An Bord Pleanála

Inspector's Report ABP 318302-23

Development	Expansion of disposal capacity at Bauxite Residue Disposal Area, expansion of capacity of Salt Cake Disposal Cell, expansion of borrow pit, upgrade works to water management infrastructure, continued use of a stockpile area for rock and top soil storage, use of top soil and rock materials for landscaped restoration, restoration of borrow pit, lighting, spillway ramps, revised boundary treatments and ancillary associated works.
Location	In townlands of Aughinish East, Aughinish West, Island Mac Teige, Glenbane West and Fawnmore at or adjacent to Aughinish Island, Askeaton, County Limerick.
Planning Authority	Limerick City and County Council
Applicant(s)	Aughinish Alumina Ltd.
Type of Application	Application under the provisions of Section 37E of the Planning and Development Act, 2000, as amended

Prescribed Bodies	Environmental Protection Agency An Taisce Transport Infrastructure Ireland Department of Housing, Local Government and Heritage
Observers	Environmental Trust Ireland Futureproof Clare CLG Cappagh Farmers Support Group Dolphin Watch
Date of Site Inspection	07/01/25
Inspector	Pauline Fitzpatrick

Contents

1.0 Introduction

1.1. Aughinish Alumina Ltd. has made an application to the Board under Section 37E of the Planning and Development Act, 2000, as amended, for the expansion of the Bauxite Residue Disposal Area (BRDA), Salt Cake Disposal Cell (SCSC), borrow pit and associated and ancillary works at its site near Askeaton County Limerick. This followed the conclusion of pre-application consultations under file ref. ABP 308903-20 whereby the Board determined that the proposed development constitutes strategic infrastructure and that a planning application should be made directly to the Board.

1.2. A previous decision in respect of the proposed development under ref. ABP 312146-21 was quashed by the High Court (perfected 29/06/23).

1.3. The relevant parties to the application were notified of the High Court Order. The applicant was requested to submit specified information in December 2023. The applicant's response was received in January 2024. This was circulated to the other parties to the application for comment with responses received March 2024.

2.0 Site Location and Description

2.1. The Aughinish Alumina Limited (AAL) facility comprises of an overall site area of c. 601 hectares on Aughinish Island located on the southern side of the Shannon Estuary. It commenced operations in 1983. The facility operates with an Industrial Emissions Licence (IE Licence) issued by the EPA under ref. P0035-07.

2.2. The facility is approx. 2km to the east of Foynes and Foynes Port, 8km to the north-west of Askeaton and c. 30km west of Limerick City. Access to the facility is from local road L1234 off the N69 national secondary road to the south. Poulaweala Creek and Robertstown Creek separate the south-eastern and southern-western coasts of the island from the mainland respectively. There is a Flood Tidal Defence Berm (FTDB) to a height of 5mOD on the northern and western side of the island (constructed by the OPW). The Limerick to Foynes railway line runs to the south of the island and is currently being redeveloped by Iarnród Éireann for freight services. The company sports facility is located in proximity to the eastern boundary of BRDA Phase 1 between the landfill area and the access road. A municipal wastewater

treatment plant (WWTP) is located to the south of BRDA Phase 2. The Robertstown River runs along the south-western boundary of the existing landfill area.

2.3. The processing plant occupies the northern section of the site with the lands to the south-west accommodating the BRDA. There is a storm water pond (SWP) and liquid waste pond (LWP) to the north-east of the BRDA with a borrow pit roughly in the centre of the overall site.

2.4. The lands to which this application pertains has a stated area of c.222 ha. and is located in the southern section of the overall site. It comprises of 3 main elements as follows:

Bauxite Residue Disposal Area (BRDA)

2.5. Phases 1 and 2 equate to 184 ha. in area. This BRDA landfill area is used for storage of bauxite residue associated with the processing plant in the production of alumina. It comprises of perimeter walls or raises, each 2 metres in height which enclose a basin of bauxite residue which is pumped from the refinery. As each raise/terrace builds on the foundation of the previous stage raise (known as the 'up stream method') the footprint of the enclosed area becomes progressively smaller with each stage raise. Phase 1 has 10 stage raises with Phase 2 raised to stage 4 at the time of the lodgement of the application. The elevation of the BRDA varies from approx. 32mOD at the centre to between 22 and 24mOD at the perimeter.

2.6. The perimeter stage raises or walls are constructed of rock fill previously sourced off site but now sourced from the on-site borrow pit. The walls are raised systematically in 2 metres stages and are stepped inwards from the outer perimeter with each stage.

2.7. Bauxite residue from the process is dewatered in the processing plant using vacuum plant filters and a deep thickener to reduce the caustic content. Water is added and then pumped via two pipelines to a discharge platform in each phase of the BRDA (2 no.). The platforms feed a network of fixed spigot points, referred to as mud points for layered deposition within the cells. The residue is 'mud farmed' since 2009 using amphirol to enhance drying and increase the density and strength parameters of the deposited bauxite layer. Areas for deposition are partitioned by bauxite residue berms up to the 3 metres in height using a bulldozer.

2.8. The BRDA is surrounded by a perimeter interceptor channel (PIC) with a piped drainage system leading to the PIC. The water is transferred to a SWP to the northeast of the BRDA which is then treated at the facility and returned to the LWP located to the east. Water is used for sprinkler systems in the BRDA to dampen fugitive dust in the deposition area during periods of dry weather. Treated water is discharged to the River Shannon under licence.

Salt Cake Disposal Cell (SCDC)

2.9. The SCSC is located centrally within the BRDA to reduce potential for contamination. It is within a composite lined cell. It is transported from the processing plant by truck. The total current volume of the SCDC is estimated to be 72,800m^3 at the crest level. Leachate generated is collected in a decant chamber then transferred by an enclosed pipeline to a holding tank and pumped back to the plant via an enclosed pipeline as a caustic recovery stream.

Borrow Pit

2.10. The existing borrow pit with an area of 4.5ha., is located to the north-east of the site and is used for sourcing aggregate to construct the stage raises. As noted previously aggregate was sourced off site. The borrow pit secured permission under ref. 17/714 (ABP 301011-18). With an estimated 370,000m^3 of material to be extracted it is expected to meet the needs of the BRDA going forward to stage 10.

Stockpile Area

2.11. The stockpile area located to the south-east of the site adjacent to the municipal WWTP equates to an area of 12.5 ha. It accommodates rock and topsoil which has been imported into the site to construct BRDA raises and to progressively restore the BRDA.

3.0 Proposed Development

In summary permission is being sought for the following:

3.1. **BRDA**

- Expand the capacity of the BRDA Phases 1 and 2. As currently permitted the BRDA can have a final perimeter elevation of 24mOD and a maximum dome crown elevation of 32mOD (stage 16). The proposed development seeks to

increase the perimeter elevation to 36mOD with a maximum dome crown elevation of 44mOD.

- The proposed increase in height (12 metres) would comprise of 6 x 2 metre stage raises (Stages 11 to 16) using the 'upstream method' as detailed in section 2 above. The bench at each stage will be 4.5 metres with the exception of stage 10 which will have a bench of 12 metres. The benches will require construction of rockfill embankments in 2 metre high vertical lifts.
- This expansion would extend the lifetime of the BRDA to 2039 at the current rate of alumina production. The proposed development will provide for the deposition of c.900,000 – 1 million m^3 per annum with a projected total deposition of c. 8 million m^3 of bauxite.
- The side slopes and terraces of the BRDA will be progressively restored.

3.2. SCDC

- A vertical extension to the SCDC from a crest height of c. 29.00mOD to c.31.25mOD which will have a maximum overall height of c.35.50mOD when capped at cell closure. The extension will accommodate disposal of an additional 22,500m^3 of salt cake (current volume of the SCDC is estimated to be 72,800m^3 at crest level.
- Approx. 27,000m^3 of rock fill material will be required to construct the perimeter wall which will be lined with c.4,500m^3 of geosynthetic material.

3.3. Surface Water Management System

- Improvements to the water management infrastructure to accommodate an Inflow Design Flood (IDF) of a greater return period in accordance with Canadian Dam Association (CDA) Guidelines.

3.4. Borrow Pit

- Extension to permitted borrow pit by 3.9ha (to give an overall area of 8.4ha.) to provide an additional 380,000m^3 of rock fill material required for the construction and operation of the BRDA.
- Operational period to be restricted to between April and September with blasting no more than once per week and 7 no. blasts per annum.

3.5. **Stockpile area**

- Continued use of the stockpile area to the south-east of the site to store topsoil to meet the additional restoration requirements of the extended BRDA.

4.0 Planning History

The wider landholding has an extensive planning history and I refer the Board to Appendix 1 of the Planning Report that accompanies the application and to the report from Limerick City and County Council. The planning history on the site dates back to the parent permission granted in 1974 under ref. no. 74/8580. I have not identified any additional planning applications/permissions since the submission of the planning application.

I would bring the following files to the attention of the Board:

File Ref	Description	Decision
05/1836 Appeal Ref: PL13.217976	Extension to BRDA and increase in alumina production to 1.95 million tonnes per annum (including retention permission for increase in production from 1 million tonnes to 1.6 million tonnes per annum).	Grant with revised conditions 16/02/07
17/714 Appeal Ref: ABP 301011-18	10-year permission for borrow pit with an extraction area of 4.5h and c.374,00m^3 of rock to a maximum depth of 8.5mOD. Extraction to occur annually between April and September. Proposal also includes demolition of shed and ancillary works.	Grant with revised conditions 13/11/18.

5.0 Policy Context

5.1. National Policy Context

5.1.1. National Planning Framework

The Shannon Estuary Integrated Framework Plan which was published in 2013 is given as a case study in the document. It is noted to be an inter-jurisdictional land and marine based plan which was the outcome of a successful multi-agency collaboration that included Limerick City and County Council, Clare County Council, Kerry County Council, Shannon Development and the Shannon Foynes Port Company as well as other key stakeholders with an interest in the estuary.

5.2. Regional Policy Context

5.2.1. Strategic Integrated Framework for the Shannon Estuary (SIFP)

The framework which was published in 2013 is an inter-jurisdictional land and marine based plan to guide the future development and management of the estuary.

Aughinish Island is designated as 'Strategic Development Location F'.

Specific policies in the SIFP include:

SIFP MRI 1.2.9 Aughinish Alumina

To safeguard the role and function of Aughinish Alumina as a key driver of economic growth in the region, encouraging its sustainable growth, expansion and diversification to facilitate greater and more competitive trade potential.

SIFP MRI 1.2.10 – Aughinish Marine Related Industry

To support and facilitate the sustainable development of marine related industry on land within this strategic development location, which harnesses the potential of the deep water, large hinterland and existing infrastructure. Other sustainable land uses may be acceptable where they are considered compatible or complementary with the level of flood risk, and where the ability to deliver the primary use (marine related industry) is not compromised. Development will be subject to compliance with the criteria set out in Objective SIFP MRI 1.2.

5.2.2. **Regional Spatial and Economic Strategy for the Southern Region**

The SIFP is cited as a good practice example.

Regional Policy Objective (RPO) 79 – Shannon Estuary and Other Harbour Plans

a. The RSES recognises the national and international importance of the Shannon Estuary, its potential to attract multinational development and the significant work that has been undertaken to progress its promotion and development. It is an objective to support and promote the delivery of the Strategic Development Locations as set out in the SIFP for the Shannon Estuary subject to the implementation of mitigation measures outlined in the SEA and AA undertaken on SIFP and zoned in the Local Authority Development Plans.

Regional Policy Objective 142 – Ports

e. Support the sustainable development of the 9 no. strategic development locations adjoining sheltered deep-water in line with the recommendations of the SIFP for the Shannon Estuary and subject to the implementation of mitigation measures outlined in the SEA and AA undertaken on the SIFP.

f. Development proposals will be subject to environmental assessment, implementation of mitigation measures outlined in applicable SEAs and AAs and feasibility studies to establish that any expansions can be achieved without adverse effects on any European sites and within the carrying capacity of the receiving environment of the ports.

5.3. **Local Policy Context**

5.3.1. **Limerick City and County Development Plan 2022 -2028**

Since the lodgement of the application the Limerick City and County Development Plan 2022 was adopted.

Aughinish Island is identified as a Strategic Development Location, the extent of which is delineated on Map 5.5 of the plan.

Objective ECON 057 – it is an objective to safeguard the Strategic Development Locations at Foynes Port, Foynes Island and Aughinish Island for the sustainable

growth and development of marine related industry and industrial development at Askeaton. All proposed developments shall be in accordance with regional and national priorities and the SEA Directive, Birds and Habitats Directive, Water Framework Directive, Shellfish Waters Directive, Floods Directive and EIA Directive. Buffer zones shall be incorporated into proposals for developments where necessary to preserve potentially valuable habitats, for example, areas of estuary, shallow bays and inlets, mudflats, lagoon, salt marsh and woodland habitat, which occur at or surrounding these Strategic Development Locations. The extent of such buffer distances shall be established in consultation with relevant statutory bodies. Detailed botanical, faunal and ornithological surveys should be undertaken in relation to proposed developments at these Strategic Development Locations, to fully consider the potential effects of the development and inform how to best avoid significant ecological effects.

Objective ECON 058(a) – it is an objective to (a) support the expansion of the Port of Foynes and promote the economic and industrial development of the Shannon Estuary as a strategic transport, energy and logistics hub, serving Limerick and the wider region by utilising naturally occurring deep water characteristics and by identifying and safeguarding existing and future strategic transportation links, subject to fulfilling the requirements of the habitats directive and the conservation objectives of the Lower River Shannon SAC site.

6.0 Submissions

The submissions received on foot of the lodgement of the application with the Board in December 2021 are summarised as follows:

6.1. Limerick City and County Council (LCCC)

The planning authority's submission comprises of the planner's report with two appendices. Appendix 1 comprises of the internal council department reports with appendix 2 providing the minutes of the meeting of Limerick City and County Council dated 24/01/22. The submission can be summarised as follows:

6.1.1. *Planning Report*

Site location and description: (see section 2 above).

Policy Context: (see section 5 above). Note that the submission refers to the previous Limerick City and County Development Plan.

Planning History: (see section 4 above).

Description of proposed development: (see section 3 above).

