive receptors within 20m of the overall Planning Application Boundary. The Principal Construction Compounds are proposed at the following locations:

- In the townland of Incha Beg, County Tipperary within the WTP site. This is the proposed Principal Construction Compound (CC1) for the RWI&PS, RWRMs and WTP
- In the townland of Lisgarriff, County Tipperary. This is the proposed Principal Construction Compound (CC2) for the Treated Water Pipeline from the WTP to the BPT, and the BPT itself
- In the townland of Killananny, County Offaly. This is the proposed Principal Construction Compound (CC5) for the section of Treated Water Pipeline between the BPT and the BPS, and the BPS itself
- In the townland of Drummond, County Kildare. This is the proposed Principal Construction Compound (CC6) for the Treated Water Pipeline from the BPS to the TPR, and the TPR itself.

113. In addition to these four Principal Construction Compounds, there are secondary Satellite Construction Compounds, located at specific centres of works, namely the RWI&PS, BPT, BPS and TPR. These Satellite Construction Compounds are required due to the sustained period of working at these particular locations. They also improve efficiency in the movement of plant, labour and materials, reducing traffic to and from Principal Construction Compounds (see Chapter 5: Construction & Commissioning).

Table 12.18: Summary of Sensitivity of Surrounding Area to Dust Impacts from the Proposed Project

Site	Sensitivity Summary		
	Dust Soiling	Human Health	Ecology
Overall Construction Working Width (including Pipe Storage Depots, access roads and road access and egress points)	High (>100 high-sensitivity receptors within 20m)	Medium (>100 high-sensitivity receptors within 20m and background below 24µg/m ³)	High (where Lower River Shannon SAC is within 20m of the Planning Application Boundary) Medium (where Grand Canal pNHA is within 20m of the Planning Application Boundary) Low (where Annaghmore Lough Fen (Offaly) pNHA is within 50m of the Planning Application Boundary)
Proposed 38 kV Uprate Works	High (10 – 100 high-sensitivity receptors within 20m)	Low (10 – 100 high-sensitivity receptors within 20m and background below 24µg/m ³)	High (Lower River Shannon SAC within 20m of the proposed 38 kV Uprate Works)
Satellite Construction Compound: CC0 RWI&PS	Low (no receptors within 250m)	Low (no receptors within 250m and background below 24µg/m ³)	High (Lower River Shannon SAC within 20m of CC0)
Principal Construction Compound: CC1 WTP	Low (1 – 10 high-sensitivity receptors within 100m – 250m)	Low (1 – 10 high-sensitivity receptors within 100m – 250m and background below 24µg/m ³)	No sensitive ecology within 50m of CC1 (excluding the access road)
Principal Construction Compound: CC2 Lisgariff	Low (1 – 10 high-sensitivity receptors within 50m – 100m)	Low (1 – 10 high-sensitivity receptors within 250m – 100m and background below 24µg/m ³)	No sensitive ecology within 50m of CC2 (excluding the access road)
Satellite Construction Compound: CC3 BPT	Medium (1 – 10 high-sensitivity receptors within 20m)	Low (1 – 10 high-sensitivity receptors within 20m and background below 24µg/m ³)	No sensitive ecology within 50m of CC3 (excluding the access road)
Satellite Construction Compound: CC4 BPS	Low (1 – 10 high-sensitivity receptors within 100m – 250m)	Low (1 – 10 high-sensitivity receptors within 100m – 250m and background below 24µg/m ³)	No sensitive ecology within 50m of the CC4 (excluding the access road)
Principal Construction Compound: CC5 Killananny	Low (1 – 10 high-sensitivity receptors within 100m – 250m)	Low (1 – 10 high-sensitivity receptors within 100m – 250m and background below 24µg/m ³)	No sensitive ecology within 50m of CC5 (excluding the access road)
Principal Construction Compound: CC6 Drummond	Medium (1 – 10 high-sensitivity receptors within 20m)	Low (1 – 10 high-sensitivity receptors within 20m and background below 24µg/m ³)	No sensitive ecology within 50m of CC6 (excluding the access road)
Satellite Construction Compound: CC7 TPR	Medium (1 – 10 high-sensitivity receptors within 20m)	Low (1 – 10 high-sensitivity receptors within 20m and background below 24µg/m ³)	No sensitive ecology within 50m of CC7 (excluding the access road)
Flow Control Valve	Low (1 – 10 high-sensitivity receptors within 100m – 250m)	Low (1 – 10 high-sensitivity receptors within 100m – 250m and background below 24µg/m ³)	No sensitive ecology within 50m of the FCV (excluding the access road)

12.2.6.3.4 Air Quality Impact Significance Criteria – Dust Receptors

114. The IAQM Guidance (2024) provides a method for classifying the risk of dust effects from construction activities based on the dust magnitude (high, medium or low) and proximity of the site to the closest receptors. Once the level of risk is determined the appropriate mitigation measures for the identified level of risk are then set out. The IAQM Guidance (2024) states *'For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'*. Therefore, once the appropriate mitigation measures are implemented, effects from dust emissions would not be significant.

12.2.7 Construction Flexibility

115. At this stage of the development of the Proposed Project there are a number of points of detail which cannot be finalised. This is due to factors such as unknown site constraints or obstacles that may affect the construction of the permanent infrastructure. Although a high level of ground investigation has been obtained to inform the planning application for the Proposed Project, further site investigations will be undertaken following grant of planning permission. This will inform a confirmed design for construction. This is a standard delivery approach and as a result, for a linear project of this nature, scale and complexity, it is typical that a level of construction flexibility is required. This flexibility in construction is necessary to provide a mechanism to overcome these matters during the later stages of the Proposed Project. The elements which are subject to construction flexibility are summarised in Table 12.19 and this also explains how this flexibility has been accounted for within the assessment reported in this chapter. Chapter 4 (Proposed Project Description) and Chapter 5 (Construction and Commissioning) in Volume 2 of this EIAR provides further detail.
116. The construction works necessary to deliver the permanent design (including the construction flexibility defined in Table 12.19) would take place within the Construction Working Width which defines the extent of the Planning Application Boundary. For the assessment reported in this EIAR this means that the construction works could take place anywhere within the Construction Working Width.
117. The assessment reported in this chapter has taken account of this construction flexibility and assessed all the likely significant effects that could arise. For this assessment, the likely significant effects reported in this chapter would not change regardless of the alignment or location of infrastructure elements within the defined construction flexibility in Table 12.19 (i.e. the difference in effects would be imperceptible for the purpose of the assessment).

Table 12.19: Definition of Construction Flexibility

Design Element	Construction Flexibility	How this has been Applied / Assessed in this Chapter
Pipeline	Treated Water Pipeline and RWRMs horizontal alignment – to allow for construction flexibility to overcome site constraints or obstacles the pipeline could be anywhere within a 20m Pipeline Corridor as defined in Chapter 4 (Proposed Project Description).	Irrespective of the pipeline alignment within the 20m corridor, the air quality assessment has assumed that construction dust emissions would occur at any point in the Construction Working Width and has assumed the closest proximity to sensitive receptors.
Pipeline	Treated Water Pipeline vertical alignment – to allow construction flexibility to overcome site constraints or obstacles, the vertical alignment of the pipeline could vary between 1.2m and 4.4m to the crown of the pipe. Exceptions would be at proposed trenchless crossing locations (which due to the construction approach would be deeper than 4.4m to crown) and where it has been identified that for hydraulic purposes, the crown of the pipeline would need to be deeper than 4.4m. These have been included in the vertical alignment set out in the Planning Application for the Proposed Project and consequently have been assessed for significant environmental effects as reported in this EIAR. These include e.g. TWB 27100 - 27700 and TWC 2600 - 2750. In these instances, the construction flexibility would be the crown of the pipe not being deeper than that shown in the Planning Application Drawings and not shallower than 1.2m. The excavation needed for the pipeline is assumed to be the largest needed for the lowest vertical parameter set out.	Not applicable to the air quality assessment.
Valves	The location of valves, and associated pipeline features, that need to be above the pipeline could change if there is a change in the vertical or horizontal alignment of the pipeline, as a result of the construction flexibility defined in the two rows above. The construction flexibility would allow them to move within the 20m Pipeline Corridor. However, the location of these pipeline features would be limited to remaining within the land parcels as identified and assessed within the EIAR (but still remaining within the 20m Pipeline Corridor).	Irrespective of the location of the valves, the air quality assessment has assumed that construction dust emissions would occur at any point in the Construction Working Width and has assumed the closest proximity to sensitive receptors.

Design Element	Construction Flexibility	How this has been Applied / Assessed in this Chapter
Outfall connections	To construct the smaller connection pipes between washout valves and washout outfalls, a small amount of construction flexibility would be required to overcome onsite obstacles or constraints. To allow for this, the connecting pipe could be anywhere within a 10m corridor.	Irrespective of the location of the connection pipeline with the 10m corridor, the air quality assessment has assumed that construction dust emissions would occur at any point in the Construction Working Width and has assumed the closest proximity to sensitive receptors.
Outfall locations	The outfall headwalls and discharge point would have to move with the alignment of the outfall pipeline, as set out above, and so the discharge point could move within the same 10m construction flexibility. To allow for the headwalls to move 10m either side of the current pipeline alignment, a total construction flexibility width of 20m has been allowed for the headwalls.	Irrespective of the location of the outfalls, the air quality assessment has assumed that construction dust emissions would occur at any point in the Construction Working Width and has assumed the closest proximity to sensitive receptors.

12.2.7.1 Variation in Construction Methods

118. In addition to the construction flexibility defined in Table 12.19 there may also be the potential for variation in the method of construction to be used to build the Proposed Project. This variation would be necessary to deal with, for example, uncertainties in ground conditions or on-site constraints. Chapter 5 (Construction & Commissioning) includes further detail on these, including the reasoning why different techniques may be required. This could include:

- Use of raft foundations or concrete piled foundations at the WTP
- Use of auger bore or pipe jacking for trenchless crossings
- Using trenchless crossing or open excavation for the crossing of low voltage power lines
- Different construction techniques for working in poor ground include peat materials.

119. The assessment reported in this chapter has been based on any of these construction techniques being adopted.

120. In addition, as set out in Appendix A5.3 (Methods of Working in Peat), four slightly different methods for constructing the pipeline in areas of peat soils have been defined. To allow for variation in ground conditions it has been assumed for the purpose of the assessment reported in this EIAR that either Method 2, 3 or 4 could be used in areas where the depth of peat is greater than 1m. Where the depth of peat is less than 1m, Method 1 is proposed to be used and it is not expected that there would be any deviation from this methodology. The environmental effects from Methods 2, 3, and 4 would be similar. However, Methods 3 and 4 would result in additional permanent infrastructure in the form of stone pillars (Method 3) or piled supports (Method 4) below the pipeline. Consequently, Method 4 would require piling and as such, would have a slighter greater environmental impact. Therefore, the EIAR is based on the application of Method 4 where the depth of peat is greater than 1m. However, in areas where Methods 2, 3, or 4 could be used, the environmental assessment has considered whether these different methods would result in different likely significant effects and therefore the assessment reported in this chapter has identified the likely significant effects from any of the three techniques. For this assessment, the likely significant effects reported in this chapter would not change regardless of the working in peat method used (i.e. the difference between the methods would be imperceptible for the purpose of the assessment).

