8 Air Quality and Odour

8.1 Introduction

This chapter assesses the likely significant effects of the proposed development on air quality and odour (including a semi-quantitative assessment of construction air emissions) resulting from the construction, operation and maintenance of the proposed development.

Chapter 4, *Description of the Proposed Scheme,* provides a description of the proposed development and **Chapter 5,** *Construction Strategy,* describes the construction strategy for the proposed development. **Chapter 19**, *Climate,* addresses potential effects on climate. The following aspects are particularly relevant to the air quality and odour assessment:

- **Construction:**
  - Air Quality aspects relating to the construction phase including site excavation, material handling, traffic movements.
  - Odour impacts from the dredging and reuse of material from Arklow River.
- **Operation and Maintenance:**
  - Aspects relating particularly to the operation and maintenance of the proposed development.

8.2 Assessment Methodology

8.2.1 General

8.2.1.1 Air quality

Air quality assessments are concerned with the presence of airborne pollutants in the atmosphere. The likely significant effects of the proposed development on air quality have been assessed by considering the background concentration levels of pollutants in the atmosphere and the potential for construction and operation effects associated with the proposed development.

This assessment has been undertaken with regard to the Transport Infrastructure Ireland (TII), (formerly the National Roads Authority (NRA)), air quality guidelines[1]. These guidelines provide a methodology for the assessment, management and mitigation of air quality at construction sites which can be adapted to suit the nature of the works.

[1] Transport Infrastructure Ireland (TII), (formerly the National Roads Authority (NRA)) (2011). Guidelines for the Treatment of Air Quality during the Planning and Construction of National Roads Schemes. TII, Dublin, Ireland.

The TII guidelines state that increases in Annual Average Daily Traffic (AADT) flows of less than 5% and 10% during the operational and construction phases of a development, respectively, are unlikely to result in significant air quality effects.

Likely significant effects on air quality are therefore assessed when the AADT flows are projected to increase above these thresholds during construction and operation of the proposed development.

The traffic volumes, as presented in **Chapter 7**, *Traffic and Transport*, show that the anticipated increases are significantly less than the 5% for operation and less than 10% for construction that trigger the requirement for a detailed assessment. Traffic is therefore unlikely to result in significant air quality effects during construction and operation and as such, there is no requirement for a detailed assessment.

8.2.1.2 Odour

The generation and dispersion of odorous emissions have been assessed due to the nature of the dredged material and the scale of the dredging operation during the construction phase of the proposed development. This assessment considers the potential for likely significant odour effects during its handling and archaeological examination.

8.2.2 Guidance and legislation

8.2.2.1 Air quality

Limit values for a range of air pollutants have been set through European and national legislation. These limit values are set for the protection of human health and ecosystems.

On 12 April 2011, the *Air Quality Standards (AQS) Regulations 2011*[2] came into force and transposed *EU Directive 2008/50/EC* [3] on ambient air quality and cleaner air for Europe into Irish law. The purpose of the AQS Regulations is to:

- establish limit values and alert thresholds for concentrations of certain pollutants;
- to provide for the assessment of certain pollutants using methods and criteria common to other European Member States;
- to ensure that adequate information on certain pollutant concentrations is obtained and made publicly available; and
- to provide for the maintenance and improvement of ambient air quality where necessary.

The limit values established under the AQS Regulations relevant to this assessment are included in **Table 8.1**.

[2] Air Quality Standards (AQS) Regulations 2011 (S.I. No. 180 of 2011)
[3] E.C (2008). Directive 2008/50/EC. *Ambient Air Quality and Cleaner Air for Europe*

Table 8.1: Limit values in the AQS Regulations

Pollutant	Limit value for the protection of:	Averaging period	Limit value ($\mu g/m^3$)	Basis of application of limit value
NO_2	Human Health	1-hour	200	≤ 18 exceedances p.a. (99.79%ile)
		Calendar year	40	Annual mean
NO_x	Vegetation	Calendar year	30	Annual mean
PM_{10}	Human Health	24-hours	50	≤ 35 exceedances p.a. (90%ile)
		Calendar year	40	Annual mean
$PM_{2.5}$	Human Health	Calendar year	25 Note 1	Annual mean

Note 1: Limit value to be reviewed by the Commission in light of further information on health and environmental effects, technical feasibility and experience of the Target Value in Member States.

There are no statutory limits for dust at a European or national level. However, *TA Luft*[4] provides a guideline for the rate of dust deposition of 350 $mg/m^2/day$ averaged over one year. The EPA concurs[5] that this guideline may be applied, although the EPA typically applies the guideline limit as a 30-day average. Dust deposition levels will be compared to the limit on a monthly basis.

8.2.3 Institute of Air Quality Management Guidance

8.2.3.1 Dust

The Institute of Air Quality Management (IAQM) *Guidance on the assessment of Dust from Demolition and Construction*, 2014 gives guidance to air quality consultants and environmental health officers on how to assess air quality impacts of dust 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.

[4] TA Luft (2002) *Technical Instructions on Air Quality.*
[5] EPA (2006) *Environmental Management in the Extractive Industry (Non-Scheduled Minerals).*

8.2.3.2 Odour

Currently, there is no general statutory odour standard in Ireland. The Institute of Air Quality Management's *Guidance on the assessment of odour for planning,* 2018[6] was used to undertake a quantitative risk assessment of odour emissions during the construction phase.

The guidance provides examples of low, medium and high risk factors for the odour source, the pathway and receptor sensitivity that are important in risk classification. However, the guidance does acknowledge that it is difficult to provide a detailed method that will be universally suitable for application to all odorous developments (or sites around them). Therefore, professional judgement will need to be used to check that the risk classification of factors is suitable to the scenario.

Further detail on the risk classification for odour source, pathway and receptor sensitivity is provided in **Table 8.11** to **Table 8.13**.

In respect of odour offensiveness, two reference documents have been cited herein and have been used to assist in determining appropriate levels. **Table 8.2** outlines the odour criteria considered for this assessment based on the UK's Environment Agency Odour Management Guidance[7] and the Institute of Air Quality Management (IAQM) Guidance[8]. A summary of the indicative limit criteria for various industrial sectors is given in **Table 8.2.**

Table 8.2: Indicative odour criteria for various industrial sectors

Industrial Sectors	Relative Offensiveness of Odour
Processes involving decaying animal or fish remains Processes involving septic effluent or sludge Biological landfill odours	Most Offensive
Intensive livestock rearing Sugar beet processing Fat frying (food processing) Well aerated green waste composting	Moderately offensive
Brewery, Confectionery, Coffee roasting, Bakery	Less offensive

An odour criterion of moderately offensive is applied to the dredged material, pending archaeological examination and removal off site, of dredge material, in line with *well aerated green waste composting*.

[6] IAQM (2018)
[7] Environment Agency (2011) *H4 Odour Management How to comply with your environmental permit*
[8] Institute of Air Quality Management (IAQM) (2018) *Guidance on the assessment of odour for planning*

8.2.4 Study area

The proposed development is located in Arklow, Co. Wicklow. The proposed development is contained within the planning boundary as shown in the site location and site layout maps; refer to **Figure 1.1** and **Figure 1.2** in **Chapter 1,** *Introduction*.

Sensitive receptor locations are defined by TII guidance as *residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present.* The closest sensitive receptors[9] to the proposed flood relief scheme development are located approximately 15m from the construction works.

In relation to the site compound areas, which will be required for archaeological monitoring of the dredged material, the closest sensitive receptors are located within approximately 25m of the site compound areas. Receptor locations at SC1, SC2 and SC6 are considered in this assessment. Refer to **Figure 8.1**, in which the receptor locations are indicated as G01 to G04.