Appropriate Assessment: Information was assessed by the Heritage Officer who recommends conditions should permission be granted pertaining to the water management system, operation and management of the borrow pit and implementation of a sampling regime to monitor the levels of metals to inform any future mitigation measures. Concludes that on the basis of the information on file which is considered adequate in order to carry out a stage 2 appropriate assessment, that the proposed development, individually or in combination with other plans or projects, would not adversely affect the integrity of Lower River Shannon SAC (002165), River Shannon and River Fergus Estuaries SPA (004077), Barrigone SAC (00432) or any other European Site, in view of the sites' conservation objectives.

Environmental Impact Assessment Report: Summary of chapters provided (see section 11 below).

Chapter 5 Archaeological, Architectural and Cultural Heritage. The County Archaeologist has deemed the proposal to be acceptable subject to monitoring of groundworks by an archaeologist.

Chapter 6 Biodiversity. Heritage Officer recommends further information to clarify the status of Meadow Barley in the area.

Chapter 7 Population, Human Health and Agriculture. It is considered reasonable that the facility operator contributes towards the cost of environmental, recreational or community facilities which would be of benefit to the community of the area. A condition requiring the establishment of a community fund recommended.

Chapter 10 Hydrology and Hydrogeology. The relevant Environment Sections recommend further information/conditions including clarification of status of groundwater vulnerability at the proposed borrow pit.

Chapter 11 Air Quality. Notes the conditions recommended by the relevant Environment Sections where appropriate.

Chapter 12 Noise and Vibration. Notes the conditions recommended by the relevant Environment Sections where appropriate. Blasting should be carried out a maximum of 6-7 times a year in line with the provisions of permission 17/714.

Chapter 14 Traffic and Transportation. Report by Operation and Maintenance Section noted which considers the issues arising can be dealt with by way of condition.

Reasoned Conclusion on Significant Effects:

- Potential for deterioration in water quality to be mitigated by control measures.
- Human health and potential for significant negative effects including the effects of noise and vibration can be mitigated by the implementation of noise reduction measures.
- Dust, noise and vibration to be mitigated through use of best practice and minimisation measures.
- Potential for adverse impacts on landscape from increase in height of BRDA mitigated by landscaping programme.
- Positive and direct impact on wider community in terms of maintaining employment levels and investment.

Community Gain Fund: The contribution made to the wider area in terms of provision of recreation facilities and amenities is acknowledged. Given the scale of the proposed development which would extend the lifetime of the plant to 2039 a formal community gain scheme should be put in place.

Overall Conclusion

Clarification sought on groundwater vulnerability and habitats as summarised above.

Development contributions to be applied.

8 no. conditions recommended including:

- Condition 5: Community fund to be established
- Condition 6: Archaeological requirements
- Condition 7: Vegetation removal to take place outside bird nesting period.
- Condition 8: Blasting to be limited to 7 no. between April and September only

6.1.2. ***Appendix 1 – Internal Reports which are summarised in the relevant sections above***.

6.1.3. ***Appendix 2 – Minutes of Meeting of Limerick City and County Council 24/01/22***

Members noted that Aughinish Island is an area of high nature value with a number of species present, in particular the presence of two species with floral protection orders, namely Meadow Barley and Great Burnet. A request was made that a full ecological survey of the meadows indicated for expansion of the borrow pit be carried out when the species are in flower, and that measures to retain these protected species are put in place as part of the development.

6.2. Prescribed Bodies

6.2.1. Development Applications Unit, Department of Housing, Local Government and Heritage

Archaeology

- No underwater impact assessment received. Recommends implementation of mitigation measures set out in section 5.5 of the EIAR.

Nature Conservation

- Notes that footprint of BRDA is not being increased and borrow pit is not within a designated site.

6.2.2. Environmental Protection Agency (EPA)

- The IE Licence is currently under review. Licence review application P0035-08 received 28/01/22. It has determined that the licence review application must be subject to EIA. The EIAR submitted with the licence review application appears to be the same as that submitted with the planning application.
- All matters to do with emissions to the environment will be considered in the licence review application assessment.
- The Agency cannot issue a Proposed Determination on the licence review application until a planning decision has been made.

6.2.3. **Transport Infrastructure Ireland (TII)**

- No specific observation.

6.2.4. **An Taisce**

- Compliance with conditions of the existing planning permissions and EPA licensing should be evaluated as a preliminary matter.
- The potential impacts to water quality as a result of bauxite and salt cake disposal, particularly a failure of containment in the BRDA, must be fully addressed by the Board to ensure compliance with the EIA Directive, Habitats and Birds Directives, WFD and Groundwater Directive.
- The risk of groundwater pollution is particularly high in areas of karst. Risk of siltation or release of other contaminants to groundwater must be fully assessed and guarded against should permission be granted.
- It is unclear whether the applicant has undertaken a specific assessment as required under Article 4 of the WFD to determine whether the project may cause a deterioration of the status of a surface or ground water body and/or whether it may jeopardize the attainment of good surface or ground water status. The Board is also required to evaluate if the proposal has the potential to affect the achievement of compliance with the conservation objectives of the water dependent Natura 2000 sites listed as Protected Areas. CJEU cases C-461/13 and C-529/15 cited.
- The site is already vulnerable to (a) downstream fluvial flooding in the Shannon, (b) high seasonal tides, (c) storm surge and coastal flooding, (d) extreme weather events, notably intense rainfall and (e) south-westerly gales; the frequency and magnitude of which will be intensified by climate change. These increased risks associated with climate change exacerbate the identified main modes of containment failure.
- Whilst the discussion of climate related risks in chapter 17 is acknowledged it is imperative that the potential impacts of these climate exacerbated disasters on containment in the BRDA and the associated risks to the environment and human health be fully assessed across all EIAR headings. In addition, the risks posed by the occurrence of two or more hazards simultaneously (e.g.

high downstream flooding in the River Shannon and storm surge), require assessment.

- There are concerns regarding flood risk assessment for the site given that CFRAM Flood Risk Assessment mapping is not available for Aughinish Island. The Board should ensure that the information provided in the EIAR, notably Chapter 10 on hydrology, is sufficient to determine the flood risk and assess the implications for containment in BRDA.
- In terms of appropriate assessment, the issues referenced above with respect to water quality and risks posed by climate change exacerbated disasters should be fully addressed. There can be no reasonable scientific doubt. European Court Cases C-258/11, C-404/09 and C-304/05 and High Court case Kelly v. An Bord Pleanala [2013 No.802 J.R.] referenced.
- The long-term plan for the site should be established and assessed against Ireland's environmental legal obligations, particularly with regard to Natura 2000 sites and water quality. The actions to be taken, if any breach is found post closure, should be detailed and evaluated. All post-closure plans must take account of and be assessed against the risks posed by climate change including exacerbated flooding and storm events.

6.3. Observations

6.3.1. Futureproof Clare CLG

The submission can be summarised as follows:

Tailings Dam

- The EIAR statement that the probability of BRDA failure resulting in a containment breach is very unlikely to almost impossible due to specified hazards and major accidents is not supported and is contradicted throughout.
- Whilst an accident might be unlikely, it is not impossible, and the precautionary principle should apply.
- Reference to Earthworks US NGO.

- Industrial disasters concerning tailing dams are well documented including Mount Poley Mine, BC 2015, Samarco Mine, Brazil 2016, Ajka, Hungary 2010. Reviews cited warn that the majority of tailing dams collapse are correlated with the height and type of dam.
- Upstream design is particularly dangerous because the underlying tailing can liquify and collapse giving way for the whole structure to topple. Engineers have found that tailings dams tend to be safest i.e. most resistant to failure and collapse when they are not built on top of or are using previously deposited tailings. The majority (85%) of tailing dam failures have occurred in dams of less than 45 metres in height.
- The BRDA and ancillary infrastructure is classified in accordance with the 2013 Canadian Dam Association (CDA) guidelines. It is contended that the assessment criteria and the terminology used to calculate the level of risk is unacceptable, reductionist and biased. It is queried why the more recent 'Global Standards on Tailings Management' 2020 was not used.

Blasting

- Concerned that the applicant has underestimated the risk involved in rock blasting.
- The applicant in its assessment classifies the red mud deposits as having the lowest threshold (PPV limit mm/s) to seismic waves, such as the ones produced by explosions (reference to Appendix A to EIAR). The appendix is based on doubtful values to calculate the PPV.
- The necessary setback distances from blasts at the borrow pit to limit the PPV to <25mm/s at the BRDA embankment (53 metres) and the GNI gas transmission pipeline (50 metres) can be easily breached. The margin of error has not been considered.
- The impact of a potential BRDA containment breach on the gas pipeline has not been properly assessed on health and safety grounds.
- Rock blasting on site is not a necessity other than cutting costs of operation. It can be sourced from local quarries.

Climate Change

- The statement that the likelihood of major accidents/disasters having an adverse impact on BRDA containment is very low is essentially contradicted by stating that because of climatic changes the severity of these events will increase.
- A review of tailing dams accidents by Rico et al. (2008) show that in Europe the most common cause of failure is related to unusual rainfall.

Biodiversity

- In the event of an incident, the view that restoration is 'highly possible' is very vague. An assumption that damage to the environment is easily reversible indicates a simplistic understanding of biological processes. UN Convention on Biodiversity cited.

Bauxite Residue

- No valid independent investigation has been conducted on possible health effects of BRDA particulate matter on humans and animals.
- The non-hazardous classification of red mud deposits is queried. Rehabilitation is queried. Reports cited in support.
- Despite the sprinkler system there is evidence that dust blows off the open-air deposits. Similar occurrences are likely to increase as the height is increased.

Groundwater Contamination

- The EIAR identifies medium to high risk for water contamination. It identified potential sources of impact. Rock blasting adds to the likelihood of spillages occurring. The potential impact on the water table has not been taken into account.
- The increased volume of the BRDA and impact on groundwater has not been addressed. The reliability of the seepage assessment is queried. The computer modelling could have overlooked potential factors for contamination. Current contamination is dismissed despite evidence of the red mud seeping into water.

- Leakage assessment should be done continuously. There is an unacceptable risk due to absence of mitigation measures.

Other Issues

- Consideration only given to Natura 2000 sites within 15km. The 15km radius is arbitrary. While the report acknowledges the likelihood of harmful effects on SACs there is no adequate assessment of how these affects will be tackled.
- Lack of meaningful public participation.
- Alleged historic incidents at the site cited.
- Competition and industry monopoly and source of bauxite.
- Dispute role of aluminium in the transition towards renewables.
- Energy consumption at the facility.
- Alternatives including redirection of funds towards research and development of initiatives should be considered.

6.3.2. **Environmental Trust Ireland**

- Accident at Ajka Hungary in 2010 referenced.
- The expansion will further exacerbate the environmental, human and animal health toxicity problems associated with the facility.
- No radiological assessment undertaken since 2008.
- Groundwater vulnerability over much of the site is high to extreme with karst features. Groundwater monitoring showed excess amounts of arsenic and mercury.
- A 15km arbitrary radius was applied in the appropriate assessment, It should have been on a case specific basis. Sites were incorrectly screened out.
- Cumulative and in combination effects in the NIS and EIAR were not properly considered or at all. Moneypoint and Tarbet power stations and Irish Cement in Mungret referenced.

- The documentation is inadequate to reach a conclusion that no reasonable scientific doubt remains that the proposal will not have an adverse effect on the integrity of European sites.
- Potential adverse impacts on the BRDA from blasting.
- Cumulative and in combination factors need to be considered in the consideration of major accidents. Reference made to COMAH/Seveso II regulations for sub-threshold development, particularly in the context where there is an existing External Emergency Plan.
- Climate change has not been adequately addressed, in particular increased frequency of flooding, extreme weather and rainfall events. Storm surges up the Shannon Estuary which is a major factor in flooding has been ignored.
- Leachate and runoff from the BRDA and SCDC into the estuary and groundwater have not been considered.
- Applications for permission and licence from EPA result in the proposal being presented in a piecemeal manner and constitutes project splitting.
- EIAR does not comply with 2014 Directive requirements.
- The documentation is inadequate and not conducive to effective and meaningful public participation contrary to Aarhus Convention.

6.3.3. **Cappagh Farmers Support Group**

- To add a further 8 million cubic metres of bauxite residue would put significant pressure on the existing embankment walls which are made up of crushed rock only.
- 170 of the 250 acres of the BRDA are not lined. The unlined BRDA 1 is in breach of condition 38 attached to permission ref. 8580.
- The unlined Phase 1 BRDA has the potential to undermine the embankments from water coming in and out underneath, eroding sections of the embankment.
- No supporting evidence provided with the application to corroborate the stability of the embankment walls and their ability to accommodate the increased capacity.

- The higher the BRDA the greater the potential for emissions by air to surrounding lands. Evidence of such events provided.
- There is no breakdown of what is contained in the red mud. References cited.
- Object to the expansion of the salt cake disposal cell. Whether these cells are finally closed with red mud is unclear.
- Impact on human and animal health and biodiversity as raised previously with the Board remain relevant.
- Impact on farming and levels of heavy metals on land.
- The ponds are on reclaimed land which were tidal.
- The sea defence walls are being eroded with sections coming away which leaves water in.
- Sea levels are predicted to rise as a consequence of climate change with areas in the vicinity, including at the back of the mud pond, expected to be impacted by major flooding within 10 years.
- Has not meaningfully addressed alternative technologies to deal with residues including sea disposal.
- The groups' concerns regarding the extension to the borrow pit are the same as those put to the Board in its appeal on file ref. ABP 301011-18. The proximity to the BRDA and proposed blasting is reckless.
- There is scientific evidence that the blasting is unsafe details of which were presented with their submission on the above referenced appeal. The precautionary principle should apply.
- The applicant can source crushed rock in the quarry in the immediate vicinity as it has done in the past.

6.3.4. **Dolphin Watch**

- The estuary has a resident group of 131-150 bottlenose dolphins which are a qualifying interest of the SAC and are further protected under Annex II of the Habitats Directive.

- Long term exposure to bauxite residue is well known to have toxic impacts on the internal organs of humans and animals. The dolphins in the estuary are exposed to this residue both from the insufficient lining of the BRDA as well as from dust blows from the surface of the red mud pond.
- Dolphins are not only susceptible to the direct impacts on bauxite residue, they are top predators and therefore rely on fish and other wildlife in the Shannon to survive. Many locals have noted a significant decline in wildlife in the area.
- The overall health of the population may be declining. Study of skin lesions referenced.
- Should a large proportion of the estuary population be wiped out, it would be extremely unlikely that they could ever bounce back which would cause the ecosystem, itself, to collapse.
- Incident at Ajka Hungary referenced.
- The impact of noise from rock blasting likely to have been underestimated. Dolphins are primarily acoustic beings and rely heavily on echolocation. They are already exposed to noise from shipping and other marine traffic. Noise travels faster in water and due to the bathymetry of the estuary, sound will reverberate off the seabed and be amplified causing extreme stress and even further physiological damage to their bodies/hearing. Any damage caused to their hearing would be detrimental to their survival, reducing their ability to hunt, as well as their ability to participate in their society.
- Economic importance of dolphins in the estuary.