12.2.8 Difficulties Encountered in Compiling Information

121. A number of assumptions have been made within the modelling as set out in the limitations in Section 12.2.6. In addition, where average speeds were not measured within the traffic survey, the average speed across similar road types (i.e. local roads, regional roads or national roads) has been used.

122. The information that has informed the assessment is sufficient to identify the likely significant effects. The limitations described in this chapter are not considered to have a material impact on the assessment conclusions as any assumptions have allowed for a conservative assessment of potential effects to air quality and thus likely included a level of 'over-estimation' of effects.

12.2.9 Cumulative Effects

123. As noted in Chapter 2 (The Environmental Impact Assessment Process), intra-project cumulative effects are described within respective topic chapters, while inter-project cumulative effects are described in Chapter 21 (Cumulative Effects & Interactions). The EIA Directive includes the consideration of existing projects within the cumulative effects assessment and this is addressed through a consideration of the incremental impact of the Proposed Project within the context of the existing baseline as described, and where applicable, the carrying capacity of the environment.

124. For traffic related impacts, the Do-Nothing traffic scenario is representative of the predicted growth in traffic, accounting for local and regional development. Cumulative impacts are implicit in the future Do-Nothing and Do-Something scenarios because committed developments (as defined in Chapter 7: Traffic & Transport) are included in the traffic model.

125. Intra-project effects of note in relation to air quality include the effects on biodiversity from dust emissions and traffic related emissions including NO_x and ammonia concentrations, N deposition and acid deposition. Additionally, air quality effects on population and communities can occur through dust soiling impacts; and on human health through dust emissions of fine particulate matter (PM₁₀ and PM_{2.5}) as well as traffic related pollutant emissions (NO₂, PM₁₀ and PM_{2.5}). Identified interactions are assessed within the respective topic chapters and summarised in Chapter 21.

12.3 Baseline Conditions

12.3.1 Meteorological Conditions

126. A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience substantial variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO 2006). Wind is of key importance in dispersing air pollutants and for ground-level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources are generally greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM₁₀, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than PM_{2.5}) from traffic sources are dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles (PM_{2.5} and PM₁₀) would actually increase at higher wind speeds as they are resuspended from road surfaces due to increased wind speeds. Thus, measured levels of PM₁₀ is a non-linear function of wind speed.

127. The Proposed Project would stretch from Limerick to Dublin; therefore, meteorological conditions are likely to vary across the Proposed Project. Met Éireann data sets for two meteorological stations have been reviewed as illustrative data sets for meteorological conditions (Met Éireann 2025). These are the Casement Aerodrome (approximately 2km south-east of the Proposed Project) and Shannon Airport Meteorological Stations (approximately 30km west of the Proposed Project).

128. Dust generation rates depend on the site activity, particle size, the moisture content of the material and weather conditions. Dust emissions are dramatically reduced where rainfall has occurred due to the cohesion created between dust particles and water and the removal of suspended dust from the air. It is typical to assume no dust is generated under 'wet day' conditions where rainfall greater than 0.2mm (US Environmental Protection Agency (USEPA) 1997) has fallen. High levels of moisture either retained in soil or as a result of rainfall help suppress the generation of dust due to the cohesive nature of water between

dust particles. Rain also assists in removing dust from the atmosphere through washout. Wind can lift particles up into the air and transport the dust downwind as well as drying out the surface. The worst dust deposition conditions typically occur, therefore, during dry conditions with strong winds (USEPA 1997).

129. Casement Meteorological Station is located at Casement Aerodrome to the south-east of the proposed TPR. The wind data for the station indicates the prevailing wind speed and direction over the five-year period 2020 to 2024. The prevailing wind direction is south-westerly in direction, with generally moderate wind speeds.
130. Shannon Airport Station is located west of the Proposed Project. Wind data for the station indicates that the prevailing wind direction is westerly to south-easterly in direction over the period 2020 to 2024.
131. In addition to the Met Éireann data sets from Casement Aerodrome and Shannon Airport, meteorological data has been provided by Uisce Éireann from meteorological stations at Ballinderry, County Tipperary and Whitegate, County Clare. These stations are located in closer proximity to the Proposed Project at 10km north-west of Construction Compound 2 (Lisgarriff) for Ballinderry Meteorological Station and 11km west of the pipeline for Whitegate Meteorological Station. The wind rose for these stations indicates the prevailing wind direction is south-westerly for Whitegate and southerly for Ballinderry.
132. A review of historical 30 year (1991 – 2020) average data for Casement Aerodrome and Shannon Airport meteorological stations indicates that, on average, at Casement Aerodrome 194 days per year have rainfall over 0.2mm and at Shannon Airport 223 days per year have over 0.2mm of rainfall (Met Éireann 2025). Therefore, it can be determined that over 50% of the time dust generation would be reduced due to natural meteorological conditions.

12.3.2 Existing Ambient Air Quality

133. Air quality monitoring programmes have been undertaken in recent years by the EPA and local authorities. The most recent annual report on air quality, Air Quality in Ireland 2024 (EPA 2025), details the range and scope of monitoring undertaken throughout Ireland. The air quality limit values discussed in Section 12.2.3.1 are in place to protect the health of sensitive human and ecological receptors.
134. As part of the implementation of the CAFE Directive (2008/50/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA 2025). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D. In the context of the Proposed Project, the air quality zones have been used to determine the appropriate areas that are representative of the Proposed Project in order to determine background levels of the relevant pollutants. In terms of air monitoring, the main region of the Proposed Project is categorised as in Zone D; however, some areas, such as at the TPR, are classed as in Zone A (EPA 2025).
135. Long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the Proposed Project.

12.3.2.1 Nitrogen Dioxide (NO₂)

136. With regard to NO₂, continuous monitoring data from the EPA (EPA 2025) at representative suburban Zone A monitoring locations of Ballyfermot, Swords, Tallaght and Dún Laoghaire, County Dublin show that levels of NO₂ were below both the annual and one-hour limit values. Annual average concentrations ranged from 10µg/m³ to 12µg/m³ in 2024. Sufficient data is available for these representative stations in Ballyfermot, Swords Tallaght, and Dún Laoghaire to observe long-term trends over the period 2020 to 2024, with results averaging between 10µg/m³ to 16µg/m³, which is below the annual average limit value of 40µg/m³, and no exceedances of the one-hour limit value. The overall 5-year average annual mean

concentration NO₂ at these representative Zone A sites is 13µg/m³. Based on these results, a conservative estimate of the background NO₂ concentration in the urban eastern region (Zone A) of the Proposed Project is 14µg/m³.

137. Long-term NO₂ monitoring was carried out at two representative rural Zone D monitoring locations (Emo, County Laois, and Kilkitt, County Monaghan) and one urban Zone D location (Castlebar, County Mayo) (EPA 2025). The NO₂ annual average from 2020 to 2024 across both rural sites ranged from 2µg/m³ to 4µg/m³. The annual average at the urban location over the 2020 to 2024 period ranged from 6µg/m³ to 8µg/m³. Hence, long-term average concentrations measured at these locations were substantially lower than the annual average limit value of 40µg/m³ and there were no exceedances of the 24-hour limit value. The overall 5-year average annual mean NO₂ concentration at these representative Zone D sites is 4µg/m³. Based on the above information, a conservative estimate of the background NO₂ concentration for the rural Zone D regions of the Proposed Project is 4µg/m³.

12.3.2.2 Particulate Matter (PM₁₀ and PM_{2.5})

138. Continuous PM₁₀ monitoring carried out at the suburban Zone A locations of Dún Laoghaire, Tallaght and Ballyfermot showed concentrations ranged from 11µg/m³ to 12µg/m³ across the sites in 2024, which is lower than the annual average limit value of 40µg/m³, but with up to one exceedance of the 24-hour limit value of 50µg/m³ (35 exceedances are permitted per year). In addition, average PM₁₀ levels at the urban background monitoring location in the Phoenix Park in 2020 to 2024 were 10µg/m³, with an average of one exceedance of the 50µg/m³ 24-hour limit value. Based on the EPA data, and the 5-year overall annual average concentration across the range of representative Zone A sites, an estimate of the worst-case background PM₁₀ concentration in the suburban Zone A region of the Proposed Project is 11µg/m³.

139. Long-term PM₁₀ monitoring was carried out at two rural (Kilkitt, County Monaghan; and Claremorris, County Mayo) and one urban (Castlebar, County Mayo) representative Zone D locations over the 2020 to 2024 period. Concentrations ranged from 7µg/m³ to 10µg/m³ over the 2020 to 2024 period at the rural sites. Concentrations ranged from 10µg/m³ to 14µg/m³ at the urban site over the 2024 to 2023 period. The overall 5-year average annual mean PM₁₀ concentration at the representative Zone D sites is 9µg/m³. Hence, long-term average PM₁₀ concentrations for rural segments of the pipeline are predicted to be lower than the annual average limit value of 40µg/m³. There were no exceedances of the 50µg/m³ 24-hour limit value at the rural Zone D sites. Based on the above information, a conservative estimate of the background PM₁₀ concentration for the Zone D region of the Proposed Project is 10µg/m³.

140. Continuous PM_{2.5} monitoring carried out at the representative Zone A locations of Ballyfermot, Dún Laoghaire and Phoenix Park in County Dublin indicated concentrations measured 6µg/m³ to 18g/m³ between 2020 and 2024, which is lower than the annual average limit value of 25µg/m³. The overall 5-year average annual mean PM_{2.5} concentration at the representative Zone A sites is 7µg/m³. Based on this information, a background PM_{2.5} concentration in the Zone A region of the Proposed Project of 8µg/m³ was selected.

141. Continuous PM_{2.5} monitoring carried out at two representative rural Zone D locations (Askeaton County Limerick; and Claremorris, County Mayo) showed annual average levels ranging from 4µg/m³ to 8µg/m³ over 2020 to 2024, which is lower than the annual average limit value of 25µg/m³. Monitoring of PM_{2.5} was also conducted in a number of representative Zone D suburban background locations (Mallow County Cork, Roscommon town and Tipperary town) over the 2020 to 2024 period. Annual mean PM_{2.5} concentrations at these suburban background sites ranged from 6µg/m³ to 10µg/m³ over the 2020 to 2024 period. Again, this is significantly less than the annual average limit value of 25µg/m³. The overall 5-year average annual mean PM_{2.5} concentration at the representative Zone D sites is 7µg/m³. Based on this information, a conservative background PM_{2.5} concentration in the Zone D region of the Proposed Project of 7µg/m³ has been used.

12.3.2.3 Summary of Background Air Quality

142. In summary, the background air quality was found to be substantially below the air quality limit values for NO₂, PM₁₀ and PM_{2.5}, as set out in Table 12.20.