[9] Sensitive receptor locations include: residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present (TII, 2011)

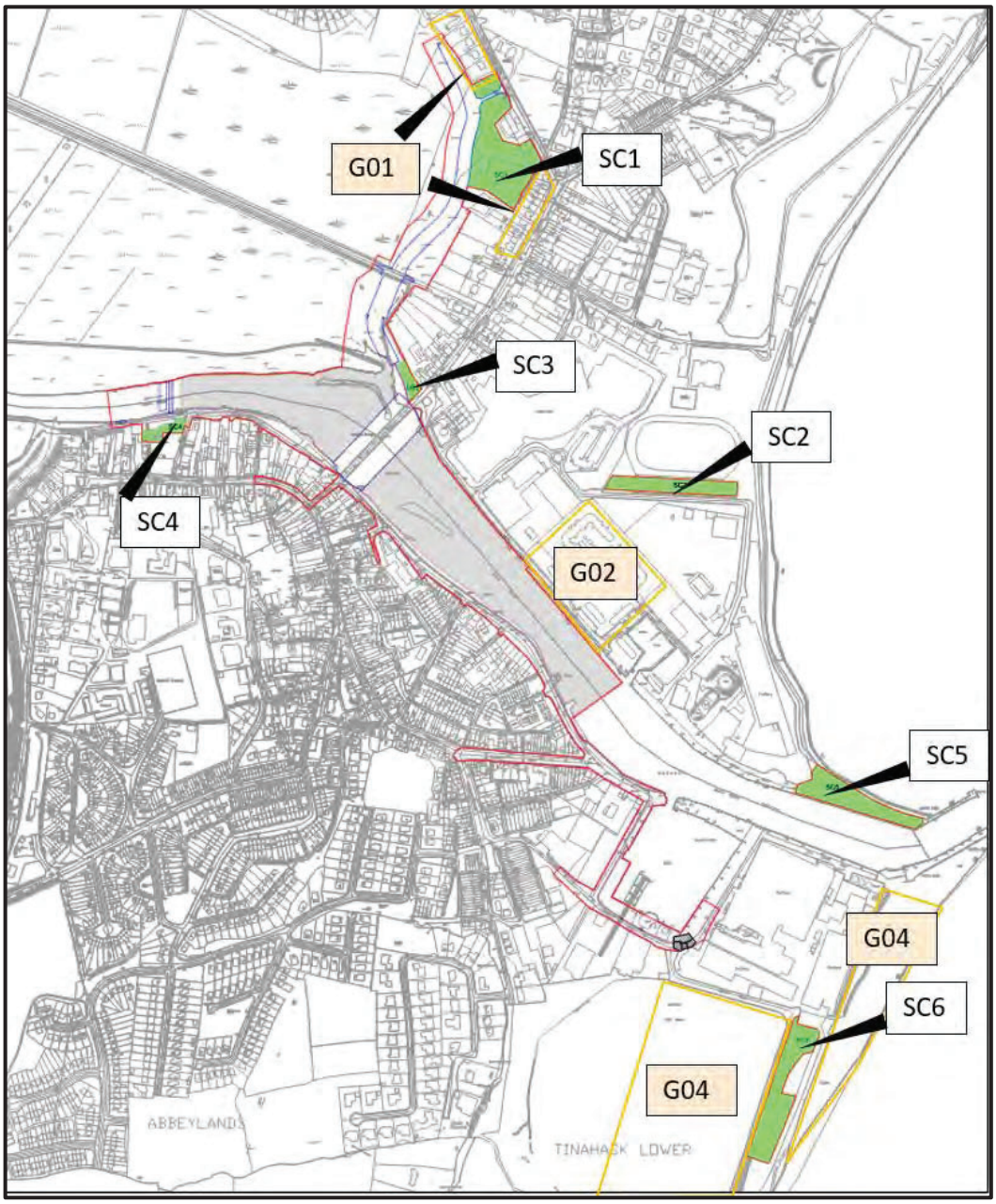


Figure 8.1: Site compounds (SC) and odour receptors (G). Not to Scale. Extracted from Drawing No 1065

8.2.5 Site visits

A site visit was undertaken on Tuesday 10 November 2020, no odours or air quality issues were detected during the site visit.

8.2.6 Categorisation of the baseline environment

A desk-based study of the baseline air quality environment of the proposed development area was undertaken in order to inform this assessment. EPA Air Quality Reports[10,11,12] were referred to.

8.2.7 Impact assessment methodology

8.2.7.1 Air quality

8.2.7.2 Construction

The construction effects have been assessed using the qualitative approach described in the latest IAQM guidance. The guidance applies to the assessment of dust from construction/demolition activities.

An 'impact' is described as a change in pollutants concentrations or dust deposition, while an 'effect' is described as the consequence of an impact. The main impacts that may arise during construction of the proposed development are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes;
- Elevated PM_{10} concentrations as a result of dust generating activities on site; and
- An increase in NO_2 and PM_{10} concentrations due to exhaust emissions from construction plant and machinery and vehicles accessing the site.

The IAQM guidance considers the potential for dust emissions from dust-generating activities, such as demolition of existing structures, earthworks, construction of new structures and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.

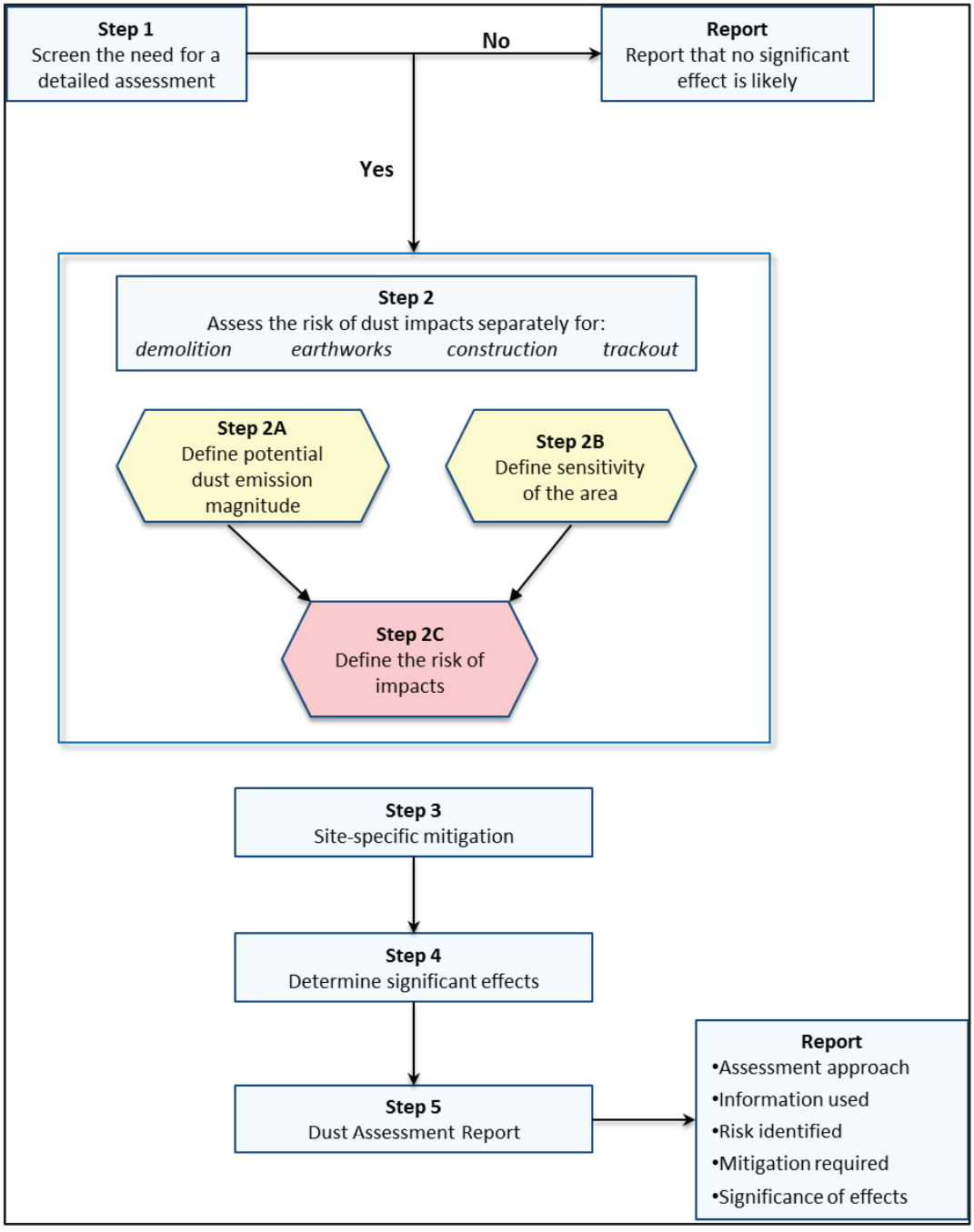
For each of these dust-generating activities, the guidance considers three separate effects: annoyance due to dust soiling; harm to ecological receptors; and the risk of health effects due to a significant increase in PM_{10} exposure. The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM_{10} exposure.