6.4. **Applicant's Response to Submissions**

The applicant's response dated 6th July 2022 addresses all but the submission from An Taisce. In view of the commonality of issues raised and to avoid undue repetition the response can be summarised as follows:

- Submissions by EPA, DAU Department of Housing, Local Government and Heritage and TII noted.

Dolphins

- It is stated in the NIS that Bottlenose Dolphin are largely concentrated near the mouth of the Shannon estuary and are infrequently present upstream of Glin c.15km west of the site.
- Claims regarding exposure of the dolphins to bauxite residue are disputed. Scientific literature does not support the claims. A recent publication based on a long-term study of the population found that the overall adult survival rate is comparable to those reported from other populations in temperate regions. The population has been studied over 30 years and it has remained relatively stable.
- The Conceptual Site Model (CSM) prepared as part of the NIS concludes that there is no evidence that heavy metals concentrations are elevated in the marine sediments and consequently no evidence that toxic impacts would occur to the marine benthic biota. The data indicates that there is no pathway from the AAL site producing a negative impact on the designated prey species of intertidal feeding birds and other higher fauna in the estuarine Natura 2000 sites.
- There is nothing unique in the Shannon population showing skin lesions.
- A Marine Mammal Risk Assessment (Appendix 6.4 of the EIAR) prepared as part of the EPA IE Licence review concluded there was no risk of likely significant effects on the species arising from noise and vibration impacts from the borrow pit. Noise and vibrations levels from a blast will attenuate quickly such that they pose no risk to sensitive receptors in the vicinity. The nearest Bottlenose Dolphin habitat is located over 1.3km from the borrow pit.

BRDA and SCDC

- The CDA guidelines are an internationally recognised best practice standard for design, operation and management of tailings facilities which promotes a risk-informed approach to safety analysis and assessment as it includes deterministic standards-based analysis among other considerations. The Global Industry Standard on Tailings Management (GISTM) 2020 provides a similar consequence classification matrix for tailings facilities. The advantage

of CDA over GISTM is that it also provides target level criteria thresholds for stability in the form of Factors of Safety (FoS) for various stages in the life of the facility and for varying scenarios.

- The method of bauxite residue storage at AAL is entirely different to that which was carried out at Ajka where an older technology 'wet ponding' was used. 'Dry stacking' system is used at the site which is in accordance with BAT and EU BREF Management of Waste from Extractive Industries.
- Bauxite residue is categorised as non-hazardous waste under European Waste Code 010309.
- Radioactive assessment of bauxite residue and process sand was carried out in 2021. The results have values comparable with, and slightly lower than the previous Radiological Protection of Ireland 2008 assessment. As such, the BRDA does not present a radiation hazard.
- The height of the BRDA is below 32m above sea level and has been carried out in accordance with the permission granted under ref. 05/1836 (PL13.217976).
- The original BRDA was constructed between 1980 and 1982 under permission ref. 15737 granted in 1979. This included a superior method of disposal of bauxite residue involving the thickening of the bauxite residue and increasing its density. The assertion that it was constructed further to permission ref. 8580 granted in 1974 (to which condition 38 was attached) is incorrect.
- Deposition of bauxite residue within the BRDA commenced at the existing land surface elevation and at no time was deposited 40 feet below this level.
- All necessary certification of the structural stability of the BRDA is recorded and reported in accordance with conditions associated with Schedule C7 of the EPA licence.
- The stability assessment of the BRDA is in Appendix D of the Engineering Design Report.
- The closure details for the SCDC are provided in Appendix A of the Engineering Design Report and shown in SCDC rase drawings.

- The handling and deposition of salt cake from the facility to the SCDC is done having regard to best practice in health and safety.
- Alternative disposal techniques were assessed in the alternatives chapter. In the event that additional storage for bauxite residue cannot be provided on site there is a significant risk for the future viability of the facility post 2030 with knock-on impacts to the region's economy.
- Section 8.2 of Engineering Design Report (Appendix A of EIAR) provides information on capping containment trials carried out. The proposed 'amended mud' capping for exposed bauxite residue is now included as Condition 8.5.21 in the IE licence.
- The monitoring and auditing requirements for the BRDA are defined in Schedule C.7 of the IE licence. The EPA is ultimately the competent authority with regard to the compliant operation of the facility.

Water and Groundwater

- Section 10.6.8 of the EIAR sets out the water management system for the proposed development.
- The Seepage and Water Quality Assessment concluded that there is negligible seepage through the base of the facility either in the unlined and lined phases due to the underlying depth of bauxite residue, the characteristics of the underlying estuarine soils and the composite basal lining system (natural and geosynthetic). There is no evidence provided by the observer as to the seepage issues.
- Groundwater monitoring carried out at observation wells show that there is no impact to groundwater or to the surrounding environment.

Borrow Pit and Blasting

- The sourcing of rockfill within the site is considered to be a more environmentally sustainable approach than sourcing material offsite. The borrow pit extension will provide for the rockfill requirement associated with the proposed BRDA raise. It will also provide future security of supply without reliance on external quarries.

- The extraction boundary has been selected based on the required set back distances as to not exceed PPV thresholds.
- Two production blasts have been conducted to date at the permitted borrow pit (June 2022) with the monitoring data showing values in compliance with both the licence requirements for vibration and air overpressure and the threshold criteria and response framework detailed in the Borrow Pit: Phase 1 BRDA, Blast Vibration Assessment (Golder 2017).
- No adverse effects have been identified for the BRDA, the gas transmission pipeline or local residences as a result of blasts. The monitoring data from the initial blast has been utilised to calibrate the model and will be continually refined following each subsequent blast to determine the maximum instantaneous charge (MIC) to remain compliant with the established thresholds. The proposed extension is at a greater distance from the BRDA over that permitted.
- Closure plan for the borrow pit provided within the application.

Human and Animal Health

- The Air Quality chapter of the EIAR evaluated a number of dust emissions scenarios with increased height of the BRDA at different stages. The Human Health Assessment considered these scenarios and adverse impacts are not predicted.
- A detailed composition of the bauxite residue and salt cake is provided in the EIAR and evaluated in the Human Health Assessment. All chemical and NORM (Naturally Occurring Radioactive Materials) have also been addressed.
- No evidence provided to support the claims as to a link to an incident at a Mayo farm and ceasing of milk production on a farm due to heavy metals.

Climate Change

- OS map of 1840 shows the site as a network of irregular fields with a number of structures throughout. Therefore, any reclamation works were carried out prior to this. The OPW completed drainage and enhanced tidal protection embankments in the 1960s, well before the facility was developed.

- AAL carries out routine maintenance works to the embankments. The embankment does not form part of the containment infrastructure for the BRDA.
- The risk assessment concluded that after allowing for the potential effects of climate change the risk associated with a containment breach or bauxite reside release was either highly improbable or very unlikely.
- The likelihood of flooding was assessed in chapter 10 (hydrology). There is no current or predicted flood risk for the site.

Environmental Impact Assessment

- Refute claims of project splitting.
- In terms of cumulative and in combination effects Tarbert power station and Irish Cement facility are existing, and it is considered that their operation would be picked up in the relevant baseline data.
- The EIAR has been prepared having regard to the EIA Directive 2014/52/EU.

Appropriate Assessment

- The context for using 15km zone of influence is for illustrative purposes. Using the source-pathway-receptor (S-P-R) model and the likely significant effects threshold, it was possible to screen out sites beyond this distance, in addition to many of the designated sites within.
- No evidence provided to support the claim that likely significant effects on a number of sites were improperly ruled out at screening stage.
- Cumulative and in-combination effects are considered in detail.
- The documentation presents considerable detail on the habitats and species in the receiving environment with a thorough consideration of the potential environmental impacts on ecology and designated sites.

Other Issues

- The precautionary principle is designed to assist with decision-making in certain circumstances where there is a lack of full scientific certainty. It is not intended to be invoked in respect of hypothetical effects and theoretical risk

and does not arise where the designed level of protection is defined and understood, and the risk of harm can be quantified. These situations are dealt with using normal risk management tools as is the case for the assessment of BRDA water management system, the assessment of natural hazards to the BRDA and the blast assessment.

- In addition to the period for lodgement of submissions on the application, public and prescribed body consultation has been undertaken as part of the EIAR (detailed in section 1.9).
- The AAL facility is not a Seveso site and is not subject to COMAH Regulations.
- Of the 5 no. incidents that have occurred at the facility the most recent is 16 years ago. AAL has an excellent record in compliance and has always maintained its 'fit and proper person' status for the purpose of IE licencing.
- The production of alumina is critical to facilitating the production of renewable technologies thereby ensuring that a low carbon and green economy centred on renewable energy production and electric transport modes can be delivered.
- AAL generates 99.85% of its own electricity and exports 97MW to the national grid.
- The impact of using gas supplied by Ervia will have an overall net zero impact on climate by 2050. Reference made to report Vision 205 – A Net Zero Carbon Gas Network for Ireland (Ervia 2019).
- AAL operates under the EU Emissions Trading Scheme (ETS) based on permit register no. IE-GHG038-10361-3. The do-something scenario will lead to indirect GHG emissions from the facility continuing beyond 2030. The ETS market will have to meet a target of a 61% reduction by 2030. There will be a gradual reduction in GHG emissions from the facility under the facility's ETS permit. It will continue to pay gradually increasing carbon cost.
- Climate Action Plan 2021 provides that emissions from industry sectors covered by the ETS are subject to Eu-wide rather than national targets set out

under EU Effort Sharing Decision. The facility which has participated since 2005 in the ETS is fully consistent with the aims of the plan.

- Limerick City and County Council has no objection to the proposal pending clarification on 2 matters. Groundwater is addressed in the EIAR and it is confirmed that Meadow Barley is not present within the application site.

7.0 Section 37F(1) Response

Due to the time elapsed since the application was lodged with the Board the applicant, by way of section 37F(1) of the Planning and Development Act, 2000, as amended, was requested to furnish the following information in a letter dated 13/12/23.

1. To make any further submission as considered appropriate on the application, including any updates to the EIAR and AA Screening Report/NIS.
2. To make a submission on the observation received by the Board from An Taisce. The response is not to contain any additional reports or supplementary reports and is to be confined to the issues raised in the observations received by the Board.

The response received dated 19/01/24 can be summarised as follows:

- The description of the proposed development remains exactly as applied for. There are no physical (or other) changes sought.
- The facility operates under EPA IE licence P0035-07 under which the applicant is required to submit annual environmental reports to the EPA providing information regarding emissions. All such reports are available on the EPA website.
- The operation of the borrow pit permitted under ABP 301011-18 commenced in June 2022. 4 no. blasts were undertaken between June and September 2022. The monitoring of these blasts illustrate that they were fully compliant with the mitigation outlined in the EIAR accompanying the borrow pit application and the requirements of the IE licence. This data is provided as Attachment 7 of the annual report.

- There are no projects existing and/or newly approved since the original application was lodged which did not form part of the cumulative impact assessment.

The provisions of the 2022 City and County Development Plan which was adopted after the Board's original decision detailed. In addition, a climate policy update is provided including reference to the Climate Action Plan.

Response to An Taisce Submission

- Not considered that there are any aspects raised in the submission that have not already been fully addressed.
- The EIAR and NIS referenced the WFD in numerous places and provides sufficient information to enable the Board to assess the development in the context of the WFD. Table 3 of the submission provides the WFD status of waterbodies within 2km of the site based on the 2016-2021 classification.
- Where appropriate, simultaneous occurrence of hazard events was considered.
- Flood risk has been fully assessed. Aughinish Island was not identified as an area of potentially significant flood risk and no flood extents are indicated for the site on the CFRAM flood mapping. Additional National Coastal Flood Hazard Mapping published by the OPW in 2021 indicates the extent of land that might experience coastal flooding for a worst-case scenario where flood defences are not considered. The coastal flood hazard mapping provides flood extents for Aughinish Island. This data does not change the outcome of the assessment of flood risk for the site given the flood protection provided by the existing FDTB. The EIAR provides an assessment of the vulnerability of the proposed development to major accidents and/or disasters including the potential for extreme storm, tidal surge and wave events.
- All aspects of the proposed development, including the closure plan and post closure monitoring, are described and assessed. Condition 10 of the IE licence requires AAL to have an approved plan in place for the orderly closure, decommissioning and aftercare of the facility. The most recently approved updated Closure, Restoration and Aftercare Management Plan was

in 2019 as part of the licence review. The plan takes account of flooding and storm events, both of which account for climate change. This plan was considered as part of the NIS and is also detailed in the Engineering Design Report: BRDA Raise Development (Appendix A of the EIAR) which accounts for climate change in the design.

8.0 Responses to Applicant's Submission

The above submission was circulated for comment. The applicant's response to submissions made on the application and as summarised in section 6.4 above (dated 22/07/22) was also circulated for comment.

The responses can be summarised as follows. Note: Reiteration of points made in the original submissions are noted.

8.1. Transport Infrastructure Ireland

No specific comment.

8.2. Environmental Protection Agency

- The licence review application may need to be updated to accommodate the changes proposed as part of the planning application.

8.2.1. An Taisce

- Refers to its original submission.
- The required participation in the EU Emissions Trading Scheme and the purchase of the associated emissions permits relates to mitigation obligations under EU climate law. This does not negate, prevent or act in place of the obligations under the national carbon budgets and sectoral emissions ceilings in accordance with the Climate Act, which covers both the ETS and non-ETS sectors. Therefore, the Board must still evaluate the proposal for alignment with national level emissions reduction obligations per the Climate Act.

8.2.2. **Futureproof Clare CLG**

2 no. submissions were received. They can be summarised as follows:

Validity of Application

- The Board's decision under ref. PL 217976 for Phase 2 BRDA and retention of increased production, in addition to a further increase in production, required EIA of that production which was not carried out. No AA was carried out. The EIS did not assess the cumulative impacts of the original alumina production installation. No application has been lodged for substitute consent.
- Case C-196/16 Comune di Corridonia the EU Court of Justice held that where there was a failure to carry out a lawful EIA member states are obliged to nullify the unlawful consequences of that failure. The Board in the current application is obliged to regularise the failure to comply with EU law. High Court decision Carrownagowan Concern Group v. An Bord Pleanala [2023] IEHC 579 cited.