Table 12.20: Summary of Background Air Quality

Pollutant	Annual Mean Concentration (µg/m ³)	
	Zone A	Zone D
NO ₂	14	4
PM ₁₀	11	10
PM _{2.5}	8	7

12.3.2.4 Sensitive Designated Habitats

143. Background concentrations for NO_x, NH₃, nitrogen and acid deposition at the closest point to the modelled road within each modelled designated habitat were derived from the 1km grid square concentrations provided on the APIS website (UK Centre for Ecology and Hydrology 2025), in line with UK Environment Agency (2014), DEHLG (2010) and UK Defra (2022) guidance. These are shown in Table 12.21. The background concentrations vary depending on the location and therefore are provided for each of the designated ecological areas assessed.

Table 12.21: Background Concentrations for NO_x, NH₃, Nitrogen and Acid Deposition (UK Centre for Ecology and Hydrology 2025)

Sensitive Designated Habitat	NO _x (µg/m ³)	NH ₃ (µg/m ³)	Nitrogen Deposition (kg/ha/yr)	Acid Deposition (keq/ha/yr)
Grand Canal pNHA at Killina	3.3	2.6	6.9	0.7
Kilcormac Esker pNHA at Blue Ball	3.0	2.5	7.4	0.5
Lower River Shannon SAC at Birdhill	3.2	2.3	6.5	0.5
River Barrow and River Nore SAC at Mountmellick	4.3	2.7	6.8	0.5
River Barrow and River Nore SAC at Portarlinton	4.0	2.6	6.4	0.4

12.3.3 Future Baseline

144. The above EPA air quality monitoring data indicates that the air quality in the area of the Proposed Project is generally good, with concentrations of the key pollutants well below the relevant limit values. However, the EPA have indicated that road transport emissions are contributing to increased levels of NO₂ and there is the potential for breaches in the annual NO₂ limit value in future years at locations within urban centres and roadside locations. Conversely, improvements in vehicles emissions are likely to occur in the future in line with more efficient engine technologies and greater uptake of electric vehicles. Burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM₁₀ and PM_{2.5}). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA 2024).

145. Concentrations of pollutants in future years in the area of the Proposed Project are likely to be overall similar to or lower than those assessed here due to improvements in engine technologies in future years and greater uptake of electric vehicles. Therefore, the predicted impacts and assessment conclusions within this EIAR chapter are unlikely to differ or are a conservative prediction.

146. Modelling of traffic emissions in relation to human receptors was carried out at a worst-case receptor in closest proximity to the impacted road link, this allows for the maximum impact to air quality from traffic emissions to be identified. Potential future receptors that are not currently present would experience similar impacts to the receptors assessed as part of this assessment.

12.4 Assessment of Effects

147. The following sections present an assessment of the potential significant air quality effects associated with the Construction and Operational Phases of the Proposed Project with respect to the appraisal methods that have been presented in Section 12.2.

148. This section presents an assessment in the absence of mitigation measures, with the exception of embedded mitigation that has been incorporated into the design (e.g. avoiding sensitive features through the siting of the Proposed Project during the optioneering stages). Mitigation measures have been proposed in Section 12.5 to prevent or reduce the potential significant effects, and the residual effects after the application of mitigation measures are reported in Section 12.6.

12.4.1 Do-Nothing Scenario

149. The Do-Nothing scenario includes retention of the current site without the Proposed Project in place. In this scenario, ambient air quality at the project location would remain as per the baseline and would change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area and changes in road traffic).

150. The Do-Nothing scenario with respect to traffic emissions has been assessed in Section 12.4.2.1 for the Construction Phase. The predicted pollutant concentrations in the absence of the Proposed Project are in compliance with the ambient air quality standards outlined in Table 12.2 as shown in Table 12.22, Table 12.23 and Table 12.24. In relation to the Operational Phase traffic, a detailed modelling assessment was scoped out as the change in traffic volumes due to the Proposed Project are below the TII screening criteria as discussed in Section 12.4.3. In the absence of the Proposed Project, emissions from traffic would remain in compliance with the ambient air quality limit values. This scenario can be considered neutral in relation to air quality.

12.4.2 Construction Phase

151. The greatest risk with respect to Construction Phase activities on air quality are due to dust emissions. There would also be potential impacts from increased vehicle transport on public roads. Construction Phase activities stretch from the proposed 38 kV Uprate Works beginning in County Clare to the TPR in Peamount in Dublin. Full details on construction activities are available in Chapter 5 (Construction & Commissioning).

12.4.2.1 Air Quality – Traffic Impacts

152. The worst-case traffic data used in this assessment is shown in Table 12.6. The roads assessed are subject to the biggest traffic impact due to the Proposed Project. All other road links potentially impacted fall below the AADT scoping criteria discussed in Section 12.2.1.2. Where average speeds were measured within the traffic survey, this value has been used for modelling. In the absence of this data, for some links the average speed across similar road types (i.e. local roads, regional roads or national roads) has been used. Effects have been assessed at a theorised 'worst-case' receptor within 5m of the road centreline.

12.4.2.1.1 Air Quality Impacts from Traffic Emissions – Human Receptors

153. The TII PE-ENV-01106 guidance (2022) details a methodology for determining air quality effect significance criteria for TII road schemes and infrastructure projects. However, this significance criteria can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact on traffic due to the Proposed Project. Results are compared against the Do-Nothing scenario, which assumes that the Proposed Project is not in place in future years, to determine the degree of impact. This requires looking at the predicted air quality for the future peak construction year (2030).

NO₂ Emissions

154. The results of the assessment of the impact of the Proposed Project on NO₂ in the anticipated peak construction year (2030) are shown in Table 12.22. The annual average concentration is in compliance with the limit value of 20µg/m³ at the worst-case receptors in 2030. Concentrations of NO₂ would be at most 6.4µg/m³ at receptor R4 which is 32% of the annual limit value in 2030. In addition, the TII guidance (2022) states that the hourly limit value for NO₂ of 200µg/m³ is unlikely to be exceeded at roadside locations unless the annual mean is above 60µg/m³. As predicted NO₂ concentrations are significantly below 60µg/m³ (Table 12.22), it can be concluded that the short-term NO₂ limit value would be complied with at all receptor locations.

155. The impact of the Proposed Project on annual mean NO₂ concentrations can be assessed relative to Do-Nothing levels. NO₂ concentrations at receptors would be predicted to increase as a result of the Proposed Project when compared with the Do-Nothing scenario. The modelling indicates the greatest impact in relation to changes in NO₂ concentrations would occur at receptor R11 which is impacted by the R422 (Link ID AF). The R422 (Link AF) has predicted daily increases of up to 233 HDVs and an overall AADT increase of 2,818 vehicles; this peak traffic would occur for a short number of weeks. There would be at most an increase of 0.39µg/m³ at receptor R11. When comparing the change in concentration with the air quality limit value, it reveals a maximum change of 1.95%. All other receptors would experience similar or lesser impacts and impacts would decrease with increased distance from the road.

156. The impact is considered neutral, as per the TII criteria (see Table 12.8), as the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 12.2) and there is a less than 5% change in concentrations.

157. The modelling assumes these increases in traffic occur for a full year rather than the shorter number of weeks that they would actually occur over. Therefore, while the impact is considered neutral based on modelling a full year of peak traffic, the impact at the residential receptors assessed for the shorter peak weeks would be even lower than modelling indicates.

158. Therefore, the significance of effect of the Proposed Project on NO₂ concentrations is Not Significant.

Table 12.22: Predicted Annual Mean NO₂ Concentrations (µg/m³)

Road Link ID	Receptor	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change Compared to AQLV	Description
C	R1	4.2	21%	4.3	21%	0.04	0.2%	Neutral
H	R2	4.4	22%	4.5	22%	0.04	0.2%	Neutral
I	R3	5.3	26%	5.4	27%	0.13	0.6%	Neutral
N	R4	6.4	32%	6.4	32%	0.04	0.2%	Neutral
O	R5	5.4	27%	5.4	27%	0.01	0.0%	Neutral
P	R6	5.1	26%	5.2	26%	0.06	0.3%	Neutral
V	R7	4.7	23%	4.7	24%	0.06	0.3%	Neutral
Y	R8	4.2	21%	4.3	21%	0.09	0.4%	Neutral
AB	R9	5.0	25%	5.1	25%	0.07	0.4%	Neutral
AE	R10	5.9	30%	6.0	30%	0.06	0.3%	Neutral
AF	R11	5.5	28%	5.9	30%	0.39	2.0%	Neutral
AI	R12	6.0	30%	6.1	31%	0.06	0.3%	Neutral
AJ	R13	5.1	26%	5.3	26%	0.14	0.7%	Neutral
AK	R14	5.3	27%	5.4	27%	0.09	0.4%	Neutral
AL	R15	4.1	21%	4.2	21%	0.07	0.4%	Neutral
AN	R16	5.6	28%	5.7	28%	0.02	0.1%	Neutral
AR	R17	4.5	23%	4.6	23%	0.04	0.2%	Neutral
AS	R18	4.7	24%	4.8	24%	0.07	0.3%	Neutral
AV	R19	5.3	27%	5.3	27%	0.01	0.0%	Neutral
AY	R20	5.3	27%	5.3	27%	0.02	0.1%	Neutral

PM₁₀ Emissions

159. In relation to changes in PM₁₀ concentrations due to the Proposed Project, the results of the assessment can be seen in Table 12.23 for the anticipated peak construction year (2030). The annual average concentration is in compliance with the limit value of 20µg/m³ at the worst-case receptors in 2030. Concentrations of PM₁₀ are at most 13.2µg/m³ which is 66% of the annual limit value in 2030. In addition, the Proposed Project would not result in any additional days of exceedance of the daily PM₁₀ limit value of 45µg/m³ at worst-case receptors assessed.

160. The impact of the Proposed Project on annual mean PM₁₀ concentrations can be assessed relative to Do-Nothing levels. PM₁₀ concentrations would increase at receptors as a result of the Proposed Project when compared with the Do-Nothing scenario. The modelling indicates the greatest impact in relation to annual mean PM₁₀ concentrations would occur at receptor R11 which is impacted by the R422 (Link AF). There would be at most an increase of 0.53µg/m³ at receptor R11. When comparing the change in concentration with the air quality limit value, it reveals a maximum change of 1.3%. All other receptors would experience similar or lesser impacts and impacts would decrease with increased distance from the road.

161. As with NO₂, the impact is considered neutral, as per the TII criteria (see Table 12.8), as the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 12.2) and there is a less than 5% change in concentrations. Therefore, the significance of effect of the Proposed Project on PM₁₀ concentrations is Not Significant.

162. For the same reasons as detailed for NO₂ above, the impact at the modelled receptors would be even lower than modelling indicates.