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 PM_{10} concentrations and the distance to the closest receptor, in order

[10] EPA (2020) Air Quality in Ireland 2019 - Indicators of Air Quality
[11] EPA (2019) Air Quality in Ireland 2018 - Indicators of Air Quality
[12] EPA (2018) Air Quality in Ireland 2017 - Indicators of Air Quality

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 the site. **Table 8.3** outlines the steps to be undertaken.

Table 8.3: Steps to undertaking dust assessment



Step 1: Screen need for assessment

The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the site boundary (for ecological receptors, 50m, see **Table 8.4**) and/or within 50m of the route(s) used by the construction

vehicles on the public highway and up to 500m from the site entrance(s). These thresholds are passed for the proposed development.

Step 2: Assess the risk of dust impacts

This step is split into three sections as follows:

2A. Define the potential dust emission magnitude;

2B. Define the sensitivity of the area; and

2C. Define the risk of impacts.

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 8.5**.

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 PM_{10} background concentrations and any other site-specific factors. **Table 8.6** and

Table 8.7 show the criteria for defining the sensitivity of the area to different dust effects.

The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures (**Table 8.10)** and an overall risk for the site derived.

Table 8.4: Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	**Distance from the Source (m)**	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table 8.5: Categorisation of dust emission magnitude

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
• total building volume <20,000m^3 • construction material with low potential for dust release (e.g. metal cladding or timber) • demolition activities <10m above ground • demolition during wetter months	• total building volume 20,000 - 50,000m^3 • potentially dusty construction material • demolition activities 10 - 20m above ground level	• total building volume >50,000m^3 • potentially dusty construction material (e.g. concrete) • on-site crushing and screening • demolition activities >20m above ground level

Dust Emission Magnitude		
Earthworks		
• total site area <2,500m^2 • soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • formation of bunds <4m in height • total material moved <10,000 tonnes • earthworks during wetter months	• total site area 2,500m^2 - 10,000m^2 • moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • formation of bunds 4 - 8m in height • total material moved 20,000 - 100,000 tonnes	• total site area >10,000m^2 • 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 >8m in height • total material moved >100,000 tonnes
Construction		
• total building volume <25,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber)	• total building volume 25,000 - 100,000m^3 • potentially dusty construction material (e.g. concrete) • on-site concrete batching	• total building volume >100,000m^3 • on-site concrete batching • sandblasting
Trackout		
• <10 Heavy duty vehicle (HDV) (>3.5t) outward movements in any one day • surface material with low potential for dust release • unpaved road length <50m	• 10 – 50 HDV (>3.5t) outward movements in any one day • moderately dusty surface material (e.g. high clay content) • unpaved road length 50 – 100m;	• >50 HDV (>3.5t) outward movements in any one day • potentially dusty surface material (e.g. high clay content) • unpaved road length >100m

Table 8.6: Sensitivity of the area to dust soiling effects on people and property

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 350
High	> 100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	< 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

Table 8.7: Sensitivity of the area to human health impacts

Background PM_{10} concentrations (annual mean)	**Number of receptors**	**Distance from the source (m)**				
		< 20	**< 50**	**< 100**	**< 200**	**< 350**
High receptor sensitivity						
> 32µg/m^3	> 100	High	High	High	Medium	Low
	10 – 100			Medium	Low	
	< 10		Medium	Low		
28 – 32µg/m^3	> 100	High	High	Medium	Low	Low
	10 – 100		Medium	Low		
	< 10					
24 – 28µg/m^3	> 100	High	Medium	Low	Low	Low
	10 – 100					
	< 10	Medium	Low			
< 24µg/m^3	> 100	Medium	Low	Low	Low	Low
	10 – 100	Low				
	< 10					
Medium receptor sensitivity						
–	> 10	High	Medium	Low	Low	Low
	< 10	Medium	Low			
Low receptor sensitivity						
–	> 1	Low	Low	Low	Low	Low

Table 8.8: Risk of dust impacts

Sensitivity of area	**Dust emission magnitude**		
	Large	**Medium**	**Small**
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Low	Low risk site	Low risk site	Negligible
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Low risk site	Negligible
Low	Low risk site	Low risk site	Negligible

The construction impact magnitudes outlined in **Table 8.11** are assigned EPA impact ratings. **Table 8.10** outlines the duration of effect based on EPA guidance[13].

Table 8.9: Construction impact magnitudes

Magnitude of impact (see Table 8.8)	EPA Impact Rating
Negligible	Imperceptible
Low	Slight
Medium	Moderate
High	Significant

Table 8.10: Duration and frequency of effects

Duration	EPA Effect Type
Effects lasting from seconds to minutes	Momentary Effects
Effects lasting less than a day	Brief Effects
Effects lasting less than a year	Temporary Effects
Effects lasting one to seven years.	Short-term Effects
Effects lasting seven to fifteen years.	Medium-term Effects
Effects lasting fifteen to sixty years.	Long-term Effects
Effects lasting over sixty years	Permanent Effects

8.2.7.3 Odour

Table 8.11 to **Table 8.13**, outline the risk factors incorporating the source odour potential, pathway effectiveness and sensitivity of the receptor using IAQM Guidance[8].

[13] EPA (2017) Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Table 8.11: Examples of risk factors for odour source, pathway and receptor sensitivity

Source Odour Potential	**Pathway Effectiveness**	**Receptor**
Factors affecting the source odour potential include: • the magnitude of the odour release (taking into account odour-control measures) • how inherently odorous the compounds are • the unpleasantness of the odour	Factors affecting the odour flux to the receptor are: • distance from source to receptor • the frequency (%) of winds from the source to receptor (or, qualitatively, the direction of receptors from source with respect to prevailing wind) • the effectiveness of any mitigation/ control in reducing flux to the receptor • the effectiveness of dispersion/ dilution in reducing the odour flux to the receptor • topography and terrain	For the sensitivity of people to odour, the IAQM recommends that the air quality practitioner uses professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the following general principles:
Large Source Odour Potential	**Highly Effective Pathway for Odour Flux to Receptor**	**High sensitivity receptor**
• Materials usage hundreds of thousands of tonnes/m^3 per year; • Mitigation/control – open air operation with no containment, reliance solely on good management techniques and best practice • The compounds involved are very odorous	• Distance – receptor is adjacent to the source/site; • Direction – high frequency (%) of winds from source to receptor (or, qualitatively, receptors downwind of source with respect to prevailing wind). • Effectiveness of dispersion/dilution – open processes with low-level releases, e.g. lagoons, uncovered material	surrounding land where: • users can reasonably expect enjoyment of a high level of amenity; and • People would reasonably be expected to be present here continuously. Examples may include residential dwellings, hospitals, schools/education and tourist/cultural.
Medium Source Odour Potential	**Moderately Effective Pathway for Odour Flux to Receptor**	**Medium sensitivity receptor**