Adequacy of EIAR

- The proposed expansion will extend the life of the installation to 2039 and thus will extend the duration of production beyond the original time horizon. The impacts of this time extension relative to the baseline prior to the establishment of the facility and commencement of production has never been assessed for the purposes of the EIA Directive.
- There is no assessment of the primary refining operations or ancillary activities including dumping at sea, abstraction of water from the River Deel and from the Askeaton groundwater body. The current application represents project splitting. There is a mis-identification of the project required to be assessed for the purposes of Article 4 of the EIA Directive.
- The EIA has failed to address the acknowledged environmental impacts of the hazardous substances discharged to groundwater as a result of the 170 acres of unlined BRDA. Such seepage is prohibited by Regulation 9 of the Groundwater Regulations, 2010.
- The EIAR used an approach to significance based on EPA Guidelines from 2017. On a precautionary basis effects which are more than 'not significant'

are sufficiently significant to require assessment, particularly in circumstances where an accumulation of insignificant effects may be considered cumulatively significant.

- The EIAR is non-compliant with the assessment of 'significance' for the purposes of the EIA Directive as determined by the Court in Monkstown Road Residents Association v. An Bord Pleanala [2022] IEHC 318.
- Unless an effect would alter a sensitive aspect of the environment, it is not assessed. Reference made to landscape, traffic, accidents.
- The EIAR referred to the Environmental Liabilities Risk Assessment (ELRA) submitted to the EPA as identifying the types of accident that might occur. The ELRA was not included. It incorrectly stated that it was only required to consider the risk of major accidents.
- EIAR did not assess the use of resources, in particular use of water. This is contrary to the Court of Justice in C-535/18 IL v Land Nordrhein-Westfalen that the EIAR must include the data necessary to assess the effects of the project on water in light of the criteria and requirements of Article 4(1) of the WFD.
- The impacts of the new Dumping at Sea regime have not been assessed in the application either for the purposes of EIA or AA. Therefore, there has been no assessment of the impacts of such dredging on the population of dolphins in the SAC.

Adequacy of NIS

- The NIS repeats the error in relation to the misidentification of the project required to be assessed. It does not comply with Article 6 of the Habitats Directive. It does not address the compensatory salt marsh or short eared owl or mention protected plants or their transplantation.
- No survey undertaken to identify presence of mudflats and sandflats not covered by seawater at low tide.
- No bird survey to identify presence of qualifying interests.

- No evidence presented on which an impact on the benthic communities in estuaries could have been excluded.
- NIS is incorrect in stating that the qualifying interest ‘estuaries’ and ‘mudflats and sandflats not covered by seawater at low tide’ have good conservation status.
- Why otters are not using the artificial otter holts not assessed.
- Impacts on salmon not adequately assessed.
- To state that the survival rates of dolphins is comparable to other populations in temperate regions does not measure negative stresses on the animals or their quality of life. The requirement is to assess all impacts on protected species not just those which result in mortality.
- The errors and omissions in the NIS prevent clear precise and definitive conclusions capable of removing all reasonable scientific doubt as to the absence of effects.

BRDA

- Academic literature supports the view that bauxite residue is hazardous (extracts and references given).
- Does not accept the assertion that the risk associated with a containment breach or bauxite residue release is highly improbable or very unlikely.
- Testing of the bauxite residue did not consider radium. The 2020 results may not be accurate or a proper representation of safe levels of radioactive materials.

Surface, Ground and Transitional Water Bodies

- Regulation 9(a) of the Groundwater Regulations states that the input of hazardous substances into groundwater is prohibited.
- Groundwater well monitoring indicates that samples had arsenic concentrations significantly in excess of 10 µg/L.
- The West Limerick Group Water Scheme has an abstraction from the groundwater body. No information has been provided as to the determinants

of concern for drinking water in the Askeaton groundwater body as a result of activities at the plant despite their presence above levels permitted under the Drinking Water Directive. Case C-723/21, Stadt Frankfurt (Oder) cited.

- Having regard to C-535/18 and article 4 of the WFD there is a requirement to identify the data necessary to assess the impact of the project on drinking water sources potentially impacted and the data must show whether the project is likely to result in the deterioration of a body of drinking water.
- Leachate from the operations has never been assessed for compliance with Article 4 of the WRD.
- The operation is identified as having a diminution of quality of associated surface waters for chemical reasons.
- The impact on abstraction of water has not been assessed for its hydromorphological impacts on the River Deel and the quantitative status of the Askeaton groundwater body.
- The EIAR does not address properly, or at all, the requirements of the WFD. The Board cannot grant permission for the continued operation of the facility without the requirements of Article 4 of the WRD being satisfied. The applicant acknowledges in the evaluation of predicted residual impacts and their significance that there will be a 'slight' impact on relevant waterbodies. In light of the fact that the groundwater body is currently in the lowest category status 'poor'. Further release of contaminants to groundwater cannot be permitted without the application of an exemption under Article 4(7) of the directive. No information has been provided to satisfy the requirements of article 4(7) and, therefore, the Board does not have jurisdiction to grant permission. CJEU Case 461/13 Bund fur Umwelt und Naturschutz Deutschland referenced in which it is stated that if the quality element concerned within the meaning of that annex is already in the lowest class, any deterioration of that element constitutes a 'deterioration of the status' of a body of surface water within the meaning of Article 4(1)(a)(i).
- The EIAR does not consider the full impacts of the continuation of the activities on the status of the waterbodies up to 2039.

Climate Change and Flood Risk

- The applicant focuses on the emissions section of the Climate Action Plan (CAP) 2024 and does not refer to chapter 13 which addresses adaptation. Pending the publication of an updated national Climate Adaptation Plan and sectoral adaptation plans the Board is required to determine the application in a manner consistent with IPPC science referred to in the Climate Action Plan.
- The applicant has not provided any details of how it proposes to reduce its emissions either in the EIAR or in its emissions report. It does not address how it will achieve the requirements of the CAP and sectoral emissions plans. Therefore the Board does not have the relevant information before it by which it can comply with its obligations under section 15 of the Act.
- The assumptions underlying the Golder Associates risk assessment and the Engineering Design Report are fundamentally flawed as they are based on historical data on tailings dam failures and fail to account for the impacts of climate change on foot of IPPC science.
- It is possible that increased rainfall has already or could change the constitution of the red mud in the BRDA. In addition, the proximity of the estuary to the BRDA means that even if the red mud ponds are more viscous and there is seepage, then as soon as the red mud meets the river it will begin to lose viscosity very quickly.
- The coastal flood modelling carried out by Climate Central provides accurate and granular information on sea level rise and coastal flood hazard backed by the latest IPCC science. In the maps lands at Aughinish which are 1 metre above the high tide line could be reached through combination of sea level rise, tides and storm surges. The Board must take account of anticipated sea level rise at least up to 2050 and beyond.
- Volume 4 of the Strategic Flood Risk Assessment of the 2022 Limerick City and County Development Plan shows much of the Foynes area in Zones A and B.
- On the basis of the data in relation to predicted flood impacts the site is properly in Flood Zone A. Chapter 10 of the EIAR is deficient in relation to

addressing flood risk. The development is not compliant with the Floods Directive as the flood risk has not been properly classified.

- It would be premature to determine the application on account of the requirements of The Planning System and Flood Risk Management Guidelines. Section 2.1 of the guidelines requires the prior assessment of flood risk prior to development consent. As this has not happened any decision to grant permission would be premature. If the Board proceeds to determine the application the location is clearly in Flood Zone A and a justification test is required.
- The Board has an obligation to interrogate the information provided on the risk of inundation of the BRDA. High Court decision Stapleton v. An Bord Pleanala [2024] IEHC 3 referenced. There is a contradiction between the applicant's submission in respect of flood risk and the independent evidence as to the anticipated sea level rise. The Board must resolve the contradiction before it can lawfully determine the application.
- The Golder report *Risk Assessment and Break Out Study for the Bauxite Residue Disposal Area (BRDA)* is based on the Canadian Dam Association Guidelines for tailings dams (CDA 2014) which is not based on the most up to date climate science and does not take account of the geographical location of Aughinish BRDA immediately beside a tidal estuary at risk of severe flood events.

8.3. Environmental Trust Ireland

2 no. submissions were received, 1 no. which is accompanied by a copy of its submission to the EPA on the Dumping at Sea Licence application. The submissions can be summarised as follows:

- If the applicant intends to rely on any reports submitted to the EPA it should have forwarded same to the Board for its consideration.
- The applicant states that dolphin is not common upstream of Glin which is contradicted in its report that states that Analysis of Static Acoustic Monitoring data carried out at Aughinish between 2011-2014 found evidence of the species for 29% of the days monitored.

- Dolphins bioaccumulate heavy metals and are susceptible to the impact of blasting from the quarry.
- Given the precarious state of Hen Harrier populations reliance on desk top studies and the National Biodiversity data website is completely insufficient. Extract from NPWS 2022 National Hen Harrier Breeding Survey cited.
- The claim that nickel does not bioaccumulate is not supported by scientific literature. Reference made to articles in support, including a peer reviewed Elsevier Journal article.
- A number of tables are attached to the applicant's submission relating to ground and surface water but there is no context or discussion or evaluation of what these are intended to show.
- The reports, in particular, the environmental reports have not been updated. They remain inadequate and contain data lacunae.
- There is lack of clarity on what the applicant intends to do. The original application applied for an extension to the salt cake cell area but also stated that it intended moving to a wet oxidation plant. If these changes have been implemented this would materially alter the current application as the salt cake cell area is no longer needed.
- No account has been taken in any of the environmental reports to the new Dumping at Sea licence application. Cumulative impacts have not been considered.
- Applying for permission in a piecemeal or disjointed manner means that the already permitted activity would be the new baseline scenario.
- There are a number of waterbodies in proximity to the site which have not been designated under the WFD. The Board has no jurisdiction to grant approval. Water quality status reports are either not available or indicate declining status.
- The dry stacking/mud farming technique was not employed until 2009. The wet ponding technique was used in the original unlined part of the BRDA which remains in situ.

- In addition to the hazardous SCDC located within the BRDA there were 2 no. previous SCDCs located within Phase 1 BRDA. These were unlined and comprised shallow hollowed out areas of c.1 ha. (pg.276 EIAR). Seepage from the base of the BRDA is occurring and the results from the groundwater monitoring wells around the site show excess amounts of certain heavy metals. The applicant did not engage with the excess levels recorded.
- There has been no radiological assessments since 2009. The 2021 assessment comprises of 3 no. samples only. Once off limited sampling of this nature is completely inadequate for statistical analysis and comparison purposes.
- No account has been taken of the impact of karst on groundwater directional flow.
- AAL has not produced any report or assessment dealing with the management of all spent fuel and radioactive waste.
- The precautionary principle has not been properly taken into account.
- No European sites outside the 15km radius were listed. No reasons were given for the exclusion of Killarney Oakwoods. Using S-P-R model it would be within the zone of influence particularly for indicator species such as bryophytes and lichens.
- No account has been taken of the impact through rainfall of emissions from the facility on Cladium and other species in the Askeaton Fen Complex SAC and the overall impact of habitat fragmentation and degradation.
- The habitat survey work undertaken is deficient with reference to protected species in the Flora Protection Order and indicator species such as bryophytes and lichens, triangular clubrush and other species forming habitat subtypes within the Annex 1 protected priority habitats of the Lower River Shannon SAC.
- Several essential surveys and reports are absent from the application including a marine mammal risk assessment and archaeology underwater impact survey.

- Cumulative and in combination effects of the quarrying with other quarry operations have not been assessed.
- The instruments recording the blasting have not been calibrated properly.
- Information is deficient (e.g. chemical sampling) and precludes meaningful public participation.

9.0 **Assessment**

Having regard to the requirements of the Planning and Development Act, 2000, as amended, the assessment of the proposed development is divided into three parts to include the planning assessment (section 10) environmental impact assessment (section 11) and appropriate assessment (section 12). Invariably there is a significant overlap in the assessments, and to avoid undue repetition where issues arise they are addressed in the environmental impact assessment (EIA) and appropriate assessment (AA) sections.

10.0 **Planning Assessment**

I consider that the issues arising in this section can be assessed generally under the following headings:

- Procedural Issues
- Principle of Development and Policy Context
- BRDA Stability and Potential for Containment Breach
- Health and Safety
- Surface and Groundwater
- Closure of Facility
- Bottlenose Dolphin
- Animal Health
- Local Authority Recommended Conditions

10.1. Procedural Issues

10.1.1. The industrial facility at Aughinish Island is long established having commenced operation in 1983 and is governed by an IE Licence P0035-07 issued 28/09/21. The licence addresses all activities within the AAL facility including the borrow pit activities and associated blasting events. The EPA is the competent authority with regard to IE licencing. As per the most recent EPA submission a licence review application was received 28/01/22 with a proposed determination on same awaiting a decision on this planning application.

10.1.2. A number of submissions to the application raise concerns as to the compliance with the requirements of previous planning permissions on the site. Cappagh Farmers Support Group in its submission contends that sections of Phase 1 are not lined as required by the parent permission ref. 8580 with specific reference made to condition 38 which required that '*the red mud pond shall be constructed and maintained in a sound structural condition and to be effectively sealed to prevent the leakage of its contents. The embankments to be of adequate strength to resist mud pressures and storm condition in the estuary'.* The applicant refutes this contention stating that Phase 1 of the BRDA was constructed between 1980 and 1982 under permission ref. 15737 (granted in 1979) and not under the 1974 permission. The fact that the relevant area is unlined is not contested by the applicant but that a superior method of disposal of bauxite residue involving the thickening of the bauxite residue and increasing its density was used. I refer the Board to Table 15 of the Engineering Design Report in Appendix A of the EIAR which sets out the lining system for the various BRDA components. In same Phase 1 is stated to have low permeability estuarine deposits of varying depth (4m to 30m). The Seepage and Water Quality Assessment in Appendix H of the same report states that there is negligible seepage through the base of the BRDA, either in the lined or unlined phases, due to the underlying depth of bauxite residue and the characteristics of the underlying estuarine soils. I address the matter of perimeter wall stability in section 10.3 below.