Table 12.23: Predicted Annual Mean PM₁₀ Concentrations (µg/m³)

Road Link ID	Receptor	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change Compared to AQLV	Description
C	R1	10.4	52%	10.5	52%	0.1	0.5%	Neutral
H	R2	10.6	53%	10.8	54%	0.17	0.4%	Neutral
I	R3	11.7	59%	12.1	61%	0.38	0.9%	Neutral
N	R4	13.0	65%	13.2	66%	0.2	0.5%	Neutral
O	R5	11.8	59%	11.8	59%	0.08	0.2%	Neutral
P	R6	11.3	57%	11.5	58%	0.21	0.5%	Neutral
V	R7	10.9	54%	11.0	55%	0.13	0.3%	Neutral
Y	R8	10.2	51%	10.5	52%	0.24	0.6%	Neutral
AB	R9	11.6	58%	11.7	59%	0.15	0.4%	Neutral
AE	R10	12.5	63%	12.6	63%	0.13	0.3%	Neutral
AF	R11	12.0	60%	12.5	63%	0.53	1.3%	Neutral
AI	R12	12.6	63%	12.8	64%	0.15	0.4%	Neutral
AJ	R13	11.4	57%	11.7	59%	0.28	0.7%	Neutral
AK	R14	11.7	59%	11.9	60%	0.23	0.6%	Neutral
AL	R15	10.2	51%	10.4	52%	0.26	0.6%	Neutral
AN	R16	12.1	60%	12.2	61%	0.1	0.2%	Neutral
AR	R17	11.1	56%	11.3	56%	0.17	0.4%	Neutral
AS	R18	11.3	57%	11.5	57%	0.19	0.5%	Neutral
AV	R19	12.5	63%	12.6	63%	0.09	0.2%	Neutral
AY	R20	12.7	64%	12.8	64%	0.14	0.4%	Neutral

PM_{2.5} Emissions

163. The results of the assessment of changes in PM_{2.5} concentrations due to the Proposed Project can be seen in Table 12.24 for the anticipated peak construction year (2030). The annual average concentration is in compliance with the limit value of 10µg/m³ at the worst-case receptors in 2030. Concentrations of PM_{2.5} are at most 8.8µg/m³ which is 88% of the annual limit value in 2030.

164. The impact of the Proposed Project on annual mean PM_{2.5} concentrations can be assessed relative to Do-Nothing levels. PM_{2.5} concentrations would increase at receptors as a result of the Proposed Project when compared with the Do-Nothing scenario. There would be at most an increase of 0.29µg/m³ at receptor R11 which is impacted by the R422 (Link AF). When comparing the change in concentration with the air quality limit value, it reveals a maximum change of 2.9% at receptor R11. All other receptors would experience similar or lesser impacts and impacts would decrease with increased distance from the road. All other receptors would experience similar or lesser impacts.

165. The impact is considered 'Slight Adverse', as per the TII criteria (see Table 12.8), as the predicted annual mean concentrations are less than 94% of the air quality standard (see Table 12.2) and there is a less than 5% change in concentrations. As per Section 12.2.6.1.7 non-significant impacts are 'Neutral' or 'Slight' changes in concentrations. Therefore, the significance of effect of the Proposed Project on PM_{2.5} concentrations is Not Significant.

166. As with NO₂ and PM₁₀ the greatest impact would occur at receptor R11 due to changes in traffic on the R422. The R422 (Link AF) has predicted daily increases of up to 234 HDVs and an overall AADT increase of 2,819 vehicles. For the same reasons as detailed for NO₂ above, the impact at the modelled receptors would be even lower than modelling indicates.

Table 12.24: Predicted Annual Mean PM_{2.5} Concentrations (µg/m³)

Road Link ID	Receptor	DN	% of AQLV	DS	% of AQLV	DS-DN	% Change Compared to AQLV	Description
C	R1	7.2	72%	7.3	73%	0.06	0.6%	Neutral
H	R2	7.4	74%	7.4	74%	0.09	0.9%	Neutral
I	R3	8.0	80%	8.2	82%	0.21	2.1%	Slight Adverse
N	R4	8.7	87%	8.8	88%	0.11	1.1%	Neutral
O	R5	8.0	80%	8.0	80%	0.04	0.4%	Neutral
P	R6	7.7	77%	7.8	78%	0.11	1.1%	Neutral
V	R7	7.5	75%	7.6	76%	0.07	0.7%	Neutral
Y	R8	7.1	71%	7.3	73%	0.14	1.4%	Neutral
AB	R9	7.9	79%	8.0	80%	0.08	0.8%	Neutral
AE	R10	8.4	84%	8.5	85%	0.07	0.7%	Neutral
AF	R11	8.1	81%	8.4	84%	0.29	2.9%	Slight Adverse
AI	R12	8.5	85%	8.5	85%	0.08	0.8%	Neutral
AJ	R13	7.8	78%	7.9	79%	0.16	1.6%	Slight Adverse
AK	R14	7.9	79%	8.1	81%	0.13	1.3%	Neutral
AL	R15	7.1	71%	7.2	72%	0.14	1.4%	Neutral
AN	R16	8.1	81%	8.2	82%	0.06	0.6%	Neutral
AR	R17	7.6	76%	7.7	77%	0.1	1.0%	Neutral
AS	R18	7.7	77%	7.8	78%	0.11	1.1%	Neutral
AV	R19	8.4	84%	8.4	84%	0.04	0.4%	Neutral
AY	R20	8.5	85%	8.6	86%	0.08	0.8%	Neutral

12.4.2.1.2 Air Quality and Traffic Effect Significance – Human Receptors

167. The traffic assessment has predicted that there would be at most neutral to slight adverse increases in pollutant concentrations at sensitive human receptors using the TII impact descriptors in Table 12.8. The Proposed Project would not result in any exceedances of the ambient air quality limit values (Table 12.2) and the air quality in the area would remain in compliance with the ambient air quality limit values. The TII criteria in Section 12.2.6.1.7 state that where impacts are 'neutral' or 'slight' and the air quality in the area remains in compliance with the ambient air quality limit values then the impact can be considered Not Significant as per the EPA EIAR Guidelines terminology (EPA 2022).

168. Overall, the impact of the Proposed Project on ambient air quality and human health in the Construction Phase, using the EPA EIAR Guidelines terminology (EPA 2022), is short-term, localised, direct, negative and Imperceptible (Not Significant).

12.4.2.1.3 Air Quality – Emissions from Vehicles – Ecological Impacts

169. The TII PE-ENV-01106 guidance (2022) requires an assessment of impacts to sensitive ecology from traffic emissions. The TII PE-ENV-01106 guidance (2022) states that if the potential impact of a project is limited to a local level, detailed consideration need only be given to roads where there is a significant change to traffic flows (>1,000 AADT or >200 HDV AADT) and the designated site lies within 200m of the road centreline.
170. There are no roads within 200m of a designated site that have a greater than 1000 AADT change in traffic. There are sections of five designated sites that have been identified as within 200m of a Haul Road link that would experience a greater than 200 HDV AADT change in traffic during the anticipated peak construction year (2030). These are identified in Table 12.9 along with the impacted road links and their distance to the ecological site of relevance. The relevant ecological sites assessed are also shown illustratively in Figure 12.1 to Figure 12.9. The impact of NO_x, NH₃, nutrient N deposition and acid deposition resulting from the Proposed Project within sections of the designated sites was assessed at the closest point to the road; where the road directly crossed a section of the ecological site, a distance of 0m was used. The predicted impacts are based on the worst-case peak construction traffic occurring for a full year (2030). However, it should be noted that this peak construction traffic would, in reality, only occur for a shorter period (a number of weeks) rather than a full year. The modelling assumes the increases in traffic occur for a full year which makes the modelling impact conservative as it would not be as high if the average annual traffic was modelled rather than the peak construction traffic. Additionally, the impacts occur within a small section of the designated sites that are in close proximity to the impacted roads; pollutant concentrations would decrease with increasing distance from the roads.
171. The assessment includes modelling of the Do-Nothing (without the Proposed Project) and Do-Something (with the Proposed Project) scenarios. Results of the Do-Something scenario are compared with the Do-Nothing scenario in order to determine the impact of the Proposed Project on pollutant concentrations.
172. The results of the modelling assessment within the relevant sections of the designated sites are detailed in Table 12.25 to Table 12.29 for NO_x, NH₃, N deposition and acid deposition. Background concentrations (as per Table 12.21) have been added to the modelled road contribution to give the total result. The 'total annual mean NO_x', 'total annual mean NH₃', 'total N deposition' and 'total acid deposition' referred to in the below tables includes the predicted modelled result from the Construction Phase traffic associated with the Proposed Project plus background concentrations as per Table 12.21. Results have been compared against the annual mean NO_x limit value of 30µg/m³ and the annual mean NH₃ limit value of 1µg/m³ to 3µg/m³ (see Table 12.2 and Table 12.3). The N deposition and acid deposition results have been compared to the critical load ranges set out in Table 12.11. As discussed in Section 12.2.6.2.5, the critical load range used to assess the impact to sensitive ecology have been based on the lowest critical load ranges for the potentially most sensitive species within the designated sites as a conservative approach regardless of whether that specific sensitive species is present within the impacted area.
173. In relation to the Grand Canal pNHA the results of the assessment are presented in Table 12.25.
174. The predicted total annual mean NO_x concentrations are in compliance with the critical level of 30µg/m³ in the Do-Something scenario. The Proposed Project would increase NO_x concentrations within the relevant section of the Grand Canal pNHA at Killina by 0.12µg/m³.
175. Modelled NH₃ concentrations are in exceedance of the critical level of 3µg/m³; however, concentrations are in exceedance in both the Do-Nothing and Do-Something scenarios. The Proposed Project would increase NH₃ concentrations within the relevant section of the Grand Canal pNHA at Killina by 0.08µg/m³. Therefore, it is demonstrated that the Proposed Project would contribute to only minor levels of NH₃ in the impacted area.

176. Predicted N deposition rates within the relevant section of the Grand Canal pNHA are in exceedance of the critical load range of 5 – 10kgN/ha/yr. The Proposed Project would increase N deposition rates by 0.42kgN/ha/yr when compared with the Do-Nothing scenario.

177. The modelled acid deposition rate is in exceedance of the lower critical load of 0.714keqN/ha/yr but is within the upper critical load of 5.146keqN/ha/yr. According to guidance from APIS (UK Centre for Ecology and Hydrology 2025) the critical load is deemed to have been exceeded if the upper load is exceeded and therefore, in this case no exceedance is predicted. The Proposed Project would increase acid deposition rates by 0.03keqN/ha/yr within the relevant section of the Grand Canal pNHA at Killina.