Source Odour Potential	Pathway Effectiveness	Receptor
• Materials usage thousands of tonnes/m^3 per year; • Mitigation/control – some mitigation measures in place, but significant residual odour remains • The compounds involved are moderately odorous.	• receptor is local to the source. • Where mitigation relies on dispersion/dilution – releases are elevated but compromised by building effects.	– surrounding land where: • users would expect to enjoy a reasonable level of amenity but wouldn't reasonably expect to enjoy the same level of amenity as in their home. • Examples may include places of work, commercial/retail premises and playing/recreation fields.
Small Source Odour Potential	**Ineffective Pathway for Odour Flux to Receptor**	**Low sensitivity receptor**
• Materials usage hundreds of tonnes/m^3 per year; • Mitigation/control – effective, tangible mitigation measures in place (e.g. BAT, BPM) leading to little or no residual odour. • The compounds involved are only mildly odorous	• Distance – receptor is remote from the source; • Direction – low frequency (%) of winds from source to receptor (or, qualitatively, receptors upwind of source with respect to prevailing wind). • Where mitigation relies on dispersion/ dilution – releases are from high level (e.g. stacks, or roof vents >3m above ridge height) and are not compromised by surrounding buildings	surrounding land where: • the enjoyment of amenity would not reasonably be expected. Examples may include industrial, farms, footpaths and roads.

Table 8.12: Risk of odour exposure (impact) at the specific receptor location

		Source Odour Potential (Table 8.11)		
		Small	Medium	Large
Pathway Effectiveness **(Table 8.11)**	Highly effective pathway	Low Risk	Medium Risk	High Risk
	Moderately effective pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

Table 8.13: Likely magnitude of odour effect at the specific receptor location

Risk of Odour Exposure (from Table 8.12)	Receptor Sensitivity (Table 8.11)		
	Low	Medium	High
High Risk of Odour Exposure	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
Medium Risk of Odour Exposure	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
Low Risk of Odour Exposure	Negligible Effect	Negligible Effect	Slight Adverse Effect
Negligible Risk of Odour Exposure	Negligible Effect	Negligible Effect	Negligible Effect

Table 8.14 outlines the EPA effect ratings and duration and frequency of effect, respectively, based on EPA guidance[14] that has been used for the odour assessment.

Table 8.14: IAQM and EPA effect ratings

IAQM effect rating	EPA effect rating
Negligible effect	Not significant
Slight adverse effect	Slight effect
Moderate adverse effect	Moderate effect
Substantial adverse effect	Significant effect

8.3 Baseline conditions

8.3.1 Air quality

The Environmental Protection Agency (EPA) *Air Quality in Ireland Reports*[10] describes the air quality zoning adopted in Ireland under the *Air Quality Standards Regulations, 2011* as follows:

[14] EPA (2017) Guidelines on the information to be contained in Environmental Impact Assessment Reports.

- Zone A (Dublin conurbation);
- Zone B (Cork conurbation);
- Zone C (24 Cities and towns); and
- Zone D (Rural Ireland: areas not in Zones A, B and C).

The site falls within Zone D. Background levels from 2019[10], 2018[11] and 2017[12] air quality monitoring of NO_2, $PM_{2.5}$ and PM_{10} in Zone C provided by the EPA are presented in **Table 8.15**.

Concentrations of each pollutant, recorded in Zone D, are averaged to represent typical background levels. Average concentrations were obtained from all stations where 90% data capture was achieved. This is in accordance with *Directive 2008/50/EC*[3] which specifies that any site used for assessment purposes must comply with 90% data capture.

Pollutant background concentrations are considered in this assessment. **Table 8.15** presents a three-year average of background pollutant concentration values for Nitrogen Dioxide (NO_2) and Particulate Matter ($PM_{2.5}$ and PM_{10}).

Table 8.15: Annual Mean Background Pollutant Concentrations for Zone D

Year	Annual Average NO_2 (µg/m³) Limit (40 µg/m³)	Annual Average PM_{10} Limit (40 µg/m³)	Annual Average $PM_{2.5}$ Limit (25 µg/m³)
2019	5.7	13.0	10.3
2018	3.3	10.7	7.5
2017	4.4	9.9	7.4
Average	4.6	11.2	8.4

8.3.2 Odour

As noted in **Section 1.3.4** of **Chapter 1**, *Introduction*, the Arklow Wastewater Treatment Plant (WwTP) project received planning consent in 2019. The proposed WwTP will mitigate the current practice of discharging raw effluent to the Avoca River. The odour baseline is considered for two scenarios below: without the WwTP in operation and with the WwTP in operation.

8.3.2.1 Without Arklow WwTP

The existing sewerage system in Arklow discharges untreated wastewater from homes and business to the Avoca River. It has been reported that this existing practice gives rise to a negative odour emanating from the Avoca River[15,16].The sailing, rowing clubs and the marina have each reported odour problems along the Avoca River.

[15]http://wicklownews.net/2017/05/not-all-sunshine-in-arklow/
[16] https://www.independent.ie/regionals/wicklowpeople/news/residents-fume-at-stinking-river-30470608.html

8.3.2.2 With Arklow WwTP in operation

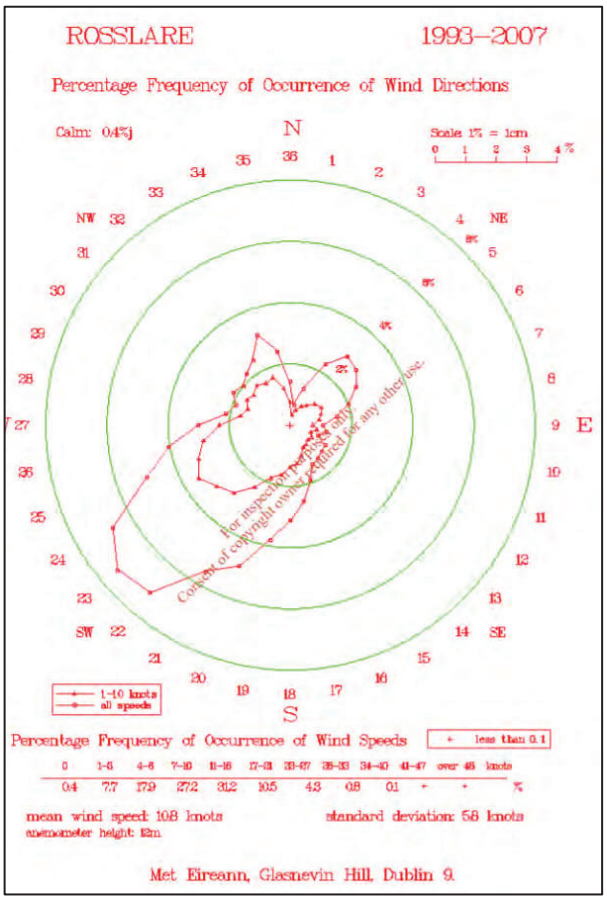
The Arklow WwTP[17] was granted planning permission in August 2019. The scheme consists of the construction of a treatment plant and associated interceptor sewers, in Arklow Town. Upon completion, the existing baseline of odours emanating from the Avoca River will be significantly improved. However, this is not predicted to decrease the odour potential from the dredged material (arising from implementation of the FRS) in the medium term.