10.1.3. The applicant also confirmed that the height of the BRDA is below 32m above sea level and has been carried out in accordance with the permission granted under ref. 05/1836 (PL13.217976).

10.1.4. An Taisce in its submission recommends that compliance with existing planning permissions be evaluated as a preliminary matter but does not detail specific areas of concern in this regard. In terms of compliance I am not aware of any previous or outstanding enforcement issues with respect to previous planning permissions on the site and note that no reference to same is made in the LCCC report on file. Compliance with conditions attached to planning permissions lies with LCCC as the enforcement authority. I also note that compliance with the conditions attached to the IE licence is a matter for the EPA as the competent authority.

10.1.5. A number of observers make reference to the Dumping at Sea application and raise concerns with respect to project splitting. Project splitting involves the breaking down of a larger development into smaller schemes so as to avoid EIA. This is not the case in this instance. The requirement to seek separate consents under different codes including industrial emissions, dumping at sea and dredging does not constitute project splitting. As with the IE licensing the EPA is the competent authority with respect to Dumping at Sea with licence ref. S0026-01 applicable to the facility. I advise the Board that due regard is had to these activities in terms of cumulative impacts with numerous references made to same in the EIAR.

10.1.6. The EIAR and NIS accompanying the application were prepared in 2021, with the applicant in its section 37F(1) response, providing details on the current policy context including the Limerick City and County Development Plan 2022 and Climate Action Plan, IE licence updates and blasting at the permitted borrow pit. It also provided a summary of its review in terms of projects and plans for consideration in terms of cumulative impacts. Whilst a period of over 3 years has elapsed since the receipt of the application and survey works which have informed the EIAR, I have regard to the fact that the AAL facility is long established, that operational procedures have not altered and continue as is and the extent of scientific evidence available arising from monitoring on site which show consistency in results. Whilst changes to the environment can and are likely occurring they are unlikely to be material or at a scale that would materially change the conclusions of any assessment in this report or require further mitigations or monitoring to be introduced. On the basis of the foregoing it is reasonable to assume that there would be no substantive change in the baseline environment or the mitigation measures set out. I do not consider that there would be any material benefit in

seeking further survey work. I therefore conclude that the detail as provided is sufficient on which a proper assessment can be carried out including EIA and AA.

10.1.7. Issues raised with regard to competition concerns with specific reference to global industrial monopolies, as well as energy use within the facility, are not a matter for comment by the Board.

10.2. Principle of Development and Policy Context

Existing Development - Overview

10.2.1. As noted previously Aughinish Alumina Limited (AAL) has been operating at Aughinish Island for a period of in excess of 40 years dating back to its commencement in the 1980's with an extensive planning history pertaining to the site as set out in section 3 of the Planning Report accompanying the application and summarised in LCCC's report.

10.2.2. AAL is the largest alumina refinery in Europe with an annual production capacity of 1.95mt/yr of alumina. Bauxite and sodium hydroxide are supplied to the site in bulk by ship where they are unloaded at the marine terminal and conveyed to on-site storage. The alumina product is also sent off site through this jetty for smelting overseas to produce aluminium metal.

10.2.3. Alumina is produced by treating bauxite ore using the Bayer process which involves the dissolution of aluminium hydrate from the bauxite under high pressure in sodium hydroxide (caustic soda). 4 no. waste streams derived from the extraction process are deposited in the BRDA. Bauxite residue (also referred to as 'red mud') and process sand are the primary waste streams that comprise the bulk of the material deposited with salt cake a secondary waste stream which is a byproduct of purification of the caustic soda liquor used in the alumina extraction process from the bauxite ore. A process of enhanced atmospheric carbonation termed "bauxite residue farming" has been developed to minimise the pH of deposited bauxite residue to the BRDA. Bauxite residue farming reduces the residue pH below 11.5.

10.2.4. The BRDA falls within the scope of Directive 2006/21/EC on the management of waste from the extractive industries. The BRDA is a Category A waste facility. The bauxite residue, process sand and sludges deposited in the BRDA are classified as non-hazardous according to the European Waste Catalogue. Salt cake is classified

as hazardous and is deposited in the SCDC, an independently lined engineered cell located within the BRDA. I address the matter of classification of the waste in section 10.4 below.

Nature and Extent of Development Proposed

10.2.5. Permission is sought for the vertical extension of the BRDA and SCDC to allow for the extension of the AAL facility from 2030 to 2039. An extension of the borrow pit is sought to facility this extension. The nature of the activities in the processing area will be unchanged.

10.2.6. Observers query the accuracy of the development for which permission is being sought in view of the time that has elapsed since the application's lodgement. The need for the proposed vertical expansion of the SCSC is specifically referenced in view of the Salt Cake Wet Oxidation Plant being developed by the applicant, the objective of which is to be remove salt cake from the waste stream. The applicant in its section 37F(1) response states that the nature and extent of the development has not changed since the lodgement of the application and on this basis the SCDC expansion which forms part of the proposed development is before the Board for assessment and adjudication.

Policy Context

10.2.7. Within a national policy context the proposal is consistent with the overarching provisions of the NPF. The Strategic Integrated Framework for the Shannon Estuary (SIFP) designates Aughinish Island as Strategic Development Location F with policy MRI 1.2.9 specifically seeking to safeguard the role and function of Aughinish Alumina as a key driver of economic growth in the region. This is replicated in the RSES with objective RPO 142 supporting the 9 no. strategic development locations identified in the SIFP.

10.2.8. Since the lodgement of the application with the Board in 2021 the Limerick City and County Development Plan 2022 has been adopted and is the applicable document against which the subject proposal is required to be assessed. As with the previous plan there is explicit support with regard had specifically to Objective ECON 057 which seeks to safeguard Aughinish Island as a strategic development location for the sustainable growth and development of marine related industry and industrial

development at Askeaton. The subject proposal can be seen to accord in principle with the overarching provisions of the objective.

10.2.9. I will address the matters concerning compliance with the relevant EU legislation elsewhere in this report.

10.3. BRDA Stability and Potential for Containment Breach

Overview

10.3.1. The existing facility provides for BRDA in two phases (Phases 1 and 2) equating to an area in the region of 184 ha. It comprises of perimeter walls or raises, each 2 metres in height which enclose a basin of bauxite residue which is pumped from the refinery. As each raise/terrace builds on the foundation of the previous stage raise (known as the 'up stream method') the footprint of the enclosed area becomes progressively smaller at each stage raise.

10.3.2. The Phase 1 BRDA was formed from two facilities, (original BRDA and the Phase 1 BRDA Extension) which merged over time. The original Phase 1 BRDA was constructed in the early 1980's covering an area of 72 ha which was extended in the mid to late 1990's covering an area of 32ha. The original BRDA basin is not lined but is underlain by low permeability estuarine soils. The Phase 1 BRDA Extension is composite lined, comprising a 1mm and 2 mm thick HDPE geomembrane overlying a minimum 0.6m depth of compacted till. Permission granted under ref. PL13.217976 provided for the raising of Phase 1 to 10 no. stages and construction of Phase 2, also to 10 no. stages. Phase 2 has an area of c.80ha and was commissioned in 2011. It is a southern extension of and is merged into the south slope of the Phase 1 BRDA. The Phase 2 BRDA basin is composite lined, comprising a 2 mm thick HDPE overlying GCL and a minimum 0.5 – 1m of compacted till. The overall BRDA provides for the storage requirements of the AAL facility of between 0.9 to 1 million m^3 per annum to 2030.

10.3.3. Phase 1 is at stage no.10. At the time of the lodgement of the application Phase 2 was raised to stage 4. As per Table 14 in the Engineering Design Report which sets out in the stage raise phasing from 2021, Phase 2 is to be at Stage 7 in 2024/2025. The elevation of the BRDA varies from approx. 32mOD at the centre to between 22 and 24mOD at the perimeter. The perimeter stage raises or walls are constructed

of rock fill which was previously sourced off site but is now sourced from the on-site borrow pit.

10.3.4. Since 2009, the deposited bauxite residue has been 'farmed'. This includes the bauxite residue in Phase 1 BRDA from above Stage 6 (16 mOD) and all of Phase 2 BRDA. The farming process consists of ploughing and aerating bauxite residue for a period of between 5 to 6 months to reduce the pH < 11.5, prior to placing the next layer.

10.3.5. The SCDS is located within the BRDA (Phase 1 extension area). It has an area of c. 1 hectare with a perimeter crest elevation of 29mOD.

10.3.6. Cappagh Farmers Support Group contend that sections of the BRDA, specifically the northern section, are constructed on reclaimed land with concerns as to the structural stability of the BRDA and its vulnerability from tidal incursion. As referenced by the applicant and confirmed from the Ordnance Survey map of 1840 the site comprised a network of irregular fields with a number of structures throughout. Therefore any reclamation works were carried out prior to this. The OPW completed drainage and enhanced tidal protection embankments in the 1960s which materially pre-dated the development of the facility. Based on this evidence the assertion that the BRDA is constructed on reclaimed land is not supported.

Proposed Development

10.3.7. The applicant is seeking permission by way of this application to provide for further capacity to allow for storage to 2039 based on the same rate of production. This would involve a vertical rather than horizontal expansion of both Phases 1 and 2 and, therefore, no increase in the footprint of the area. The proposal seeks to increase the height of each phase by 6 stages (from stage 11 to stage 16). This would result in an increase in the perimeter elevation from 24mOD to 36mOD with a dome crown elevation increase from 30mOD to 44mOD. The 'upstream' construction method will continue to be used with rock fill for the stage raises sourced from the borrow pit on site. The application is seeking permission to extend the said borrow pit. Approval is also being sought to vertically extend the SCDC to provide for an additional storage of c. 22,500m^3 providing for the equivalent of 3 years storage capacity. It would comprise of a single raise with an increase in

height of 2.25 metres. This would result in a new perimeter crest elevation of 31.25mOD.

Potential for Containment Breach

10.3.8. The potential for a containment breach at the BRDA and the consequences of such a major accident on the receiving environment and sensitive receptors is raised by all the observers to the application. A number of mechanisms by which such a breach could arise are detailed including failure of the perimeter walls, undermining of structural integrity by blasting at the borrow pit and climate change impacts.

10.3.9. The Board is advised that the integrity of the BRDA including its embankment and wall has, and continues to be, subject of ongoing monitoring under the IE licence issued by the EPA. I refer specifically to Condition 8 and associated Schedule C.7 of the licence which sets out the monitoring requirements, frequency and analysis method/technique. In addition, an annual BRDA status report and a biennial independent audit equivalent to a Safety Evaluation of Existing Dams (SEED) audit are required. The annual review, summarises the monitoring results from the piezometers, the inclinometers and extensometers, the visual inspection of the facilities and assesses the stability of the BRDA. The assessment of the data indicates that the BRDA is performing in compliance with the target FoS criteria for the permitted BRDA constructed to Stage 10 (see Engineering Design Report for the BRDA Raise and Section 8.6.3 of the EIAR).

10.3.10. In accordance with Section 4.2.1.3.4.3 of the 2018 Best Available Techniques (BAT) Reference Document for the Management of Waste from the Extractive Industries, Directive 2006/21/EC, EUR 28963 EN, (MWEI BREF 2018), and in the absence of a National or EN Standard, AAL has selected to undertake the classification of the BRDA in accordance with the CDA Guidelines (CDA 2014) and to adopt the target level standard-based criteria for design parameters which are dependent on the consequence of failure. The analysis for undrained (total stress) condition within the bauxite residue is considered the critical stability case. While in general geotechnical terms and for other more free-draining tailings this is considered the ‘short term’, for the bauxite residue this represents a ‘long term’ condition that requires a minimum factor of safety (FoS) of 1.5.

10.3.11. In response to the submission by Futureproof Clare CLG the applicant clarified that the use of CDA guidelines rather than the more recent Global Industry Standards on Tailings Management (2020) was based on the fact that whilst the Global Industry Standard on Tailings Management (GISTM) 2020 provides a similar consequence classification matrix for tailings facilities, the CDA also provides target level criteria thresholds for stability in the form of Factors of Safety (FoS) for various stages in the life of the facility and for varying scenarios. The applicant's justification is considered reasonable and I note that the guidelines used are internationally recognised best practice standard for design, operation and management of tailings facilities. There is no reason to conclude that the assessment undertaken was substandard or flawed as a consequence of their use.

10.3.12. The design of the BRDA Raise is based on detailed assessments which are set out in the Engineering Design Report and include geotechnical analyses comprising of

- Seismic Liquefaction Assessment (foundation soils and bauxite residue);
- Stability Assessment;
- Blast Assessment;
- Consolidation Assessment; and
- Breach Assessment.

10.3.13. Appendices to the report provide the detailed assessment under each of the headings, the results of which are assessed in the body of the main report.

10.3.14. The Breach Assessment has regard to a risk assessment update for the BRDA constructed to Stage 10 (Risk Assessment and Break-Out Study (Golder 2019A)). The assessment is considered appropriate for the BRDA construction to Stage 16 as the BRDA footprint, the failure mechanisms and discharge pathways in a breach scenario remain unchanged. However, there is potential for increased volume and extent of discharge during a breach scenario due to the proposed increase in elevation of the BRDA to Stage 16 and these values have been reassessed in the Engineering Design Report and specifically in Appendix G.

10.3.15. I note that the Engineering Design report was prepared by a suitably qualified and competent person (Golder Associates) which is the applicant's Engineer of Record

for the BRDA following the applicant's adoption of the Canadian Dam Association Dam Safety Guidelines for the BRDA.

10.3.16. On the basis of the detail provided I note the following:

Perimeter Wall Stability: Increased Bauxite Disposal

10.3.17. Stability analyses for critical and representative samples of the BRDA were carried out using the limit equilibrium modelling software SLOPE-W Version 10.0.0.17401. Both drained (effective stress) and undrained (total stress) conditions were analysed for both the bauxite residue and the estuarine deposits. A FoS was applied based on the CDA Guidelines, namely a FoS of 1.5 for long term drained analysis and FoS of 1.3 for short term undrained conditions following embankment construction. All sections analysed in Phases 1 and 2 returned FoS in compliance with the target criteria of 1.5.

10.3.18. Similar stability analyses were undertaken for the SWP and LWP and PIC in 2019 with the results summarised in Table 20. All pond sectors save for Sector M returned a FoS greater than 1.5. Sector M returned a FoS of 1.3 for the undrained analysis which is the original design FoS for this structure. The long term drained analysis recorded a FoS in excess of 1.5. The target factor of safety criteria attained are consistent with current international guidelines for tailing dam safety management and best practice.