Table 12.25: Predicted Air Quality Impacts to Ecology from Vehicle Emissions – Grand Canal pNHA

Grand Canal pNHA						
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
			Lower	Upper	Lower	Upper
Do-Nothing	Total NO _x (µg/m ³)	5.06	30		17%	
	Total NH ₃ (µg/m ³)	3.09	3		103%	
	N deposition (kgN/ha/yr)	9.85	5	10	197%	99%
	Acid deposition (keqN/ha/yr)	0.86	0.714	5.146	120%	17%
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
			Lower	Upper	Lower	Upper
Do-Something	Total NO _x (µg/m ³)	5.18	30		17%	
	Total NH ₃ (µg/m ³)	3.17	3		106%	
	N deposition (kgN/ha/yr)	10.27	5	10	205%	103%
	Acid deposition (keqN/ha/yr)	0.89	0.714	5.146	125%	17%
Scenario	Pollutant	Change due to Project	Limit		Change as % of Limit	
			Lower	Upper	Lower	Upper
Do-Something minus Do-Nothing	Total NO _x (µg/m ³)	0.12	30		0.4%	
	Total NH ₃ (µg/m ³)	0.08	3		2.7%	
	N deposition (kgN/ha/yr)	0.42	5	10	8.4%	4.2%
	Acid deposition (keqN/ha/yr)	0.03	0.714	5.146	4.2%	0.6%

178. In relation to the Kilcormac Esker pNHA the results of the assessment are presented in Table 12.26.

179. The predicted total annual mean NO_x concentrations are in compliance with the critical level of 30µg/m³ in the Do-Nothing and Do-Something scenario. The Proposed Project would increase NO_x concentrations within the relevant section of the Kilcormac Esker pNHA at Blue Ball by 0.02µg/m³.

180. The Proposed Project would not cause a change in predicted NH₃ concentrations, N deposition rates or acid deposition rates (see Table 12.26) and therefore no significant impact to ecology from air quality in relation to these pollutants is predicted.

Table 12.26: Predicted Air Quality Impacts to Ecology from Vehicle Emissions – Kilcormac Esker pNHA

Kilcormac Esker pNHA						
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
			Lower	Upper	Lower	Upper
Do-Nothing	Total NO _x (µg/m ³)	3.23	30		11%	
	Total NH ₃ (µg/m ³)	2.55	3		85%	
	N deposition (kgN/ha/yr)	7.68	10	15	77%	51%
	Acid deposition (keqN/ha/yr)	0.52	0.286	5.069	182%	10%
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
			Lower	Upper	Lower	Upper
Do-Something	Total NO _x (µg/m ³)	3.25	30		11%	
	Total NH ₃ (µg/m ³)	2.55	3		85%	
	N deposition (kgN/ha/yr)	7.68	10	15	77%	51%
	Acid deposition (keqN/ha/yr)	0.52	0.286	5.069	182%	10%
Scenario	Pollutant	Change due to Project	Limit		Change as % of Limit	
			Lower	Upper	Lower	Upper
Do-Something minus Do-Nothing	Total NO _x (µg/m ³)	0.02	30		0.1%	
	Total NH ₃ (µg/m ³)	0	3		0.0%	
	N deposition (kgN/ha/yr)	0	10	15	0.0%	0.0%
	Acid deposition (keqN/ha/yr)	0	0.286	5.069	0.0%	0.0%

181. In relation to the Lower River Shannon SAC the results of the assessment are presented in Table 12.27.

182. The predicted total annual mean NO_x concentrations are in compliance with the critical level of 30µg/m³ in the Do-Something scenario reaching at most 15% of the limit. The Proposed Project would increase NO_x concentrations within the relevant section of the Lower River Shannon SAC at Birdhill by 0.17µg/m³.

183. Modelled NH₃ concentrations are in exceedance of the critical level of 1µg/m³ in both the Do-Nothing and Do-Something scenarios (see Table 12.21); reaching at most 255% of the limit in the Do-Something scenario. However, the high concentrations are primarily due to the high background concentrations which are already in exceedance of 1µg/m³ (see Table 12.21). The Proposed Project would increase NH₃ concentrations within the relevant section of the Lower River Shannon SAC at Birdhill by 0.07µg/m³. Therefore, it is demonstrated that the Proposed Project would contribute to only minor levels of NH₃ in the impacted area.

184. Predicted N deposition rates within the relevant section of the Lower River Shannon SAC are within the critical load range of 5 – 10kgN/ha/yr. The Proposed Project would increase N deposition rates by 0.38kgN/ha/yr when compared with the Do-Nothing scenario.

185. The modelled acid deposition rate is in within the critical load range of 0.714 – 6.558keqN/ha/yr. The Proposed Project would increase acid deposition rates by 0.03keqN/ha/yr within the relevant section of the Lower River Shannon SAC at Birdhill.

Table 12.27: Predicted Air Quality Impacts to Ecology from Vehicle Emissions – Lower River Shannon SAC

Lower River Shannon SAC						
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
			Lower	Upper	Lower	Upper
Do-Nothing	Total NO _x (µg/m ³)	4.23	30		14%	
	Total NH ₃ (µg/m ³)	2.48	1		248%	
	N deposition (kgN/ha/yr)	7.78	5	10	156%	78%
	Acid deposition (keqN/ha/yr)	0.54	0.714	6.558	76%	8%
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
			Lower	Upper	Lower	Upper
Do-Something	Total NO _x (µg/m ³)	4.4	30		15%	
	Total NH ₃ (µg/m ³)	2.55	1		255%	
	N deposition (kgN/ha/yr)	8.16	5	10	163%	82%
	Acid deposition (keqN/ha/yr)	0.57	0.714	6.558	80%	9%
Scenario	Pollutant	Change due to Project	Limit		Change as % of Limit	
			Lower	Upper	Lower	Upper
Do-Something minus Do-Nothing	Total NO _x (µg/m ³)	0.17	30		0.6%	
	Total NH ₃ (µg/m ³)	0.07	1		7.0%	
	N deposition (kgN/ha/yr)	0.38	5	10	7.6%	3.8%
	Acid deposition (keqN/ha/yr)	0.03	0.714	6.558	4.2%	0.5%

186. In relation to the River Barrow and River Nore SAC at Mountmellick the results of the assessment are presented in Table 12.28.

187. The predicted total annual mean NO_x concentrations are in compliance with the critical level of 30µg/m³ in the Do-Something scenario reaching at most 35% of the limit. The Proposed Project would increase NO_x concentrations within the relevant section of the River Barrow and River Nore SAC at Mountmellick by 0.48µg/m³.

188. Modelled NH₃ concentrations are in exceedance of the critical level of 3µg/m³; however, NH₃ concentrations are in exceedance in both the Do-Nothing and Do-Something scenarios and the high concentrations are primarily due to the high background concentrations which are already in exceedance of 1µg/m³ (see Table 12.21). The Proposed Project would increase NH₃ concentrations within the relevant section of the River Barrow and River Nore SAC at Mountmellick by 0.14µg/m³. Therefore, it is demonstrated that the Proposed Project would contribute to only minor levels of NH₃ in the impacted area.

189. Predicted N deposition rates within the relevant section of the River Barrow and River Nore SAC at Mountmellick are in exceedance of the critical load range of 5 – 10kgN/ha/yr in both the Do-Nothing and Do-Something scenarios. The Proposed Project would increase N deposition rates by 0.76kgN/ha/yr when compared with the Do-Nothing scenario.

190. The modelled acid deposition rate is in exceedance of the lower critical load of 0.714keqN/ha/yr but is within the upper critical load of 6.13keqN/ha/yr. According to guidance from APIS (UK Centre for Ecology and Hydrology 2025) the critical load is deemed to have been exceeded if the upper load is exceeded and therefore, in this case no exceedance is predicted. The Proposed Project would increase acid deposition rates by 0.06keqN/ha/yr within the relevant section of the River Barrow and River Nore SAC at Mountmellick.

Table 12.28: Predicted Air Quality Impacts to Ecology from Vehicle Emissions – River Barrow and River Nore SAC at Mountmellick

River Barrow and River Nore SAC at Mountmellick						
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
			Lower	Upper	Lower	Upper
Do-Nothing	Total NO _x (µg/m ³)	10.08	30		34%	
	Total NH ₃ (µg/m ³)	3.8	1		380%	
	N deposition (kgN/ha/yr)	12.97	5	10	259%	130%
	Acid deposition (keqN/ha/yr)	0.94	0.714	6.13	132%	15%
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
			Lower	Upper	Lower	Upper
Do-Something	Total NO _x (µg/m ³)	10.56	30		35%	
	Total NH ₃ (µg/m ³)	3.94	1		394%	
	N deposition (kgN/ha/yr)	13.73	5	10	275%	137%
	Acid deposition (keqN/ha/yr)	1	0.714	6.13	140%	16%
Scenario	Pollutant	Change due to Project	Limit		Change as % of Limit	
			Lower	Upper	Lower	Upper
Do-Something minus Do-Nothing	Total NO _x (µg/m ³)	0.48	30		1.6%	
	Total NH ₃ (µg/m ³)	0.14	1		14.0%	
	N deposition (kgN/ha/yr)	0.76	5	10	15.2%	7.6%
	Acid deposition (keqN/ha/yr)	0.06	0.714	6.13	8.4%	1.0%

191. In relation to the River Barrow and River Nore SAC at Portarlinton the results of the assessment are presented in Table 12.29.

192. The predicted total annual mean NO_x concentrations are in compliance with the critical level of 30µg/m³ in the Do-Something scenario reaching at most 37% of the limit. The Proposed Project would increase NO_x concentrations within the relevant section of the River Barrow and River Nore SAC at Portarlinton by 0.42µg/m³.

193. Modelled NH₃ concentrations are in exceedance of the critical level of 3µg/m³; however, NH₃ concentrations are in exceedance in both the Do-Nothing and Do-Something scenarios and the high concentrations are primarily due to the high background concentrations which are already in exceedance of 1µg/m³ (see Table 12.21). The Proposed Project would increase NH₃ concentrations within the relevant section of the River Barrow and River Nore SAC at Portarlinton by 0.14µg/m³. Therefore, it is demonstrated that the Proposed Project would contribute to only minor levels of NH₃ in the impacted area.

194. Predicted N deposition rates within the relevant section of the River Barrow and River Nore SAC at Portarlinton are in exceedance of the critical load range of 5 – 10kgN/ha/yr in both the Do-Nothing and Do-Something scenarios. The Proposed Project would increase N deposition rates by 0.75kgN/ha/yr when compared with the Do-Nothing scenario.

195. The modelled acid deposition rate is in exceedance of the lower critical load of 0.714keqN/ha/yr but is within the upper critical load of 6.13keqN/ha/yr. According to guidance from APIS (UK Centre for Ecology and Hydrology 2025) the critical load is deemed to have been exceeded if the upper load is exceeded and therefore, in this case no exceedance is predicted. The Proposed Project would increase acid deposition rates by 0.05keqN/ha/yr within the relevant section of the River Barrow and River Nore SAC at Portarlinton.