8.3.2.3 Prevailing winds

Met Éireann records windrose data for a number of locations across Ireland. Historic data from Rosslare is the closest to the study site, refer to **Table 8.16**. The prevailing winds are from the south west for open sites while winds from the northeast or north occur least often. It is taken that information provided in **Table 8.16** is valid for use in this assessment.

[17] Arup, 2018. Arklow Wastewater Treatment Plant Project EIAR Section 9.

Table 8.16: Historic Windrose for Rosslare 1993-2007.



8.4 Description of the Proposed Development

8.4.1 Introduction

Chapter 4, *Description of the Proposed Scheme* provides a description of the proposed development. The construction of the proposed scheme can be divided into five Work Packages and the aspects relevant to air quality and odours are described in detail in **Chapter 5,** *Construction Strategy*:

- **WP 1:** Lowering the floor of Arklow Bridge including Bridge underpinning, Bridge remedial works and scour protection works.
- **WP 2:** Channel dredging upstream and downstream of Arklow Bridge.
- **WP 3:** Construction of debris and gravel traps with associated maintenance access ramp.
- **WP 4:** Construction of flood defence walls along River Walk, South Quay and around the dock on the south (right) bank, upstream and downstream of Arklow Bridge including the adjacent stormwater drainage and a section of the WwTP interceptor sewer. Public realm and landscape features including footpaths, terraces, planters and seating will be constructed along the working area.

- **WP 5:** Construction of flood defence earth embankment and flood defence wall on north (left) bank along eastern side of Arklow Town marsh including stormwater drainage diversion works. Upon completion of the earth embankment, the green space on the dry side of embankment will be planted with trees. Landscaping will also be carried out on the river side of the flood defence wall.

The proposed scheme requires a network of construction compounds as part of the works. A total of six site compounds have been identified. The site compounds will have a range of functions including the storage of materials, the stockpiling and archaeological examination of dredged material, construction offices and welfare facilities. Refer to **Drawing No 1065** in **Appendix 4.1** and **Figure 5.3** in **Appendix 5.1** for further details and locations of the site compounds.

The following aspects are particularly relevant to the air quality and odour assessment:

- **Construction:**
  - Dust impacts associated with construction activities at Arklow Bridge;
  - Dust impacts associated with the debris trap and gravel trap construction;
  - Dust impacts associated with flood defence walls, drainage and embankment construction activities; and
  - Odour impacts from the excavation and placement of estuarine/dredged material. The impact from this phase of works will be primarily at the site compounds which will be used for archaeological examination of a portion of the dredge material. As such, construction compounds are discussed in detail in **Section 8.4.1.** Refer also to the relevant tables presented in Chapter 5 *Construction Strategy*, for a breakdown of estuarine/dredge material types and transportation directly offsite or to the site compounds.
- **Operation:**
  - No potential significant air quality or odour impacts are predicted during the operational phase.

8.4.2 Dredged material and storage compounds

As discussed in Section 5.2.2 of **Chapter 5** *Construction Strategy*, some of the excavated estuarine/dredge material (arising during WP1, WP2 and WP3) will need to be transported to site compounds for archaeological examination. Refer also to the relevant tables in Chapter 5 *Construction Strategy*, for a breakdown of estuarine/dredge material types and transportation directly offsite or to the site compounds. The following construction compounds will facilitate the archaeological examination of a portion of dredged material.;

- SC1, located in a green area off the Dublin Road, will facilitate the construction of work packages WP1, WP2, WP3 and WP5. It will be used for the archaeological examination of inert estuarine material during WP1 and WP3 and dredged material with slightly elevated chloride levels during WP2. The dredge material will also be temporarily stockpiled at SC1 for reuse in the embankment construction.

- SC2 is located at the southern end of Arklow Sports field opposite Bridgewater Shopping centre parking facility along Mill Road. It will be used for work package WP2 for the archaeological examination of dredged material including hazardous and non-hazardous material followed by onward transportation to its final destinations for recovery/disposal.
- SC5 is located at a vacant site at the eastern end of North Quay and will be used for archaeological monitoring for dredged material with slightly elevated chloride levels from WP2.
- SC6 is located along South Beach Road. It will be used during WP2 for archaeological excavation of inert dredged material.

Table 5.4 in Chapter 5 Construction Strategy details the approximate volumes of estuarine and dredge materials from WP1, WP2 and WP3 for transportations to site compounds for archaeological examination/reuse/removal directly offsite.

Sands and gravels, which tend to deposit in proximity to Arklow Bridge (upstream and downstream) are the preferred materials for embankment construction. These materials will drain and dry faster than the finer solids (silts and clays). Therefore, it is anticipated that most of the reused material for embankment construction will be sourced upstream and downstream of Arklow Bridge during WP1 and WP2. WP3 will provided a much smaller quantity of material, see Chapter 5.

In relation to the locations of dredging, large quantities of material will be excavated along the perimeter of the channel, with limited material available for dredging in the middle of the channel.

Control of odour from anaerobic sediments containing hydrogen sulphide from dredging is rarely more than a temporary problem[18]. Typically, during dredging, sediment is anaerobic. When first discharged it may cause odours, but these are lost within a few days of its exposure to air. However, the repetition of the dredging process will add to the duration of potential odour generation.

Table 8.17 presents the five work packages, associated compounds, their material storage and any further comments. A portion of the material from each WP will be subject to archaeological testing. Full details of the archaeological testing are presented in **Chapter 11,** *Archaeology, Architectural and Cultural Heritage*. As presented in **Table 8.17**, no material will be stored at SC3 and SC4.

[18] EPA Victoria. Best Practice Environmental Management Guideline for Dredging, 2001. Section 3.7.

Table 8.17 Uses of Site Compounds (at taken from Table 5.2 of Chapter 5)

WP Ref	Dredged Material Archaeological Testing	Material Temporary Storage	Comment	Time Frame (Year)	Duration of Potential Impact (see Table 8.10)
WP1	SC1	SC1	Inert material will be archaeologically examined and will either be stored for reuse and/or taken offsite	Y2 – Y4 (summer months only)	Temporary (for each of the 3 years) (approx. 8 months)
WP2	SC1	SC1	Slightly elevated Cl_2 material will be archaeologically examined and will either be stored for reuse and/or taken offsite	Excavated in Y4 (summer months) Reused in Y5	Temporary (approx. 9 months)
	SC2	N/A	Haz and Non-Haz contaminated and archaeological examination, then taken offsite	Excavated in Y4 (summer months) Reused in Y5	Temporary (approx. 9 months)
	SC5	SC5	Slightly elevated Cl_2 Material. Stored for up to 6 months, then taken offsite	Excavated in Y4 (summer months) Reused in Y5	Temporary (approx. 9 months)
	SC6	N/A	Inert material will be archaeologically examined, then taken offsite	Excavated in Y4 (summer months) Reused in Y5	Temporary (approx. 9 months)
WP3	SC1	N/A	Inert material will be archaeologically examined, then taken offsite	Y2	Temporary (approx. 7 months)

8.4.3 Embankment construction

The following section outlines the construction methodology for the construction of the embankment during WP5. The implementation of this methodology will assist in reducing the dust and soiling impacts. This section should be read in conjunction with the mitigation measures outlined in **Section 8.6.1.1.**

The procedures for embankment construction will include;

- All fill material for the embankment will be placed in layers no greater than 150mm thick.

- The largest size particle will not be greater than 1/3rd the height of the lift / 50mm.
- Each layer will be thoroughly compacted before the next layer is placed. A minimum of 6 passes to achieve the required compaction effort is generally required.
- The material forming the embankment will be placed with sufficient moisture to ensure proper compaction. If the material is too dry, water will be added. If the material is too wet it will be spread and mixed.
- A wheeled scraper or truck will be used to place the selected soil material (clay) on the dam site. The clay will be spread by the use of the blade on a tamper foot roller.