10.3.19. As per the details provided on PL13.312146 for the Phase 1 BRDA extension and development of Phase 2, the FoS of 1.3 as proposed at that time was accepted by the Board and I am not aware of any compliance issues arising as a consequence of this less onerous target.

10.3.20. On the basis of the above I consider that the methodology and modelling used by a suitably qualified person (Golder Associates) are adequate from which it can be concluded that there will be no concerns arising from increased bauxite storage.

Perimeter Wall Stability: Borrow Pit Blasting

10.3.21. Since the lodgement of the application extraction has commenced at the 4.5 ha borrow pit granted permission under ref. ABP 301011-18 (17/714) which is located to the north-east of the BRDA c.170 metres from the SWP and LWP. The 374,000m^3 of rock resource is anticipated to meet the needs of the permitted BRDA to Stage 10

and the requirements arising from the restoration plans in addition to a contingency allowance. The said application was accompanied by a report from Golder Associates *Borrow Pit: Phase 1 BRDA Blast Vibration Assessment* which concluded that the effect of blasting would pose a very unlikely risk to the stability of the BRDA. This was accepted by the Board. As per the permission granted the borrow pit is to operate between 1st April and 30th September, only, with a maximum of 7 no. blasts per annum.

10.3.22. Limitations and control on noise, vibration and air overpressures are specified in Conditions 4 and 5 and Schedule B of the IE licence with the monitoring requirements set out in Schedule C. In same it is specified that the borrow pit is to operate between 1st April and 30th September, only, with blasting to be undertaken no more than once a week. Condition B5 of the licence sets out limits for vibration and air overpressure with the nearest monitoring location's vibration level capped at 12 mm/second and air overpressure at 1.25dB (Lin) max. peak. Schedule C.5.1 sets out the requirements for vibration and air overpressure monitoring from blasting with AAL required to prepare an annual blasting report.

10.3.23. The applicant in its section 37F(1) response notes that the borrow pit operation commenced in June 2022 including 4 no. blasts undertaken between June and September 2022. As required the blasts were monitored (by Golder and Associates) with the results provided to the EPA in accordance with its licence requirements. It is stated that the blasts were shown to be in compliance with the limits as set with no adverse effects identified for either the BRDA or the gas transmission pipeline in proximity. It is reasonable to assume that further blasting has been undertaken in the intervening period with no evidence to suggest that the monitoring results were not in compliance.

10.3.24. The current proposal is seeking an 3.5 ha extension to meet the anticipated requirements of the vertical expansion of the BRDA and the knock-on increases to implement the closure design. In summary, the extended borrow pit would provide for a total of 754,000m^3 of rock. The extension provides for an eastwards extension of the extraction area which will be further away from the BRDA than the borrow pit as permitted.

10.3.25. On the basis of the results of the blasting monitoring undertaken to date which has occurred closer to the perimeter of the BRDA than would arise in the borrow pit extension area, I consider that it is reasonable to conclude that the blasting associated with the extension area would not give rise to concerns regarding BRDA stability.

Perimeter Wall Stability: Climatic Factors

10.3.26. The likelihood of flooding was assessed in chapter 10 (hydrology) of the EIAR with no current or predicted flood risk identified for the site. As per the current CFRAM maps available (Flood Maps - Floodinfo.ie) Aughinish Island is not identified as an area of potentially significant flood risk with no flood events recorded at or in the vicinity of the AAL site. The nearest events noted were to the south at Barrigone (2019), to the east at Morgan's House (Turlough recurring) and to the west at Foynes (the most recent recorded event 2019).

10.3.27. I note reference by Futureproof Clare CLG to the Strategic Flood Risk Assessment in As noted Foynes is within Flood Zones A and B. The mapping as presented in Figure 8-7 does not extend to the subject site.

10.3.28. National Coastal Flood Hazard Mapping published by the OPW in 2021 indicates the extent of the site that might experience coastal flooding for a worst case scenario. This data shows the extent of land that might be flooded by the sea (coastal flooding) during a theoretical or 'design' flood event with an estimated probability of occurrence, rather than information for actual floods that have occurred in the past. This represents the worst case scenario as any flood defences potentially protecting the coastal floodplain are not taken into account. I also note the detail available from Climate Central as referenced by Futureproof Clare CLG (Climate Central - | Land below 1.0 metre of water, Aughinish) which shows the areas where a water level of 1 metre above the high tide line could be reached through combinations of sea level rise, tides and storm surge. As with the OPW National Coastal Flood Hazard Mapping this dataset does not consider flood control structures (on sites outside of the U.S.). Thus, the detail available from both sources does not take into consideration the fact that the northern and western sides of Aughinish island are protected by the OPW constructed a flood tidal defence berm (FTDB) to a height of 5mOD. In the interests of clarity I note that the embankment does not form part of

the containment infrastructure for the BRDA. The OPW has maintained the FTDB with repair and improvement works undertaken. AAL currently monitor and maintain the FTDB structure with improvement works to the upstream slope on the north bank undertaken.

10.3.29. As noted previously there is no evidence to support the 3rd party claim that portions of the BRDA lands are reclaimed. Thus it reasonable to conclude that it would not be affected or undermined by tidal activity.

10.3.30. Climate change factors have been taken into account in the construction planning and I refer the Board to Section 17.3.1 of the EIAR and Appendix G of the Engineering Design Report which assess the potential of a breach occurring as a result of climate change with regard had to rising sea levels and increased rainfall. The risk assessment concluded that after allowing for the potential effects of climate change the risk associated with a containment breach or bauxite reside release was either highly improbable or very unlikely depending on the scenario considered.

10.3.31. I consider that the applicant's assessment of climate change scenarios including flooding is based on site specific details from appropriate sources (OPW, Met Eireann etc.) is reasonable and robust and on which a proper assessment can be made and on which it can be concluded that climate change is not a threat to the BRDA containment stability.

Containment Breach and Liquefication of Bauxite

10.3.32. Concerns about the liquefication of bauxite should the containment walls be breached is raised by a number of observers. Liquefication occurs where moist soil acts like a liquid due to intense shaking (e.g. during an earthquake).

10.3.33. As noted previously prior to 2009 bauxite residue deposited in the Phase 1 BRDA did not undergo the process known as 'mud farming' and is referred to an 'unfarmed'. Since 2009 the deposited bauxite residue has been 'farmed' and includes the bauxite residue in Phase 1 of the BRDA from Stage 6 (16mOD) and all of Phase 2. The farming process consists of ploughing and aerating bauxite residue for a prolonged period (the process typically takes 5 to 6 months) to reduce the pH to11.5 prior to placing the next layer.

10.3.34. I refer the Board to Appendix C attached to the Engineering Design Report which specifically addresses this matter. An initial screening assessment was undertaken

to assess the estuarine soils beneath the bauxite residue and an assessment of the residue, itself, in terms of susceptibility to seismic liquefication. The estuarine deposits were determined not to be susceptible. The bauxite residue was determined to be in the range of moderate susceptibility thus requiring further analysis.

10.3.35. An analysis of the liquefication potential of the bauxite residue during a seismic event with a return period of 1 in 2,475 years for a magnitude 5 earthquake near the BRDA shows that the factor of safety exceeds the required threshold of 1.0.

10.3.36. The impact of a breach scenario is largely dependent on the volume of material discharged and distance travelled by the material discharged. Both of these factors are dependent on the ability of the bauxite residue to liquefy. Where the bauxite residue is farmed, the material would slump rather than liquefy.

10.3.37. I note observers make reference to the failure at Ajka Alumina Plant in Hungary and the significant adverse impacts on the receiving environment. The Board is advised that the method of bauxite treatment in that instance differs from that operative at AAL since 2009 in that it used a wet ponding form of containment and had a higher liquid content in the bauxite residue. The mud farming method used on the subject site reduces the liquid content in the residue and increases the solid content to c.75%.

10.3.38. The estimated volume of bauxite residue that could potentially be released in a breach scenario has been assessed by two methods and the range is 40,000 m^3 to 90,000 m^3. In term of the farmed bauxite the distance travelled would be small, a distance of the order of 12.1m from the downstream toe of Phase 2 BRDA and into the PIC. Both the upper levels (above Stage 7) of the Phase 1 BRDA and all of Phase 2 BRDA would be expected to slump into the PIC or within approx. 12m of the downstream toe.

10.3.39. Where the material is potentially able to liquefy, which are confined to the lower slopes of the Phase 1 BRDA to Stage 6 (16 mOD at perimeter to 20 mOD centrally), the distance travelled would be a maximum of 224m, although the presence of the PIC at the downstream toe may contain the flow even further. This run-out distance assumes that the farmed bauxite residue above the unfarmed bauxite residue also liquefies. If only the elevation of the unfarmed bauxite residue is considered, then the run-out distance is reduced to 52m.

10.3.40. The area between the FTDB and the BRDA, SWP and LWP is at an elevation of approx. 1 mOD and has a footprint of approx. 187,000 m^2, excluding the Special Protection Area (SPA) or Special Areas of Conservation (SAC) footprints and is therefore capable of retaining circa 0.75 million m^3 of tailings and/or water provided that the flood embankment at a crest elevation of 5 mOD remains intact.

10.3.41. In the event of a breach scenario resulting in bauxite residue flowing into the SWP and/or the PIC, the contaminant wastewater will be displaced and would flow via the open drainage network leading to the sluice gate valve in the West Drain (see Drawing 10), which leads to the Robertstown River. AAL have installed a penstock valve on this sluice gate which can be closed to prevent discharge to the Robertstown River.

10.3.42. If the flood embankment is breached due to a tidal surge, and a BRDA breach scenario occurred, the bauxite residue and containment wastewater would potentially be washed into the Robertstown and Shannon Rivers. However, the expected break-out volumes are relatively small.

10.3.43. I consider that the applicant has provided sufficient detail and analysis which has included modelling and risk assessments to support its conclusion that the potential for liquefication in the case of a containment breach would be limited to areas in close proximity to the site.

BRDA Stability and Potential for Containment Breach – Conclusion

10.3.44. I consider that the applicant has provided sufficient detail in terms of detailed modelling and risk analysis for various scenarios in relation to BRDA stability and potential for breach of containment. The risk assessment clearly indicates that any potential breakout, whilst it cannot be categorically ruled out, is highly improbable and very unlikely.

10.4. Closure of Facility

10.4.1. An Taisce in its submission refers to the need for a long terms plan for the site.

10.4.2. Condition 10 of the IE licence pertains to closure, restoration and aftercare management with a Closure, Restoration and Aftercare Management Plan (CRAMP) to be reviewed annually. Financial provisions for the CRAMP are deposited by AAL annually into a Secured Fund and a Parent Company Guarantee (PCG) is in place to

match the balance for the Secured Fund target value in place. The CRAMP is funded for a minimum 35-year period following closure (5 years of active aftercare and 30 years of passive aftercare).

10.4.3. I consider that the applicant has given due consideration to the closure phase of the development and has adequately identified, described and assessed the direct and indirect effects of post closure in the EIAR and has detailed the monitoring requirements including stability checks for 5 years following closure and passive after care for a period of a minimum of 30 years. Due consideration would be required to given to climate change effects in the review of the said plan.

10.5. Health and Safety

10.5.1. To avoid undue repetition the Board is advised that this matter is addressed in the EIA below in the section titled Population and Human Health (section 11.4). I note that observers express concerns as to the impact of the bauxite residue and salt cake on human and animal health. Several academic papers including Khairul et al cited in support of the view of the hazardous nature bauxite residue are noted.

Residue Bauxite - Classification

10.5.2. As per the European Waste Code bauxite residue is categorised as non-hazardous waste under European Waste Code 010309. I refer the Board to the EPA 2018 document *Waste Classification: List of Waste and Determining if Waste is Hazardous or Non-hazardous* (applicable from July 2018) wherein waste classification 01 03 09 refers to red mud from alumina production other than wastes mentioned in Class 01 09 10. Waste classification 01 03 10* refers to red mud from alumina production containing hazardous substances other than the wastes mentioned in 01 03 07. This would suggest a level of interpretation as to whether bauxite residue constitutes a hazardous material.

10.5.3. Annex 3 of the EU Council Directive 91/689/EEC refers to properties of waste which render them hazardous, such as being explosive, exhibit highly exothermic reactions, cause irritation following contact, harmful if ingested, or toxic. The bauxite residue does not appear to exhibit any of the characteristics set out in Annex 3 that would render it hazardous.

10.5.4. I also refer the Board to an attachment to the Health Impact Assessment (Appendix 7.3 of EIAR) which provides the European Parliament's Committee on Petitions response to a petition on the Aughinish Alumina Plant dated 29/09/14. I refer specifically to section 8 in which it is stated that the Commission assessed copies of laboratory analysis commissioned by the licensee and approved by the EPA and considered that the red mud deposited on site is correctly characterised as non-hazardous according to the applicable EU legislation.

10.5.5. On balance, therefore, I consider it reasonable to conclude that the nature of the bauxite residue at the facility comes within the definition of European Waste Code 01 03 09.

Salt Cake

10.5.6. The salt cake is classified as hazardous according to the European Waste Catalogue and is disposed of within an engineered cell. As noted previously a Salt Cake Wet Oxidation Plant has been constructed, the objective of which is to remove salt cake from the waste stream. The plant will be fully integrated into the alumina production process, operate continuously and allow recovery of the process stream. The purpose of the vertical extension of the SRDA is to provide for storage facilities should the wet oxidation plant not be operating (maintenance periods etc).

Radiation

10.5.7. The EPA is the competent Authority in Ireland for dealing with regulatory, monitoring and advisory responsibilities in matters relating to ionising radiation and radioactive contamination in the environment.

10.5.8. In terms of radioactive assessment bauxite residue is a low level source of naturally occurring radioactive material (NORM). The applicant advises that radioactive assessment of bauxite residue and process sand was carried out in 2021 with the results showing values comparable with and slightly lower than the values recorded in 2008 by the Radiological Protection Institute of Ireland (RPII merged with the EPA in 2014). The latter RPII assessment concluded that bauxite residue refining did not expose workers or the public to excessive radiation levels and that the low levels NORM in bauxite are in compliance with safe levels set out in S.I. No. 125/2000: Radiological Protection Act, 1991 (Ionising Radiation) Order, 2000.