Table 12.29: Predicted Air Quality Impacts to Ecology from Vehicle Emissions – River Barrow and River Nore SAC at Portarlinton

River Barrow and River Nore SAC at Portarlinton						
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
			Lower	Upper	Lower	Upper
Do-Nothing	Total NO _x (µg/m ³)	10.6	30		35%	
	Total NH ₃ (µg/m ³)	3.78	1		378%	
	N deposition (kgN/ha/yr)	13.05	5	10	261%	131%
	Acid deposition (keqN/ha/yr)	0.88	0.714	6.13	123%	14%
Scenario	Pollutant	Modelled Result	Limit		Result as % of Limit	
Do-Something	Total NO _x (µg/m ³)	11.0	30		37%	
	Total NH ₃ (µg/m ³)	3.92	1		392%	
	N deposition (kgN/ha/yr)	13.8	5	10	276%	138%
	Acid deposition (keqN/ha/yr)	0.93	0.714	6.13	130%	15%
Scenario	Pollutant	Change due to Project	Limit		Change as % of Limit	
Do-Something minus Do-Nothing	Total NO _x (µg/m ³)	0.42	30		1.4%	
	Total NH ₃ (µg/m ³)	0.14	1		14.0%	
	N deposition (kgN/ha/yr)	0.75	5	10	15.0%	7.5%
	Acid deposition (keqN/ha/yr)	0.05	0.714	6.13	7.0%	0.8%

12.4.2.1.4 Air Quality and Traffic Effect Significance – Ecological Receptors

196. The TII PE-ENV-01106 guidance (2022) states that outputs of the air quality assessment should be reviewed with the project ecologist in order to determine if the predicted effects are significant in relation to ecology. Where predicted N deposition and acid deposition rates are above 1% of the critical load, effects may be significant and must be discussed with the project ecologist; however, there are a number of additional factors which must be considered, as discussed in Section 12.2.6.2. The predicted N deposition and acid deposition as a result of the Proposed Project are above 1% of the critical load range; additionally, predicted NH₃ concentrations are in exceedance of the limit values at the assessed locations. Thus the above modelling results were reviewed by the project ecologist to determine their significance.

197. The air quality impact on sensitive ecology is discussed in further detail in Chapter 8 (Biodiversity). Site specific surveys of the impacted areas were undertaken to determine if the sensitive species in relation to NO_x, NH₃, N deposition and acid deposition were present in the area. The site-specific surveys of the Grand Canal pNHA at Killina, Kilcormac Esker pNHA at Blue Ball, Lower River Shannon SAC at Birdhill and the River Barrow and River Nore SAC at Mountmellick and Portarlinton confirmed that the sensitive species were not present. Thus, it can be concluded that while there may be some exceedances of pollutant concentrations, these would not be significant in relation to ecology. The Proposed Project is predicted to contribute only minor increases in pollutant levels compared with the Do-Nothing scenario.

198. It should also be noted that a conservative approach has been taken in this modelling assessment and the peak construction traffic has been modelled as occurring for an entire year when in reality it would only occur for a number of weeks in any location. In addition, the N deposition and acid deposition results have been compared to the critical load ranges for the potentially most sensitive species within the designated sites as a conservative approach regardless of whether that specific sensitive species is present within the impacted area.

199. Overall, the effect on ambient air quality and ecology at the Grand Canal pNHA at Killina, Kilcormac Esker pNHA at Blue Ball, Lower River Shannon SAC at Birdhill and the River Barrow and River Nore SAC at Mountmellick and Portarlinton due to the Proposed Project in the Construction Phase, using the EPA EIA Guidelines terminology (EPA 2022), is short-term, localised, direct, negative and Not Significant.

12.4.2.2 Air Quality – Dust Impacts

200. The greatest potential impact on air quality during the Construction Phase is from construction dust emissions, PM₁₀ and PM_{2.5} emissions and the potential for dust soiling. Material handling activities on-site, including excavation and backfill, typically emit dust. Large particle sizes (greater than 75µm) fall rapidly out of atmospheric suspension and are subsequently deposited in close proximity to the source. Particle sizes of less than 75µm are of interest as they can remain airborne for greater distances and can give rise to the potential dust soiling at the sensitive receptors.

201. While construction activities are likely to produce some level of dust during the earth moving and excavating phases of the Proposed Project, these activities are mainly be confined to particles of dust greater than 10µm. Particles of dust greater than 10µm are considered an annoyance but do not have the potential to cause significant health effects. For instance, bulldozing and compacting operations release 84% of particles which are greater than PM₁₀ with only 16% of particles being less than 10µm (UK Department of the Environment, Transport and the Regions 2000).

202. Dust generation rates depend on the site activity, particle size (in particular the silt content, defined as particles smaller than 75µm in size), the moisture content of the material and weather conditions, including levels of rainfall, wind speed and wind direction. Dust emissions are dramatically reduced where rainfall has occurred, due to the cohesion created between dust particles and water, and the removal of suspended dust from the air. As per Section 12.3.1, a review of meteorological data for the area indicates that dust emissions would be reduced over 50% of the time due to natural meteorological conditions.

203. Due to the linear nature of the Proposed Project, any impact to individual sensitive receptors along the Construction Working Width is likely to occur over only part of the Construction Phase. As such, while there is potential for dust soiling and significant levels of PM₁₀ and PM_{2.5} concentrations, it would vary both temporally and spatially as the construction develops. However, this is not applicable to the fixed Infrastructure Sites.

204. The TII PE-ENV-01106 guidance (2022) states that the dust assessment should consider fungus, specifically *Aspergillus spp.* According to the TII PE-ENV-01106 guidance (2022), *Aspergillus spp.* is a fungus that may be present in soil, compost and rotting leaves, plants, trees and crops, and dust, and so spores may be released and become airborne during earthworks or demolition of older buildings. It does not normally affect healthy individuals but may have adverse respiratory effects for individuals with immunosuppressed or low immunity. *Aspergillus spp.* is therefore of particular concern near hospital wards in which highly immune suppressed patients are accommodated. No additional impact assessment has been conducted specifically for *Aspergillus spp.* However, for locations where highly immune suppressed patients are accommodated, mitigation will be completed in line with the National Guidelines for the Prevention of Nosocomial Aspergillosis (HSE 2018), as set out in Section 12.5.2.

205. The following operations are the main dust-generating sources or activities:

- Vegetation clearance – removes grass and other soil covering thereby exposing earth and potentially generating dust
- Demolition – there are a total of five buildings to be demolished; demolition activities generate dust through the breakdown of materials in a potentially dusty manner and their removal from site
- Concrete batching – large amounts of potentially dusty materials required for batching plants

- Movement of trucks along paved public roads – potential of trackout from construction sites or resuspension of dust
- Movement of trucks along unpaved temporary stone tracks – potential for resuspension of dust as vehicles move around the site
- Extraction of material – works are broken down into different types (shallow, diaphragm wall); however, all activities involve the movement of potentially dusty material which has the potential to generate dust
- Stockpiling of material – stockpiles have the potential to generate dust due to dry material movement and wind erosion
- Hydraulic breakers fitted to excavators to break up the rock – large amounts of material to be removed which needs consideration with respect to potential for dust emissions.

206. The following sections use the appraisal method as discussed in Section 12.2.6.3 to appraise the risk to sensitive receptors of dust soiling and dust-related human health and ecological impacts during the Construction Phase in accordance with the IAQM Guidance (2024).

207. The dust emission magnitude from the proposed works is classified as small, medium or large as per the IAQM Guidance (2024) criteria described in Table 12.12. The magnitude is then combined with the sensitivity of the surrounding area (Table 12.18) to assess the potential risk of dust impacts and determine the level of site-specific mitigation required.

12.4.2.2.1 Demolition

208. It is proposed to remove five buildings in total as part of the Proposed Project. A single farm shed located toward the centre of the WTP site would be removed to accommodate construction of the WTP itself. There would also be three buildings and above-ground petrol pumps associated with an existing but disused petrol station on the R445 Regional Road would be removed in order to form the junction of the access road to the WTP site from the R445. The three buildings in question associated with the disused petrol station are a derelict stone building, a roofed storage shed/garage, and a roofed office building. A further barn would need to be demolished in order to provide an access over the Grand Canal to the Construction Working Width. Demolition of these buildings and the petrol pumps is within the Construction Working Width.

209. A summary of the site specific potential dust emission magnitudes is presented in Table 12.30.

210. The dust emission magnitude for the proposed demolition activities within the Construction Working Width and WTP were classified as small due to the volume of buildings to be demolished (as per the criteria in Table 12.12). Taking into account the sensitivity of the surrounding area to the sites as previously determined (Table 12.18), this results in an overall medium risk of dust soiling impacts, a low risk of human health impacts and a medium risk of ecology impacts due to proposed demolition activities, as shown in Table 12.31.

12.4.2.2.2 Earthworks

211. Earthworks primarily involve excavating material, haulage, tipping and stockpiling. This activity also involves levelling the site and landscaping. Using the criteria in Table 12.12, the dust emission magnitude for the proposed earthwork activities has been classified for the Construction Working Width and the Principal Construction Compound areas.

212. Table 12.30 shows a summary of the site-specific potential dust emission magnitudes.

213. The earthwork magnitude ranges from medium to large for the various Principal Construction Compound areas, proposed 38 kV Uprate Works and Infrastructure Sites due to the variation in the size of each area; those with a total area greater than 110,000m² are categorised as large while those with a total area between 18,000m² and 110,000m² are categorised as medium as per the IAQM criteria in Table 12.12. The site area for the full Construction Working Width is greater than 110,000m²; however, earthwork activities are unlikely to occur across the entirety of the Construction Working Width at once, therefore the dust emission magnitude is smaller at individual construction areas. However, a medium dust emission magnitude has been applied as a conservative approach so that the potential for worst-case dust emissions is considered; this also means the highest degree of mitigation is employed thereby reducing the risk of significant air quality effects.
214. Taking into account the sensitivity of the surrounding area to the sites as previously determined (Table 12.18), this results in an overall low – medium risk of dust soiling impacts, a low – medium risk of dust-related ecology impacts and a low – medium risk of dust-related human health impacts due to proposed earthwork activities, as shown in Table 12.31.

12.4.2.2.3 Construction

215. The construction of permanent buildings/tanks would be completed at the RWI&PS, WTP, BPT, BPS, FCV and TPR. Along the main pipeline, features including Line Valves, Washout Valves, Air Valves and potential future connections would be constructed but they would be small and dispersed in nature and therefore have a low potential for dust emissions. On-site concrete batching would take place at three locations: WTP, BPT and BPS. Chapter 5 (Construction & Commissioning), Table 5.11 provides an overview of facilities at Construction Compounds and Pipe Storage Depots with prefabs being put in place for staff welfare at a number of the sites and there being no permanent structures.
216. The dust emission magnitude for the proposed construction activities is classified as large at the WTP, medium at the RWI&PS, BPT, BPS and TPR and small at CC2, CC5, CC6, proposed 38 kV Uprate Works, FCV and Construction Working Width (including Pipe Storage Depots and access roads) as per the criteria set out in Table 12.12. The dust emission magnitude for the construction works is summarised in Table 12.30.
217. Taking into account the sensitivity of the surrounding area to the sites as previously determined (Table 12.18), this results in an overall low – medium risk of dust soiling impacts, a low risk of human health impacts and a low – medium risk of ecology impacts due to proposed construction activities, as shown in Table 12.31.

12.4.2.2.4 Trackout

218. Factors which determine the dust emission magnitude associated with trackout are vehicle size, vehicle speed, vehicle numbers, geology and duration.
219. The dust emission magnitude from trackout activities can be classified as large as there would be stretches of unpaved road that are greater than 100m required for the construction of the Proposed Project (see criteria in Table 12.12).
220. Table 12.30 shows a summary of the site-specific potential dust emission magnitudes.
221. Taking into account the sensitivity of the surrounding area to the sites as previously determined (Table 12.18), this results in an overall low – high risk of dust soiling impacts, a low – medium risk of dust-related human health impacts and a high risk of dust-related ecology impacts due to proposed trackout, as shown in Table 12.31.