8.5 Potential Effects

8.5.1 'Do-nothing' scenario

In the scenario where the proposed development did not proceed as planned, none of the construction or operational effects as set out in this chapter would occur.

8.5.2 Construction

Dust emissions are likely to arise from the following activities:

- Site clearance;
- Utility diversions;
- Foundation construction;
- Site excavation;
- Sheet piling;
- Stockpiling of separated materials;
- Handling of construction materials;
- Construction traffic movements; and
- Embankment construction;

The effects of air emissions from onsite generators are not considered significant and have not been assessed.

The potential impact of construction activities is assessed below in accordance with the methodology outlined in **Section 8.2.7.2**.

8.5.2.1 Dust emission magnitude

Following the methodology outlined in **Section 8.2.7.2**, each dust-generating activity has been assigned a dust emission magnitude as shown in . For

earthworks, as a worst case it has been assumed that these will occur in the whole site area.

As outlined in **Section 8.2.7.2**, the IAQM guidance was used to assess the potential air quality impacts on sensitive receptors during the construction phase. **Table 8.18** presents the dust emission magnitude in accordance with **Table 8.5**.

Table 8.18: Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Demolition	Small	Total building volume <20,000m^3
Earthworks	Large	Total site area >10,000 m^2
Construction	Medium	Potentially dusty construction material.
Trackout	Large	>50HDV outward movements in any one day

8.5.2.2 Sensitivity of the Area

The sensitivity of the area to dust soiling has been assigned as *high*, due to high number of sensitive receptors within close proximity of dust generating activities.

The background PM_{10} concentration is less than the lowest value of 24µg/m^3 outlined in the guidance which relates to *low* sensitivity for human health.

As some of the works are proposed within the boundary of the Arklow Town Marsh pNHA, an ecological sensitivity has been assigned as *high.*

The overall sensitivity has been summarised as shown in **Table 8.19**.

Table 8.19: Sensitivity of the surrounding area

Potential Impact	Sensitivity of the surrounding area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	High	Medium	High
Human Health	Negligible	Low	Low	Low
Ecological	Medium	High	Medium	High

The risk of dust impacts outlined in the table above defines the impacts on the area without mitigation.

8.5.2.3 Risk of impacts

Taking into consideration the dust emission magnitude and the sensitivity of the area, the site has been classified as *medium risk* for demolition and construction, and *high risk* for earthworks and trackout, see **Table 8.20**. The associated EPA impact ratings and durations are also outlined in **Table 8.20**.

Note that these are potential impacts. Specific mitigation is described in **Section 8.6.1.1** and residual effects are described in **Section 8.8.**

Table 8.20: Summary dust risk table prior to mitigation

Activity	Dust risk prior to mitigation	EPA Impact Rating (see Table 8.9))	EPA Impact Duration (see Table 8.10))
Demolition	Medium	Moderate	Short-term
Earthworks	High	Significant	Short-term
Construction	Medium	Moderate	Short-term
Trackout	High	Significant	Short-term

8.5.2.4 Odour

Table 8.21 presents the odour potential, pathway effectiveness and receptor sensitivity for each of the four storage compounds considered in the assessment.

Table 8.22 presents the impact assessment undertaken for receptors adjacent to the four storage compounds where material will be stored. The compounds which have been assessed are those at which dredged material will be temporarily stored, see Table 8.17. Receptor locations, where applicable are taken as groups of dwellings, as opposed to individual receptors, at the locations indicated in Figure 8.1.

Table 8.21: Odour potential, pathway effectiveness and receptor sensitivity

Work Package	Material Temp Storage and Archaeological Testing	Receptor details and location (see Figure 8.1)	Source Odour Potential and Reason (Table 8.11)	Pathway Effectiveness and reason (see Table 8.11)	Receptor Sensitivity and reason (see Table 8.11)
WP1	SC1	G01	Medium The dredged material is assessed as moderately odorous	Highly effective Receptor is adjacent to the source/site high frequency (%) of winds from source to receptor	High (Dwellings)
	SC1	G01		Highly effective Receptor is adjacent to the source/site high frequency (%) of winds from source to receptor	High (Dwellings)
	SC2	G02		Highly effective (at western boundary)	High (Dwellings)

Work Package	Material Temp Storage and Archaeological Testing	Receptor details and location (see Figure 8.1)	Source Odour Potential and Reason (Table 8.11)	Pathway Effectiveness and reason (see Table 8.11)	Receptor Sensitivity and reason (see Table 8.11)
WP2			Thousands of m^3 of material.	Receptor is adjacent to the source/site Moderately effective (at eastern boundary) Receptor is local to the source	
	SC5	G04		Moderately effective Receptor is local to the source	Medium (Arklow South Beach)
	SC6	G04		Moderately effective Receptor is local to the source	Medium (Beach / golf course)
WP 3	SC1	G01		Highly effective Receptor is adjacent to the source/site high frequency (%) of winds from source to receptor	High (Dwellings)

Table 8.22: Impact assessment of the likely odour effects at existing sensitive receptors

Work Package	Material Temp Storage and Archaeological Testing	Receptor details and location	Source Odour Potential	Pathway (Transport Effectiveness)	Odour Exposure (Table 8.12)	Receptor Sensitivity	Potential Likely Odour Effect (EPA rating see Table 8.14)	Duration
WP1	SC1	G01	Medium	Highly effective pathway	Medium	High	Moderate Adverse Effect (Moderate)	Temporary
WP 2	SC1	G01	Medium	Highly effective pathway	Medium	High	Moderate Adverse Effect (Moderate)	Temporary
	SC2	G02	Medium	Highly/Moderately effective pathway	Low to Medium	High	Slight Adverse Effect (Not significant) to Moderate Adverse Effect (Moderate)	Temporary
	SC5	G04	Medium	Moderately effective pathway	Low	Medium	Negligible (Not significant)	Temporary
	SC6	G04	Medium	Moderately effective pathway	Low	Medium	Negligible (Not significant)	Temporary

Work Package	Material Temp Storage and Archaeological Testing	Receptor details and location	Source Odour Potential	Pathway (Transport Effectiveness)	Odour Exposure (Table 8.12)	Receptor Sensitivity	Potential Likely Odour Effect (EPA rating see Table 8.14)	Duration
WP 3	SC1	G01	Medium	Moderately effective pathway	Low	Medium	Negligible (Not significant)	Temporary

The results from **Table 8.22** predict that during all WPs, the highest potential impact on the nearest receptors as a result of dredged material storage is at G01 (SC1) during WP1/WP2. For WP2 and WP5, it is noted that these WPs will be undertaken at the same time, i.e. dredged material will arrive, will be temporarily stored and then used for embankment construction. A moderate temporary negative potential impact is predicted.

A moderate temporary negative impact is also predicted at G02 (SC2) while impacts are predicted at G03 (SC5) and G04 (SC6) are deemed not significant.

8.5.3 Operation and Maintenance

There will be no significant change in traffic volumes as a result of the operational phase. The only operational air emission sources will be from emergency water pumps and associated emergency generator. As such, their impact on nearby receptors is not considered significant.

In relation to odour, the gravel and debris traps will be cleared yearly. Maintenance dredging is estimated to occur once every 10 years. The impact on nearby receptors is likely to be slight, negative and temporary.

8.6 Mitigation Measures and Monitoring

8.6.1 Mitigation

8.6.1.1 Construction

The following measures will be implemented to reduce dust impacts during the construction phase. All of the below mitigating measures are included in the Construction and Environmental Management Plan (CEMP) for dust management (refer to **Appendix 5.1**).