10.5.9. Environmental Trust Ireland in its submission considers that in view of the time that elapsed since the testing undertaken by the Radiological Protection of Ireland further testing should be undertaken. I submit that having regard to the recent 2021 testing which supplements the independent testing of 2008 and to the fact that the nature of the processing and deposition of bauxite residue has not changed in the intervening period, further testing is not an imperative and that it is reasonable to conclude on the basis of the information available that bauxite residue does not pose a radiation hazard to human or animal health or agricultural practices.

Dust

10.5.10. I address this matter in section 11.8 of the EIA below. Observers raise concerns that the increase in height of the BRDA would result in an increase in dust emissions to adjoining lands and give rise to concerns in terms of human health.

10.5.11. As per the current IE licence dust monitoring is undertaken at 35 no. locations which provides for the baseline of the entire AAL facility including any dust emissions from the current BRDA and borrow pit (when operational). The results show levels significantly below the TA Luft limit values and below the EU Regulations (Café Directive) limits for PM_{10} and $PM_{2.5}$.

10.5.12. This baseline information was used in the air dispersion model AERMOD which was used to assess the dispersion of fugitive dust from the site, the results of which would conclude that there would be negligible increase in fugitive dust with the increase in elevation associated with the stage rises.

10.5.13. It is also considered that no cumulative impact would occur with other quarries in the area given the separation distances between the sites and the prevailing wind direction at this location.

10.5.14. Emissions to air will continue to be subject to emission limits imposed by the IE licence which are set to ensure compliance with ambient air quality standards. Monitoring requirements will also be specified (see C.6 of the current licence).

10.5.15. I note reference by Cappagh Farmers Support Group to a newspaper article about dust emissions recorded at a farm in County Mayo. As noted in the article the EPA did not identify a link between the AAL facility and the samples taken at the farm.

10.6. On the basis of the assessment carried out based on monitoring data which is site specific and extensive I consider that the modelling undertaken to be robust and that it is reasonable to conclude that the development does not pose a threat to human or animal health in terms of the bauxite residue and fugitive dust emissions.

10.7. **Surface and Groundwater**

10.7.1. I advise the Board that there is a material overlap with section 11.7 of the EIA below and I refer to my assessment therein. An Taisce and observers to the application consider that the potential adverse effects of the proposed development on ground and surface waters are material concerns. It is contended that there are lacunae in the information provided which precludes a proper assessment.

10.7.2. The BRDA is surrounded by a Perimeter Interceptor Channel (PIC) which collects water emerging from the BRDA (seepage, bleed water, sprinkler water and surface water run off) and conveys it via pumps either to the Effluent Clarification System (ECS) located in the plant and/or to the Storm Water Pond (SWP)/liquid waste pond (LWP), both of which are located to the north-east of the BRDA. The function of the SWP is to provide surge capacity for surface water that cannot be immediately processed in the effluent clarification system. It also provides water used for dilution or wash water in other areas of the facility. The LWP receives water from the effluent clarification system and the retention time allows for cooling and settlement prior to controlled discharge to the River Shannon or recirculation to the BRDA sprinkler system.

10.7.3. The separate SCDC has a separate system for treatment of surface water which is funnelled to a perforated decant tower located at the north-east corner of the cell. The decant pipe at the base of the tower transfers water by gravity to a storage tank and is then pumped to the plant for caustic recovery.

10.7.4. The current water management infrastructure for the external catchment area (i.e. access roads etc.) was designed to accommodate the BRDA development to Stage 10 and for an inflow design flood (IDF) with a return period of 1 in 200 years. There are currently no spillways or emergency discharge systems to release waters in excess of this event. It is proposed to modify the existing water management infrastructure to accommodate the BRDA development to Stage 16 and for an IDF of

a greater return period, in accordance with CDA guidelines, based on the classification of the BRDA i.e. 1/3 between 1 in 1,000 and the probable maximum flood (PMF) event (see Section 7.8 of the EIAR). In summary the upgrades will consist of modifications to existing PICs, construction of additional PICs, alterations to culverts, increased crest elevations on PICs, installation of a pump and overflow culverts, alterations to discharge points and upgrades to pump arrangements.

10.7.5. There are 2 no. licenced discharges of treated effluent from the AAL facility to the estuary, both discharge at the same outfall point which is located close to the AAL marine terminal. Monitoring both upstream and downstream is carried out in accordance with the IE licence. The proposed development does not comprise any change to the 2 no. licenced discharges.

10.7.6. The IE licence details surface water discharges and monitoring requirements in addition to groundwater monitoring requirements. The EPA is the competent authority in terms of compliance with these requirements. Extensive data is available from this monitoring which has informed the applicant's assessment. This data is site specific and provides for scientific certainty.

10.7.7. Surface water monitoring is undertaken at 3 no. locations in accordance with the IE licence at (a) Mangan's Lough along the northern boundary of the BRDA and the north-western boundary of the SWP, (b) the OPW works channel at the north-western boundary of the BRDA and (c) Robertstown Gate along the western boundary of the BRDA (see Figure 10.14). The parameters required to be monitored are pH, electrical conductivity and soda. I refer the Board to Figures 10.15 to 10.17 in the EIAR in which the results for the specified parameters are provided. The results of surface water metal analysis carried out in April 2021 are presented in Table 10.6.

10.7.8. In terms of groundwater there are 45 no. monitoring wells around the site (see Figure 10.28 of the EIAR). I refer the Board to Figures 10.29 to 10.42 with the results for wells near the borrow pit area set out in Figures 10.43 to 10.48. Water quality metal analysis undertaken in 2021 are presented in Tables 10.7 and 10.8.

10.7.9. Observers raise concerns about anomalies in monitoring results including the high levels of electrical conductivity along the northern boundary. I consider that the applicant's reasoning for same to be acceptable and can be attributed to saline

intrusion associated with the adjacent estuary. The fact that lower levels of conductivity were recorded in monitoring wells at a further remove from the estuarine area would support this reasoning.

10.7.10. Results for heavy metal concentrations in groundwater are set out in Table 10.7 with elevated levels of arsenic, cadmium, iron, magnesium, nickel and zinc recorded on occasion. However, these exceedances occur in isolation to other parameters and do not form part of a continuing trend which could be attributed to consistent trends in terms of elevated concentrations. As noted above the Seepage and Water Quality Assessment in Appendix H of the Engineering Design Report (Appendix A of EIAR) concludes that there is negligible seepage through the base of the BRDA either in the lined or unlined phases due to the underlying depth of bauxite residue and the characteristics of the underlying estuarine soils.

10.7.11. The data contained in the EIAR and NIS including the Conceptual Site Model and further confirmatory study on marine sediment data show that metal sediment concentrations in the estuarine deposits to the north of the site are comparable to typical background concentrations in the Irish marine environment.

10.7.12. Having regard to the nature and extent of the proposed development, the proposed mitigation measures as detailed to protect ground and surface waters effectively constitute established working practices and measures on the site. The surface water runoff from the bauxite residue is to continue to percolate through the rock fill stages and discharge to the encompassing PIC with no discharges to groundwater. There is no requirement for a connection to a water mains or abstraction from groundwater.

10.7.13. On the basis of the assessment provided based on extensive monitoring data and investigations which are site specific, empirical and provide scientific certainty, I consider that the conclusion reached that the proposed development before the Board would have no impact on surface and groundwater to be reasonable. As noted previously the applicant is legally obliged to conform with the IE licencing requirements with the EPA the competent authority in terms of enforcement.

10.7.14. In response to LCCC's report on the application the applicant confirmed that from the details available via monitoring wells at the borrow pit extension, groundwater levels range from 1.064mOD to 8.073mOD. Extraction is to be to a depth of 8.5mOD and

will be above the water table. Thus, the lowest level of excavation will retain c. 0.5 metres above the maximum groundwater level and dewatering will not be required.

10.7.15. In terms of An Taisce's and observers' submissions with respect to the Water Framework Directive (WFD) the applicant in its section 37F(1) response notes that the WFD was specifically considered as part of the EIAR and provides a summary of the water body status within the 2km study area (see Table 3). I note that groundwater at the industrial facility has a status of 'poor' and deemed to be 'at risk'.

10.7.16. I note that the freshwater lens of groundwater beneath the application is predominately located downstream and laterally separated from the mainland by Poulaweala Creek and the Robertstown River. Although part of the application site in the southeast falls within the mainland area of Glenbane West, groundwater in this region flows west and northwest towards Poulaweala Creek and Robertstown River. There is no water abstraction point downstream of the AAL facility.

10.7.17. I have assessed the proposed development and considered the objectives as set out in Article 4 of the Water Framework Directive to protect and, where necessary, restore surface & ground waterbodies in order to reach good status (meaning both good chemical and good ecological), and to prevent deterioration. Having considered the nature, scale and location of the project I consider that it is reasonable to conclude on the basis of objective information that the proposed development will not result in a risk of deterioration of any waterbody (rivers, lakes, groundwaters, transitional and coastal) either on a temporary or permanent basis.

10.8. **Bottlenose Dolphin**

10.8.1. Bottlenose Dolphin is a qualifying interest of the Lower River Shannon SAC which is subject of appropriate assessment. To avoid undue repetition I refer the Board to section 10 below in which I address the potential impacts on the qualifying interest specifically with regard has to its conservation objectives and the specified attributes and targets.

10.8.2. A number of observers make reference to the species. Dolphin Watch, in addition to referencing the negative physical impacts on the species, expresses concern as to the potential impact on its business and to tourism in the region.

10.8.3. The AAL facility has been in operation for a period of in excess of 40 years with no evidence available to support the view that it has or is having an adverse impact on the species. Indeed the article cited by Dolphin Watch prepared by E. Rogan et al[1] states that the number of dolphins using the Shannon SAC ranges between 121-160 which lies within the range of previous estimates calculated since 1997 indicating a stable population size.

10.8.4. In response to the concerns in terms of skin lesions, available academic evidence would appear to support the view that such lesions is a phenomenon found in the species worldwide and not just the Shannon Estuary population, possibly attributable to wider climate change issues. There is no evidence to support the view that the activities at the AAL facility are linked to same.

10.8.5. I would reiterate the fact that the AAL facility is subject of an IE licence which governs emissions to the Shannon and which is subject to ongoing monitoring. The proposed development allows for the extension of the life of the facility, only, with no changes proposed to how BRDA is stored. I acknowledge that the borrow pit is to be extended.

10.8.6. The matter of blasting at the borrow pit and impacts on estuarine ecology and biodiversity including dolphin has been raised by a number of observers. At this juncture I refer the Board to the Marine Mammal Risk Assessment in relation to blasting operations at the borrow pit which is provided in Appendix 6.4 of the EIAR. The assessment follows a request from the EPA during the IE licence review. It concludes that as the blasting is to occur on land and not underwater it would not pose any risk (death/injury) or disturbance to marine mammals. I note that blasting is limited to between April 1st and September 30th with approx. 7 blasts per period. As the borrow pit extension is at a further remove from the estuary than the permitted borrow pit footprint, it is reasonable to conclude that its blasting requirements would also not pose a risk.

10.8.7. The Shannon Estuary is a busy waterway providing access to Limerick and Foynes Ports in addition to the vessels travelling to and from the AAL facility bringing in raw

[1] Bottlenose dolphin survey in the Lower River Shannon SAC 2018_report to NPWS, Department of Culture, Heritage and the Gaeltacht

materials and shipping out alumina. There are also smaller craft movements including those operated by tourism related enterprises. It is within this context that I reiterate the fact that the most recent study of bottlenose dolphin concluded that the population is stable and it is not unreasonable to suggest that the species has habituated to the nature and extent of activity.

10.9. Animal Health

10.9.1. Observers, specifically Cappagh Farmers Support Group express concern as to the impacts on animal health and agricultural lands. I note that this is addressed in chapter 7 of the EIAR with the assessment informed by other assessments in the EIAR including land and soil, air, water and biodiversity.

10.9.2. As in the case of human health there is no evidence that emissions from the AAL facility generally, or from the BRDA and extension of the borrow pit, will cause adverse effects on an animal health or agricultural lands. There has been no link made between respiratory or other adverse animal health impacts and emissions from industrial facilities in the region. The facility is required to comply with the conditions of the IE licence with the limits set therein so as protect environmental health. I refer the Board to other sections of this report with respect to air and dust and surface and groundwater (10.5, 10.6, 11.6 and 11.8).

10.10. Local Authority Recommended Conditions

For the Board's information and in the interests of clarity the following table provides a synopsis of the conditions recommended in LCCC's report on the application.

Condition No: **Subject**	**Requirement**	**Included/excluded in Schedule of Conditions**
Condition 1 General	Development to be carried out in accordance with plans/particulars	Included, standard condition
Condition 2 Financial Contribution	Section 48 requirement	Included, standard condition
Condition 3 Compliance	Mitigation measures in EIAR	Included, standard condition

Condition 4 Compliance	Mitigation measures in NIS	Included, standard condition
Condition 5 Amenities	Community Gain Fund	Included, additional to measures in EIAR
Condition 6 Cultural Heritage	Archaeological monitoring	Included, standard condition
Condition 7 Biodiversity	Vegetation removal restrictions	Included, additional to measures in EIAR.
Condition 8 Noise and Vibration	Blasting restrictions	Included in interest of clarity

11.0 Environmental Impact Assessment

11.1. Introduction

11.1.1. The application falls within the scope of the amending 2014 EIA Directive (Directive 2014/52/EU) and the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. Article 94 of the Planning and Development Regulations, 2001, as amended, and associated Schedule 6 set out the requirements on the contents of an EIAR.

11.1.2. This part of the report is therefore divided into two sections. The first section provides an examination of the EIAR and assesses compliance with the requirements of Article 94 and Schedule 6 of the Regulations. The second section provides an examination, analysis and evaluation of the development and an assessment of the likely direct and indirect significant effects of it on defined environmental parameters, having regard to the EIAR and relevant supplementary information. It also provides a reasoned conclusion.

EIAR Structure

11.1.3. The application documentation including the EIAR was co-ordinated by Tom Phillips Associates on behalf of the applicant.