12.4.2.2.5 Summary of Dust Impacts

222. Taking into consideration the magnitude of potential dust-generating activities (demolition, earthworks, construction and trackout), shown in Table 12.30 and sensitivity of receptors (Table 12.18), the resultant risk of dust impacts is determined (Table 12.31).

223. This risk level informs the required mitigation measures with respect to dust soiling, dust-related human health impacts and dust-related ecological impacts. Mitigation measures appropriate for sites with a low risk, medium risk or high risk of dust impacts are required for the Proposed Project depending on the risk level identified for the specific areas within Table 12.31.

224. In the absence of mitigation there is potential for short-term, direct, negative and Slight (Not Significant) effects to air quality from construction dust emissions.

Table 12.30: Summary of Dust Emission Magnitude

Site	Demolition	Earthworks	Construction	Trackout
Overall Construction Working Width (including Pipe Storage Depots, access roads and road access and egress points)	Small	Medium	Small	Large
Proposed 38 kV Uprate Works	N/A	Small	Small	Large
Flow Control Valve	N/A	Small	Small	Large
Satellite Construction Compound: CC0 RWI&PS	N/A	Medium	Medium	Large
Principal Construction Compound: CC1 WTP	Small	Large	Large	Large
Principal Construction Compound: CC2 Lisgarriff	N/A	Large	Small	Large
Satellite Construction Compound: CC3 BPT	N/A	Medium	Medium	Large
Satellite Construction Compound: CC4 BPS	N/A	Medium	Medium	Large
Principal Construction Compound: CC5 Killananny	N/A	Large	Small	Large
Principal Construction Compound: CC6 Drummond	N/A	Large	Small	Large
Satellite Construction Compound: CC7 TPR	N/A	Large	Medium	Large

Table 12.31: Summary of Dust Risk to Define Site-Specific Mitigation

Site	Demolition			Earthworks			Construction			Trackout		
	Dust Soiling	Human Health	Ecology	Dust Soiling	Human Health	Ecology	Dust Soiling	Human Health	Ecology	Dust Soiling	Human Health	Ecology
Overall Construction Working Width (including Pipe Storage Depots, access roads and road egress points)	Medium risk	Low risk	Medium risk	Medium risk	Medium risk	Medium risk	Low risk	Low risk	Low risk	High risk	Medium risk	High risk
Proposed 38 kV Uprate Works	N/A	N/A	N/A	Low risk	Negligible	Low risk	Low risk	Negligible	Low risk	High risk	Low risk	High risk
Flow Control Valve	N/A	N/A	N/A	Negligible	Negligible	N/A	Negligible	Negligible	N/A	Low risk	Low risk	N/A
Satellite Construction Compound: CC0 RWI&PS	N/A	N/A	N/A	Low risk	Low risk	Medium risk	Low risk	Low risk	Medium risk	Low risk	Low risk	High risk
Principal Construction Compound: CC1 WTP	Negligible	Negligible	N/A	Low risk	Low risk	N/A	Low risk	Low risk	N/A	Low risk	Low risk	N/A
Principal Construction Compound: CC2 Lisgarraff	N/A	N/A	N/A	Low risk	Low risk	N/A	Negligible	Negligible	N/A	Low risk	Low risk	N/A
Satellite Construction Compound: CC3 BPT	N/A	N/A	N/A	Medium risk	Low risk	N/A	Medium risk	Low risk	N/A	Medium risk	Low risk	N/A
Satellite Construction Compound: CC4 BPS	N/A	N/A	N/A	Low risk	Low risk	N/A	Low risk	Low risk	N/A	Low risk	Low risk	N/A
Principal Construction Compound: CC5 Killananny	N/A	N/A	N/A	Low risk	Low risk	N/A	Negligible	Negligible	N/A	Low risk	Low risk	N/A
Principal Construction Compound: CC6 Drummond	N/A	N/A	N/A	Medium risk	Low risk	N/A	Low risk	Negligible	N/A	Medium risk	Low risk	N/A
Satellite Construction Compound: CC7 TPR	N/A	N/A	N/A	Medium risk	Low risk	N/A	Medium risk	Low risk	N/A	Medium risk	Low risk	N/A

12.4.2.3 Construction Summary

225. Table 12.32 provides a summary of the air quality effects during construction in the absence of mitigation measures.

226. With regard to Construction Phase traffic emissions and the resulting effects on air quality due to increased pollutant levels, there would be short-term, direct, negative and Imperceptible effects to air quality and human health due to the Proposed Project construction traffic, which is considered a Not Significant effect in the EPA EIAR Guidelines terminology (EPA 2022).

227. With regard to Construction Phase traffic emissions and air quality effects to sensitive designated ecology, there would be short-term, direct, negative and Not Significant effects using the EPA EIAR Guidelines terminology (EPA 2022).

228. In relation to Construction Phase dust emissions, in the absence of mitigation there would be short-term, direct, negative and Slight effects to air quality from construction dust emissions, which is considered a Not Significant effect in the EPA EIAR Guidelines terminology (EPA 2022).

Table 12.32: Summary of Construction Phase Effects

Element/Receptor	Duration of Impact	Quality of Impact	Significance of Effect
Deterioration in ambient air quality due to increased pollutants from construction traffic emissions and effect on human health	Short-term	Negative	Imperceptible (Not Significant)
Air quality effects to sensitive designated ecology due to increased pollutants from construction traffic emissions	Short-term	Negative	Not Significant
Dust soiling effects on property	Short-term	Negative	Slight (Not Significant)
Dust-related human health effects	Short-term	Negative	Slight (Not Significant)
Dust-related ecological effects	Short-term	Negative	Slight (Not Significant)

12.4.3 Operational Phase

229. The assessment of baseline air quality in the region of the Proposed Project has shown that current levels of key pollutants are substantially lower than their limit values.

230. Operational traffic is the primary source of potential air quality impacts during the Operational Phase of the Proposed Project. No other sources of air quality impacts have been identified. Traffic models identified that the change in traffic due to the Proposed Project once operational would be below the TII scoping criteria in Section 12.2.1.2. The Proposed Project would result in an additional 278 AADT on the R445 in County Tipperary. This is the largest increase in operational traffic due to the Proposed Project and all other road links would have a lesser impact (refer to Chapter 7: Traffic & Transport). Therefore, using the TII scoping criteria (TII 2022), no road links were classed as 'affected' by the Operational Phase of the Proposed Project and no detailed air quality modelling assessment was required.

231. It can be concluded that the effect on sensitive receptors, both human and ecological due to air quality and operational traffic emissions would be long term, direct, localised, neutral and Imperceptible using the EPA EIAR Guidelines effect descriptors (EPA 2022), which is Not Significant.

12.4.4 Testing and Commissioning

232. The testing and commissioning activities would result in minimal emissions to air, primarily as a result of vehicle emissions due to staff accessing the various sites for testing or commissioning activities. No other sources of air emissions are predicted for the testing and commissioning works.
233. The Operational Phase traffic includes vehicles associated with testing and commissioning activities and would not result in a significant change in vehicles on the local road network. A detailed air assessment of Operational Phase traffic emissions has been scoped out as per Section 12.2.2.2.

12.5 Mitigation and Monitoring Measures

12.5.1 Embedded Mitigation Measures

234. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the Proposed Project design. This is referred to as embedded (or design) mitigation. Embedded mitigation is inherent to the Proposed Project design, and forms part of the project description and construction methodology described in Chapters 4 (Proposed Project Description) and 5 (Construction & Commissioning) of the EIAR. As such, embedded mitigation is considered in the assessment of pre-mitigation effects in Section 12.4. Chapter 3 (Consideration of Reasonable Alternatives) of the EIAR details the reasonable alternatives that have been considered throughout the design development of the Proposed Project, including the environmental factors which have influenced the decision making.
235. In relation to embedded mitigation, where necessary, and to avoid potential significant dust impacts to nearby receptors, site compounds were located to avoid dense residential areas and compound layouts were reviewed and laid out so as to reduce dust emissions as much as practicable.

12.5.2 Specific Mitigation and Monitoring Measures

236. Specific mitigation measures are proposed to prevent or reduce significant adverse effects. Where appropriate, consideration has been given to the appropriateness of monitoring measures, the purpose of which is to check that the mitigation measures required to prevent or reduce significant adverse effects are delivered and perform as intended, in accordance with the requirements of the EIA Directive.
237. Mitigation and monitoring measures for air quality are described below and are included in the CEMP which has been produced to support this EIAR (refer to Appendix A5.1).

12.5.2.1 Traffic Emissions Mitigation Measures

238. The traffic impact assessment as detailed in Section 12.4.2.1 has indicated that vehicle emissions during the Construction Phase would have a short-term, negative and Imperceptible (Not Significant) effect on ambient air quality and concentrations of NO₂, PM₁₀ and PM_{2.5}. No mitigation measures are therefore required to avoid or reduce significant effects. However, the following good practice measures will be implemented to reduce vehicle emissions as far as practicable. These measures include:
- Implement a policy which prevents idling of vehicles both on and off site, including HDV holding sites
 - Efficient scheduling of deliveries to reduce trips as far as practicable
 - Construction vehicles shall conform to the current EU emissions standards and where reasonably practicable, their emissions shall meet upcoming standards prior to the legal requirement date for the new standard. This would reduce emissions on Haul Roads.

239. In addition, as part of the Proposed Project, a Traffic Management Plan (see Appendix A7.2) will be put in place for the Construction and Operational Phases. This includes measures such as implementation of GPS monitoring of haulage traffic to track that HDVs are using the specified Haul Roads.

12.5.2.2 Construction Dust Mitigation Measures

240. To reduce the risk from dust emissions during demolition, earthworks, construction and trackout activities a series of mitigation measures appropriate for the level of risk identified for the activities in Table 12.31.

241. These measures have been collated in Appendix A12.1 (Dust Mitigation Measures). These measures are based on the IAQM Guidance (2024) and are appropriate for sites that have a high level of risk associated with dust emissions. These mitigation measures are incorporated into a Dust Management Plan which is included in Appendix A5.1 Annex E and will form part of the overall CEMP prepared by the Contractor for the Construction Phase of the Proposed Project. The Register of Environmental Actions and Commitments (Annex G of Appendix A5.1), includes a commitment to update the Dust Management Plan prior to construction. With the implementation of the dust mitigation measures outlined in Appendix A12.1 and the Dust Management Plan, the air quality effects from dust emissions during the Construction Phase would be not significant.