Air Quality

Mitigation for all sites

- A Communications Management Plan that includes community engagement will be developed and implemented before work commences on site.
- The name and contact details of person(s) accountable for air quality and dust issues will be displayed on the site boundary. This may be the environment manager/engineer or the site manager.

- The contact information of the contractor's head or regional office will be displayed on the site boundary.

Site Management

- All dust and air quality incidents and complaints will be recorded, the causes identified, appropriate measures will be taken to reduce emissions in a timely manner, and the measures taken will be recorded.
- Regular liaison meetings will be held with the contractors on other significant construction (i.e. potentially Arklow WwTP) sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. Off-site transport/ deliveries, which might be using the same strategic road network routes, will be co-ordinated

Monitoring

- Daily on-site and off-site inspection will be undertaken, where receptors (including roads) are nearby, to monitor dust. Inspection findings will be recorded, and the log will be available to Wicklow County Council when asked. The frequency of inspections will be increased during site activities with a high potential to produce dust are being carried out.
- Dust deposition monitoring locations will be chosen in consultation with the Wicklow County Council.

Preparing and maintaining the site

- The site layout will be planned so that machinery and dust causing activities are located away from receptors, as far as is possible.
- A c. 2.4m hoarding of density of at least 7kg/m^2 will be provided around construction works and site compounds.
- Runoff of water or mud from site will be prevented.
- Site fencing, barriers and scaffolding will be kept clean using wet methods.
- Materials that have a potential to produce dust will be removed from site as soon as possible, unless being re-used on site. If they are being re-used on-site they will be covered as described below.
- Stockpiles will be covered, seeded or fenced to prevent wind whipping.

Operating vehicle/machinery

- All vehicles will switch off engines when stationary - no vehicles will idle on site.
- Mains electricity or battery powered equipment will be used where practicable and the use of petrol or diesel powered generators will be avoided where practicable.
- A maximum-speed-limit of 25 km/hr on surfaced and 15 km/hr on unsurfaced haul roads and work areas will be imposed and signposted.

Operations

- Only cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems, will be used.
- An adequate water supply will be provided on the site for effective dust/particulate matter suppression/mitigation.
- Enclosed chutes and conveyors and covered skips will be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment will be minimised and fine water sprays will be used on such equipment wherever appropriate.
- Equipment will be readily available on site to clean any dry spillages, and spillages will be cleaned up as soon as reasonably practicable after the event using wet cleaning methods.
- Hessian, mulches or trackifiers will be used where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
- The cover will be removed in small areas during work and all areas will not be uncovered at once
- Sand and other aggregates will be stored in bunded areas and will not be allowed to dry out, unless this is required for a particular process, in which case appropriate additional control measures will be put in place.
- Water-assisted dust sweeper(s) will be used on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Vehicles entering and leaving sites will be covered to prevent escape of materials during transport.
- On-site haul routes will be inspected for integrity and any necessary repairs to the surface will be undertaken as soon as reasonably practicable.
- A wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable) will be provided.
- An adequate area of hard surfaced road will be provided between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates will be located at least 10 m from receptors where possible.

Odour

The following mitigation measures are proposed during the dredging and storage of material.

- Vehicles leaving sites will be covered to prevent escape of materials and odour during transport.
- Onsite monitoring will be undertaken, discussed further in **Section 8.6.3.1**.

8.6.2 Operation and Maintenance

As discussed in Section 8.5.3 the impact on nearby receptors is likely to be slight, negative and temporary during debris trap clearing and maintenance dredging. During maintenance work, vehicles leaving sites will be covered to prevent escape of materials and odour during transport.

8.6.3 Monitoring

8.6.3.1 Construction

Air Quality

Monthly dust monitoring, using dust deposition gauges, will be undertaken at the site compound boundaries and nearest sensitive receptors to the works during the construction phase of the proposed development. The TA Luft dust deposition limit values of 350 mg/m^2/day will be applied as a 30-day average.

Odour

Two odour specialists will be present onsite to monitor odour during the excavation of estuarine material from the river (also referred to as dredge material in some sections of the EIAR) during work packages (WP) 1-3, upstream and downstream, and across the channel profile. The odour assessors will alternate so that not one assessor will be continually onsite so that odour fatigue is avoided.

During WP1 and WP3, the following procedures will be observed.

- Estuarine excavated material that is too odorous for archaeological examination at SC1 will be transported directly offsite, as SC5 and SC6 will not be operational at that stage.

During WP2 the following procedures will be observed.

- Hazardous and non-hazardous contaminated material that is deemed too odorous (odour rating of 3 or more, see **Table 8.24**) for stockpiling at SC2 will be transported directly offsite.
- Inert material that is too odorous for SC1 will be transported to SC6.
- Material with a slightly elevated chloride concentration that is too odorous for SC1 will be transported to SC5.

The assessment of odour will follow the guidance as set out in the EPA's Odour Emissions Guidance Note AG9, as outlined in **Table 8.23** and **Table 8.24**.

Table 8.23: Types of odour, intensity and persistence

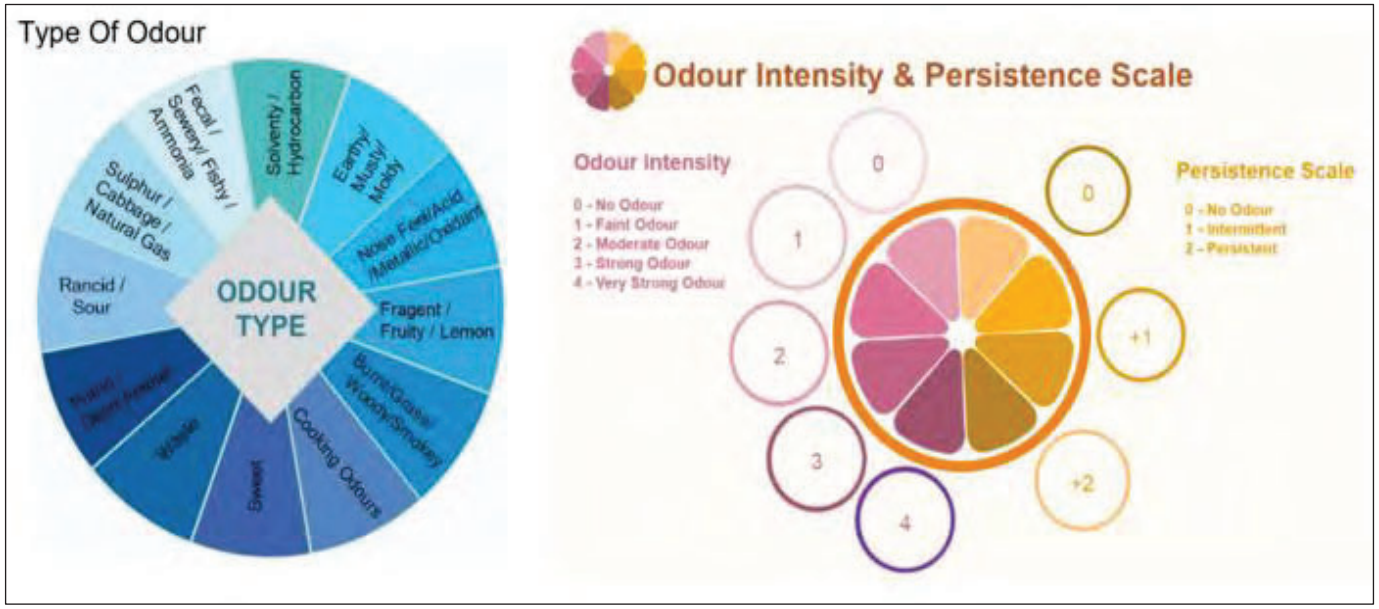


Table 8.24: Odour intensity

Odour rating	Odour intensity
0	No detectable odour
1	Faint odour (barely detectable, need to stand still and inhale facing into the wind)
2	Moderate odour (easily detectable while walking and breathing normally, possibly offensive)
3	Strong odour (bearable but offensive – might make clothes / hair smell)
4	Very strong odour (unbearable, difficult to remain in area affected by odour)

8.6.3.2 Operation and maintenance

As no significant adverse effects are predicted to occur during the operation of the proposed development, no monitoring measures are required.

8.7 Cumulative Effects

This section includes an assessment of the potential for likely significant direct and indirect cumulative effects of projects listed in **Table 20.1** in **Chapter 20** '*Cumulative Impacts and Interaction of Effects*' in combination with the proposed scheme and taken together in combination with the proposed scheme.

A detailed assessment is not deemed necessary for the following projects:

Action Health Enterprises GP Limited The Former Boland's Builders Providers, Castle Park (181170)

This project relates to the development of a primary care facility at Castle Park.

Given the moderate scale of this project, in terms of both construction activities and construction traffic, there is minimal potential for cumulative air quality and odour effects. As construction activities will be undertaken approximately 150m from the proposed development and will be screened by the line of properties on Main Street, no significant negative cumulative effects are predicted at the receptors considered for the proposed development.

Circle K Safeway Service Station (20426)

This project relates to the demolition of the existing, and construction of a new, fuel forecourt at the existing Circle K service station, which is located immediately adjacent to Arklow Town Marsh and SC1 of the proposed scheme.

Given the minor scale of this project, in terms of both construction activities and construction traffic, there is minimal potential for cumulative air quality and odour effects. Considering construction activities will be undertaken approximately 150m from the proposed development, no significant cumulative effects are predicted.

No 7 and 8 Bridge Street & No 34 Main Street (19750)

The project relates to the demolition of two existing buildings and the construction of a new retail and commercial building on Main Street.

Given the minor scale of this project, in terms of both construction activities and construction traffic, there is minimal potential for cumulative air quality and odour effects. Considering construction activities will be undertaken approximately 140m from the proposed development, no significant cumulative effects are predicted.

Gaines Europe Ltd Unit 1A Lower Tinahask, South Quay (16248)

This project relates to the development of a new warehouse and distribution facility at Arklow Harbour.

Given the moderate scale of this project, in terms of both construction activities and construction traffic, there is potential for cumulative air quality effects given that construction activities will be undertaken approximately 50m from the proposed development. However, the nearest sensitive receptor is located approximately 300m from the works. Therefore, no significant cumulative effects are predicted.

Gaines Europe Ltd Tinahask Lower, South Quay (16414)

This project relates to the demolition of an existing industrial building at Arklow Harbour.

Given the major scale of this project, in terms of both construction activities and construction traffic, there is potential for cumulative air quality effects. However, given that construction activities will be undertaken approximately 50m from the proposed development, on the opposite side of the Arklow Harbour, no significant cumulative effects are predicted. In addition, construction works associated with the adjacent Gaines Europe Ltd development will be monitored to ensure compliance with its dust limits.

Joby Developments North Quay, Arklow (15857)

This project relates to the demolition of existing structures and construction of retail and residential units at North Quay.

Given the moderate scale of this project, in terms of both construction activities and construction traffic, there is potential for cumulative air quality effects. However, given that the main construction activities will be undertaken approximately 200m from the proposed development, on the opposite side of the Arklow River, no significant cumulative effects are predicted. In addition, construction works associated with the adjacent Joby development will be monitored to ensure compliance with its dust limits.

Irish Water Arklow, Co. Wicklow (SI201801)

The following paragraphs consider the potential for in-combination impacts arising from the proposed development in association with the Arklow WwTP if both are under construction at the same time.

As noted in **Section 2.6.1** of **Chapter 2**, *Background and Need for the Scheme*, the proposed WwTP will physically overlap with the Arklow Flood Relief Scheme (FRS) as there are common areas within the town where works for both the proposed WwTP and FRS developments will be undertaken. It has been agreed between OPW and Irish Water that the project that is first able to progress the directly overlapping construction works on site will do so. Refer to **Section 2.6.3** of **Chapter 2**, *Background and Need for the Scheme*, for further details on the interactions between the two schemes.

Taking that into consideration, the construction works assessed cumulatively are sheet piled foundations for the flood defence walls for the FRS on the south bank and the construction of the tunnel boring machine launch shaft for the WwTP on North Quay.

For the Arklow WwTP project, the closest sensitive receptors are located approximately 20m away from the works. Therefore, there is the potential for soiling, PM_{10} and vegetation effects arising from the cumulative construction activities along the North Quay. However, as stated within the WwTP EIAR, "*with the implementation of the standard mitigation measures outlined no significant negative effects are envisaged"*[19].

In relation to traffic, the construction traffic threshold of 10%, see **Section 8.2.1.1,** is not predicted to be exceeded should both projects be constructed at the same time.

With the implementation of the mitigation measures outlined in **Section 8.6**, no significant adverse residual negative effects on air quality are envisaged during the construction or operation of the proposed development. Therefore, cumulatively, no significant impacts are predicted.

In relation to odour, no significant effects are anticipated during the construction of the Arklow WwTP, therefore, no significant cumulative effects are predicted should both schemes be constructed concurrently.

Mill Sea Ltd North Quay, Arklow (18316)

Given the minor scale of this project, in terms of both construction activities and construction traffic, there is minimal potential for cumulative air quality effects to arise. As the main construction activities will be undertaken approximately 140m from the proposed development on the opposite side of the Arklow River no significant negative cumulative effects are predicted.

Wicklow County Council Inner Harbour / Dock, Off South Quay (20469)

This project relates to the development of storage units at Arklow Harbour.

Given the minor scale of this project, in terms of both construction activities and construction traffic, there is minimal potential for cumulative air quality effects to arise. As the construction activities will be undertaken approximately 150m from the main construction works proposed development on the opposite side of the Arklow River, no significant negative cumulative effects are predicted.

Crag Digital Avoca Limited (18940/201285)

This project relates to the development of data centre as the Avoca Rove Park industrial Estate. As the construction activities will be undertaken approximately 2.5km from the main construction works proposed development, no significant negative cumulative effects are predicted.

Arklow Bank Wind Park, Co. Wicklow- Pre-Application (306662)

This project relates to the development of onshore transmission connection infrastructure related to the Arklow Bank Wind Park offshore wind energy project.

[19] Irish Water, 2018. Arklow Wastewater Treatment Plant Project. https://www.water.ie/planning-sites/arklow-wastewater/docs/environmental-documents/volume-2/Arklow%20WWTP%20EIA%20-%20Chapter%208%20(Air%20Quality%20Climate).pdf

As the construction activities will be undertaken approximately 2km from the main construction works of the proposed development, no significant negative cumulative effects are predicted.

Parade Ground- WCC Part 8

This project relates to public realm improvement works at Parade Ground, Arklow, which at its closest, is approximately 50m from the proposed development.

Given the minor scale of this project, in terms of both construction activities and construction traffic, there is minimal potential for cumulative air quality effects to arise.

FORESHORE

FS007049 Sure Partners Site Investigations at Arklow Bank

Due to the offshore location and nature of this development, no negative likely significant cumulative effects are identified in relation to air quality and odour.

8.8 Residual Effects

With the implementation of the mitigation measures outlined in **Section 8.6**, no significant adverse residual negative effects on air quality are envisaged during the construction or operation of the proposed development.

Similarly, with the implementation of the mitigation and monitoring measures outlined in **Section 8.6,** no significant adverse residual negative effects on odour are envisaged during the construction phase of the proposed development.

8.9 References

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