242. Activities such as earthworks, in particular close to the identified designated ecological areas, close to sensitive residential receptors or close to river crossings, will be considered sensitive activities with respect to dust generation. The measures outlined within Appendix A12.1 shall be strictly adhered to by the Contractor. The proposed mitigation measures will be reviewed at regular intervals during the Construction Phase to monitor the effectiveness of the procedures in place and to maintain the goal of reducing dust as far as practicable. It is the responsibility of the appointed Contractor to develop, update and enforce the dust mitigation measures. The Dust Management Plan prepared by the Contractor must include all appropriate dust and emissions mitigation measures, including for asbestos and Aspergillus (in particular for Peamount Hospital), applicable to the circumstances of the relevant site, based on the local authority requirements and industry good practices. The Dust Management Plan will be updated by the appointed Contractor, and for each worksite shall include:

- An inventory and timetable of activities which may give rise to emissions or dust
- Alert levels
- Alert system to be used (including notification process)
- Details of control measures
- Details of dust-monitoring arrangements, including the location of sensitive receptors, monitoring locations and monitoring equipment to be used
- Details of the air quality reporting requirements.

243. The full suite of dust mitigation measures is outlined in Appendix A12.1 and includes detailed measures specific to demolition, earthworks, construction and trackout activities. These procedures will be monitored and assessed to check they are working satisfactorily. In the unlikely event of significant dust soiling occurring outside the site of major works areas or Construction Compounds, movements of materials likely to raise dust and dust-generating activities will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

244. Prior to any demolition, a detailed demolition study will be conducted and a demolition plan prepared for each site. This plan will take into consideration the potential for dust generation and nearby sensitive receptors. Surveys will be required to identify the location of any asbestos or other harmful substances which will require removal in accordance with the Code of Practice for Demolition (BS 6187) (British Standards Institution 2011) and Asbestos-Containing Materials (ACMs) in Workplaces – Practical Guidelines on ACM Management and Abatement (Health and Safety Authority 2013). All work and disposal will be carried out by licensed specialist contractors.

12.5.2.3 Construction Compound Specific Mitigation

245. In addition to the general dust mitigation measures proposed as part of the Proposed Project, there are also specific measures proposed at Peamount and Drummond Compounds.
246. At locations where highly immune suppressed people are present (i.e. hospitals), the National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis during Construction/Renovation Activities (National Disease Surveillance Centre 2002) and National Guidelines for the Prevention of Nosocomial Aspergillosis (HSE 2018) will be complied with by the appointed Contractor.
247. Research has found that dust suppression techniques also prevent the suspension of *Aspergillus* successfully (Fournel, *et al.* 2010). The National Guidelines for the Prevention of Nosocomial Aspergillosis (HSE 2018) provide a risk assessment for *Aspergillus*, and preventative dust mitigation measures in Appendix B: Pre-Project Planning and Contractor Advice. The HSE guidance also provides information that will be included as part of tender documents. Prevention works, in addition to the standard dust mitigation with respect to *Aspergillus*, will involve advising that the windows on the façades of the hospital that are in closest proximity to the works are sealed where feasible to limit fugitive dust entering the hospital through windows. Highly immune suppressed patients which are susceptible to *Aspergillus* are usually located in hospital rooms with HEPA filters in place and the windows are therefore not openable. An *Aspergillus* Prevention Plan will be completed by a specialist to prevent *Aspergillus* spores spreading. The potential risk from *Aspergillus* is also considered in Chapter 15 (Human Health). The mitigation measures put in place to control construction dust are also considered as mitigation measures with respect to *Aspergillus* as they will limit the potential for spread of the fungal spores.
- In relation to *Aspergillus* specifically, survey and prevention works will take place before construction commences by a competent Contractor in proximity to any sensitive buildings and in particular in proximity to Peamount Hospital
 - Prevention works will involve advising that the windows on the façades of the hospital that are in closest proximity to the works are sealed where feasible to limit dust entering the hospital through windows (in line with the National Guidelines for the Prevention of Nosocomial Aspergillosis)
 - An *Aspergillus* Prevention Plan will be developed by a suitably qualified specialist prior to commencement of works on the site to prevent *Aspergillus* spores spreading
 - The National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis will be taken into consideration by the competent Contractor as a source for the *Aspergillus* Prevention Plan.
248. With regard to Drummond Compound, the following measures proposed to mitigate impacts on sensitive receptors around the compound. The general construction dust mitigation measures will be applicable to the activities associated with the pipeline construction activities up to 500m to the east and west of the compound location.
- Bound surface construction roads will be installed alongside the boundary between the Proposed Project, Drummond Compound and the adjoining horticultural business (Monaghan Mushrooms). These will be regularly damped down with fixed or mobile sprinkler systems and regularly cleaned
 - The Drummond Compound area will be hard surfaced (using tarmac) to reduce dust emissions to the adjoining horticultural business. This will be regularly damped down with fixed or mobile sprinkler systems and regularly cleaned
 - Any grassed areas on site will be kept mown short to prevent flies (which are a disease vector for the adjoining highly sensitive horticultural operations). A mowing schedule will be implemented by the Contractor which will include for weekly mowing of grassed areas on site during the growing season (spring/summer). The frequency of mowing will be reviewed by the Contractor at regular intervals (minimum monthly) and tailored as necessary
 - Additional real-time particulate matter monitoring of fine particulate matter (PM₁₀ and PM_{2.5}) will be undertaken at 1 no. location along the northern boundary of the site. This will give the ability to respond to short-term dust events

- Should any unplanned events, accidents, or spillages of potentially dusty material occur, they will be dealt with as soon as possible, taking into consideration the mitigation measures in Appendix A12.1 and the Dust Management Plan in Appendix A5.1 Annex E.

249. The name and contact details of a person to contact regarding air quality and dust issues will be displayed on the wayleave or Construction Compound boundaries; this noticeboard will also include head/regional office contact details. Community engagement before works commence on-site will be put in place, including a communications plan. All dust and air quality complaints will be recorded and causes identified, along with the measures taken to reduce emissions. This complaints log will be available for viewing by the local authority, if requested. Daily on- and off-site inspections will occur for dust soiling and to check compliance with the Dust Management Plan.

12.5.2.4 Construction Dust Monitoring Measures

250. Due to the close proximity of the site to a number of sensitive receptors, monitoring of construction dust deposition at the site boundary during the Construction Phase of the Proposed Project will be undertaken where there are sensitive receptors adjacent to or within 250m of the Planning Application Boundary. This is to check the proposed mitigation measures are working satisfactorily. Monitoring can be carried out using the Bergerhoff method in accordance with the requirements of the German standard VDI 2119 (Verein Deutscher Ingenieure 2013). The Bergerhoff method consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The results of the monitoring will comply with the TA Luft limit value of 350mg/m²/day during the monitoring period of 30 days (+/- 2 days).

251. In areas of particularly high sensitivity, such as the TPR construction compound location, which the Peamount Hospital site is directly adjacent to (less than 10m); and the Drummond Compound, a real-time particulate monitor to monitor PM₁₀ and PM_{2.5} concentrations will be used. This monitor has the capability to provide alerts if particulate concentrations are elevated above set trigger levels.

12.5.2.5 Operational Phase

252. There is no significant predicted operational effect with respect to air quality and therefore there are no specific mitigation measures required during the Operational Phase of the Proposed Project.

12.6 Residual Effects

253. This section reports the residual effects on air quality as a result of the Proposed Project, taking account of the mitigation measures set out in Section 12.5.

12.6.1 Construction

254. The assessment reported in Section 12.4 for effects on human receptors from traffic emissions during construction concluded there would be no significant effects from the Proposed Project. As such, no specific mitigation measures are required, and the residual effects are as described in Section 12.6; short-term, direct, localised, negative and Imperceptible (Not Significant). Although no mitigation is required, good practice measures would be implemented by the Contractor to reduce vehicle emissions as far as practicable.

255. In relation to effects on ecological receptors from traffic emissions, the increase in NO_x and NH₃ concentrations and N deposition and acid deposition rates has been assessed as Not Significant.

256. The dust risk assessment identified a high risk of dust soiling effects on people and property and sensitive ecology associated with some of the Construction Phase activities (as reported in Section 12.4.2). However, with effective implementation of the dust mitigation measures outlined in Section 12.5 and Appendix A12.1, the Proposed Project would result in a short-term, localised, direct, negative and Imperceptible (Not Significant) effect on air quality during the Construction Phase.

12.6.2 Operation

257. Once operational, the Proposed Project would have a long-term, direct, neutral and Imperceptible (Not Significant) effect on air quality as reported in Section 12.4.3. As such, no mitigation measures are required, and the residual effects are as described in Section 12.6.

12.6.3 Summary of Effects

Table 12.33: Summary of Residual Construction Phase and Operational Phase Air Quality Effects

258. contains a summary of the residual Construction Phase and Operational Phase effects due to the Proposed Project, taking account of the proposed mitigation measures set out in Section 12.5. Following the application of mitigation measures, there would not be any likely significant residual effects from air quality on human health or ecology, or from dust emissions.

Table 12.33: Summary of Residual Construction Phase and Operational Phase Air Quality Effects

Element	Description of Potential Impacts	Pre-Mitigation		Mitigation and Monitoring Measures	Post-Mitigation
		Sensitivity	Significance of Effect		Residual Significance
Construction Phase dust impact	<p>Low to medium risk of dust impacts to property, human health and sensitive ecology identified for demolition, construction and earthworks activities.</p> <p>Low to high risk of dust impacts to property, human health and sensitive ecology identified for trackout activities.</p>	High to low sensitivity as per Table 12.18	Slight (Not Significant)	<p>Dust mitigation measures as per Section 12.5.2.2 and Appendix A12.1.</p> <p>Monitoring as per Section 12.5.2.4 to check mitigation is being successfully implemented.</p>	Imperceptible (Not Significant)
Construction Phase traffic emissions impact – human health	<p>Background air quality is substantially below the limit values which reduces the sensitivity of the air quality environment. Residential properties are regarded as high sensitivity receptors to air quality and traffic emissions.</p> <p>Modelling of traffic emissions indicates that changes in pollutant concentrations would be at most slight in relation to human health as per the TII criteria in Table 12.8.</p>	High sensitivity	Imperceptible (Not Significant)	No site-specific mitigation is required beyond standard good practice measures as per Section 12.5.2.1.	Imperceptible (Not Significant)
Construction Phase traffic emissions impact – ecology	<p>Increase in NO_x, NH₃, N deposition and acid deposition at sections of the Grand Canal pNHA, Kilcormac Esker pNHA, Lower River Shannon SAC, and River Barrow and River Nore SAC in Mountmellick and Portarlington.</p> <p>Impacts assessed by project ecologist as part of Chapter 8 (Biodiversity) of the EIAR and the Natura Impact Statement.</p>	High sensitivity as increases in pollutant levels can impact sensitive species and species richness	Not Significant	No mitigation required.	Not Significant ²
Operational Phase traffic emission impact	Operational Phase traffic is below threshold for detailed air modelling assessment. Impacts from Operational Phase traffic have been scoped out in Section 12.2.1.	High sensitivity	Imperceptible (Not Significant)	No mitigation is required.	Imperceptible (Not Significant)

² The Proposed Project is predicted to contribute only minor increases in pollutant levels compared with the Do-Nothing scenario. While some predicted results are above the limit values these are in areas where background concentrations are already high and in exceedance of the limit values, specifically in relation to NH₃ and N deposition.

12.7 References

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