11.1.4. The EIAR consists of 4 volumes, grouped as follows:

- Main Report
- Appendices
- Non-Technical Summary
- Photomontage Booklet

Compliance with Legislation

11.1.5. As is required under Article 3(1) of Directive 2014/52/EU amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, the submitted EIAR describes and assesses the direct and indirect significant effects of the project on the following factors: (a) population and human health; (b) biodiversity with particular attention to the species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; (c) land, soil, water, air and climate; (d) material assets, cultural heritage and the landscape. It also considers the interaction between the factors referred to in points (a) to (d). Article 3(2) includes a requirement that the expected effects derived from the vulnerability of the project to major accidents and/or disasters that are relevant to the project concerned to be considered.

11.1.6. Article 94, of the Planning and Development Regulations, 2001, as amended, sets out the required content of an EIAR which includes the information specified in paragraphs 1 and 2 of Schedule 6. I assess compliance with the requirements in the table below.

Section 94(a) Information to be contained in an EIAR (Schedule 6 Paragraph 1)	
A description of the proposed development comprising information on the site, design, size and other relevant features of the proposed development. (including the additional information referred to under section 94(b)).	A description of the site and proposed development is contained in Chapters 2 and 3 of the EIAR including details on the location, site, design and size of the development and construction methodology. In each technical chapter of the EIAR details are provided on the use of natural resources and the production of emissions and/or waste (where relevant).

A description of the likely significant effects on the environment of the proposed development (including the additional information referred to under section 94(b)).	A description of the likely significant effects of the development on the environment is provided in the technical chapters, and associated documentation, of the EIAR. Technical chapters reflect the environmental parameters set out in Article 94. As indicated in the environmental impact assessment below, I am satisfied that the EIAR has adequately identified the significance of environmental effects with regard to population and human health, biodiversity, land and soil, water, air and climate, material assets, cultural heritage and landscape and allows for a proper assessment.
A description of the features, if any, of the proposed development and the measures, if any, envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment of the development (including the additional information referred to under section 94(b)).	The proposed development includes designed-in mitigation measures and measures to address potential adverse effects identified in technical studies. These, and arrangements for monitoring are set out in each technical chapter and are summarised in Chapter 19. Mitigation measures are largely capable of offsetting significant adverse effects identified in the EIAR. Where further measures are appropriate these have been included as specific conditions for the reasons and considerations stated in the assessment below
A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main	A description of the alternatives considered is contained in Chapter 4 of the EIAR. The alternatives considered include 'do nothing', alternative locations within the landholding and alternative residue management methods. The main reasons for opting for the current proposal is so as to allow for efficiencies availing of existing infrastructure and minimising transport requirements (see section 11.2 below). I am

reasons for the option chosen, taking into account the effects of the proposed development on the environment (including the additional information referred to under section 94(b)).	satisfied that the applicant has undertaken a study of reasonable alternatives in assessing the proposed development and has outlined the main reasons for opting for the current proposal before the Board, and in doing so, the applicant has taken into account the potential impacts on the environment.
Section 94(b) Additional information, relevant to the specific characteristics of the development and to the environmental features likely to be affected (Schedule 6, Paragraph 2).	
A description of the baseline environment and likely evolution in the absence of the development.	A description of the baseline/receiving environment is set out in each of the technical chapters. The do nothing scenario is considered in each instance in which the existing industrial site and activities continue without change.
A description of the forecasting methods or evidence used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information, and the main uncertainties involved.	The methodology employed in carrying out the EIA, including the forecasting methods is set out in each of the individual chapters assessing the environmental effects. The applicant has indicated in the different chapters of where difficulties have been encountered (technical or otherwise) in compiling the information to carry out EIA and are summarised in chapter 20. The limitations relate to archaeology, waste and traffic. I do not consider the difficulties identified render the detail provided to be deficient and consider that there is sufficient detail to allow for a proper assessment.
A description of the expected significant adverse effects on the environment of the proposed development	This issue is specifically dealt with in Chapter 16 of the EIAR and in the Risk Assessment and Break-Out Study for the Bauxite Residue Disposal Area (BRDA) which is attached to the Engineering

deriving from its vulnerability to risks of major accidents and/ or disasters which are relevant to it.	Design Report in Appendix A. Specific risks have been identified with regard to BRDA stability. These risks are reasonable and are assessed in my report.
Article 94(c) A summary of the information in non-technical language.	This information has been submitted as a separate standalone document. I have read this document, and I am satisfied that it is concise and comprehensive and is written in a language that is easily understood by a lay member of the public.
Article 94(d) Sources used for the description and the assessments used in the report.	The sources used to inform the description, and the assessment of the potential environmental impact are set out in each chapter. I consider the sources relied upon are generally appropriate and sufficient.
Article 94(3) A list of the experts who contributed to the preparation of the report.	A list of the various experts who contributed to the report are set out in Table 1.4 (Chapter 1) of the EIAR. The introductory section of each of the chapters also provided details of individuals' expertise and qualifications which demonstrates the competence of the person in preparation of the individual chapters within the EIAR.

Consultations

11.1.7. Details of the consultations entered into by the applicant with relevant stakeholders is set out in section 1.9.1 (see sample letter in Appendix 1.2) with details provided of the pre-application consultation brochure prepared and circulated to the local community and engagement with local politicians (see Appendices 1.3 and 1.4).

11.1.8. As legally required the application is accompanied by copies of the relevant notices and the website on which the documentation can be accessed. The approval process has allowed for the submission of observations/objections with parties to the application provided a further opportunity to make a submission following the

applicant's section 37F(1) response. I consider that the engagement has been effective in terms of advising the public of the proposed development and that 3rd parties were not disenfranchised.

Cumulative Impacts

11.1.9. In the context of cumulative assessment the overall AAL facility is inherent throughout the documents submitted and topic assessment. I note specifically that the IE licence pertains to the overall AAL facility. I do not consider that the project has been misidentified for the purposes of EIA and the EIAR is quite clear as to the nature and extent of the development subject of assessment, with the entire AAL facility presented therein where necessary.

11.1.10. The projects considered in the EIAR for the purposes of cumulative assessment are summarised in Appendix 18.1 and include the Port of Foynes developments, and Limerick to Foynes N69 road scheme. Whilst not included in the Appendix but as previously noted, dumping at sea and dredging activities are considered in the body of the EIAR document with numerous references made to same under the appropriate cumulative impacts headings. At this juncture I submit that having regard to nature and extent of the proposed development which would not result in any unlicenced water discharges to the Shannon Estuary, the management measures in place which effectively mitigate any deposition of airborne sediment in the estuary, and the fact that the site is protected from flooding, there is no potential for cumulative effects.

11.1.11. Other developments referenced by observers such as Tarbert and Moneypoint power stations and the Cement Factory in Limerick, all of which are existing, would have been captured in terms of the receiving environment. These facilities are subject to their own monitoring regimes and IE licences.

Compliance

11.1.12. I am satisfied that the EIAR has been prepared by competent experts to ensure its completeness and quality, and that the information contained in the EIAR, and supplementary information provided by the developer in its response to submissions dated 06/07/22 and its section 37F(1) response dated 19/01/24, adequately identifies and describes the direct, indirect and cumulative effects of the proposed development on the environment, and complies with article 94 of the Planning and

Development Regulations 2000, as amended. Overall, I am satisfied that the information provided is reasonable and sufficient to allow the Board to reach a reasoned conclusion on the significant effects of the Proposed Scheme on the environment, taking into account current knowledge and methods of assessment.

11.2. Reasonable Alternatives

11.2.1. **Article 5 (1) (d) of the 2014 EIA Directive requires**:

"(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;"

11.2.2. **Annex (IV) (Information for the EIAR)** provides more detail on 'reasonable alternatives':

"2. A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for electing the chosen option, including a comparison of the environmental effects."

11.2.3. The matter of alternatives is addressed in Chapter 4 of the EIAR. The assessment is premised by the fact that the facility is a long established operation including the location and footprint of the BRDA. In a do nothing scenario the absence of additional storage would require the closure of the plant when existing permitted storage arrangements are exhausted in 2030. This would result in significant job losses, with negative impacts on both the local economy and the diversification of the state's economic base. The continuing and forecast demand for alumina globally would require alumina to be produced elsewhere

11.2.4. Consideration of alternative locations at a remove from the AAL landholding was considered to be inappropriate and unfeasible given the efficiencies of proximity to the plant and the capital investment required. In terms of bauxite residue and salt cake the range of alternatives considered span from alternative locations within the AAL landholding, horizontal expansion and alternative bauxite residue and salt cake management methods. In terms of the latter whilst research is ongoing at present

there are no alternative methods which would eliminate the existence of bauxite residue as a by-product from the alumina refinery process and, therefore, there is a need to facilitate its storage. In terms of alternative treatment of salt cake the applicant has constructed a Wet Oxidation System, the objective of which is to remove salt cake from the waste stream. The plant will be fully integrated into the alumina production process, operate continuously and allow recovery of the process stream.

11.2.5. Alternatives in terms of the borrow pit extension included sourcing of the necessary material off site but which would bring about impacts on the road network and noise and dust. The size of the extension on site was also considered.

11.2.6. The applicant contends that the preferred option subject of the application is the most feasible availing of existing infrastructure and minimising transport requirements.

11.2.7. I consider the requirements in terms of reasonable alternatives have been satisfactorily discharged and the reasoning for the preferred option explained. It indicates how the proposed design evolved and how it was adjusted to take into consideration environmental effects. On balance, therefore, I consider that the requirements in terms of reasonable alternatives have been satisfactorily discharged and the requirements of the EIA Directive in this regard have been met.

11.3. Likely Significant Direct and Indirect Effects

11.3.1. This section of the EIA identifies, describes and assesses the potential direct, indirect and cumulative effects of the project under each of the environmental factors referred to in Article 3 (1) of the Directive. The assessment includes an examination, analysis and evaluation of the application documents, including the EIAR and submissions received. I will address the environmental factors in the following chronology in line with that set out in the Directive :

- Population and Human Health (to include assessment of noise)
- Biodiversity
- Land and Soil
- Water

- Air and Climate
- Material Assets
- Cultural Heritage
- Landscape
- Interaction between the above

11.3.2. The assessment also includes the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters.

Preliminary Issues

11.3.3. The development subject of this EIA will facilitate an extension of the life of the overall AAL facility and, therefore, increase the period during which there will be high levels of anthropogenic activity in the area which is heavily modified and industrialised in addition to the duration for which there will be emissions associated with the operation of the plant. The nature of the activities in the processing area will be essentially unchanged but the increase in storage capacity in the BRDA will extend the lifetime of the overall facility from 2030 to 2039. The overall AAL facility is subject to emission limits as set out in the EPA IE licence conditions.

11.3.4. As the construction and operation of the BRDA, SCDC and Borrow Pit will take place in tandem I concur with the applicant's view that the traditional separation of construction and operational phases is not considered to be applicable in this case.

11.3.5. In terms of closure/decommissioning I note that the overall AAL facility is subject to an approved plan by way of Condition 10 of the IE licence. This Closure, Restoration and Aftercare Management Plan (CRAMP) covers both the refinery plant area and BRDA. The most recent iteration of the plan which was submitted with the IE licence review P0035-07 was approved by the EPA in 2021.

11.3.6. Futureproof Clare CLG considers that the baseline against which the development should be assessed is that which prevailed prior to the development of the AAL facility on the site. As noted above the consent process for the industrial facility dates back to the 1970's. The parent permission granted under ref. 8580 would have been assessed and considered to be acceptable against the baseline environment that existed at that time and in the context of the applicable legislative and environmental parameters. All subsequent applications would, accordingly,

have been assessed against the baseline environment that existed at the time i.e. with the industrial facility in place and against the legislative and environmental requirements of the time. As noted, the BRDA development permitted under ref. 05/1836 (PL13.217976) was accompanied by an EIS and the borrow pit permitted under 17/714 (ABP 301011-18) was accompanied by an EIAR. Both would have been subject to EIA. The decisions to grant permission were not subject to judicial review and stand.

11.3.7. I consider that the appropriate baseline environment against which the current proposal is assessed is that as currently exists, namely with the AAL facility. To assess the proposal relative to an undeveloped site is an artificial construct which bears no resemblance to the situation on the ground. I would also submit that it is entirely unreasonable to seek the retrospective application of legislative provisions to development which predate the said provisions. The development permitted under ref. PL13.217976 would have been assessed under the EIA Directive 85/337/EEC as amended by Directives 97/11/EC and 2003/35/EC.

11.3.8. Observers to the application contest the categorisation of impacts in the EIAR based on relevant methodologies across a number of topics including landscape, noise and vibration and major accidents. The extent of impact assigned is also disputed in a number of instances. I note that each chapter commences with an explanation of the methodologies used in its preparation with the competent person(s) who prepared the chapter determining the impact and significance of that impact based. I have due regard to the matter of significance under each topic heading and to the potential that the addition of a number of minor or insignificant effects could lead to more significant effects.

11.4. Population and Human Health

Issues Raised

11.4.1. LCCC recommends a condition requiring the establishment of a community fund and restrictions on the number of blasts per annum.

11.4.2. Observers express concerns as to the impact of the operation on human health.

Environmental Impact Assessment Report

11.4.3. I consider that this environmental topic appropriately encompasses the subject issues as raised in the EIAR chapter titled Population Human Health and Agriculture in addition noise and vibration.

11.4.4. Chapter 7 assesses Population Human Health and Agriculture with supporting details provided in Appendix 7.1. A Human Health Assessment is provided in Appendix 7.3. Chapter 12 addresses noise and vibration.

11.4.5. Other matters which would have a direct bearing on population and human health such as water, air and climate, landscape and major accidents and disasters are addressed under the corresponding headings below. Invariably there is an overlap and I recommend that they be read in tandem.

Baseline

11.4.6. The area of the AAL facility is predominantly agricultural with one off housing ribboning along the local road network with a relatively low population density. The nearest dwelling is c.0.9 km from the site.

11.4.7. Foynes and Foynes Port are approx. 2.5km to the west of the site with Wyeth Nutritionals and Gouldings Fertiliser to the east.

11.4.8. The AAL facility employs 482 with another 385 maintenance and installation contractor employees.

11.4.9. Dust deposition monitoring is undertaken at 35 no. locations at the AAL facility. To avoid undue repetition I refer the Board to the receiving environment details provided in section 11.8 below.

11.4.10. In terms of noise, measurements are conducted at five (5) nearby noise sensitive locations (NSL's) as defined in AAL's operating licence (ref. Industrial Emissions Licence Reg No. P0035-07), the nearest being located 600 metres southeast of the facility adjacent to Poulaweala Creek. The results of the annual noise surveys confirm that noise emissions from the existing AAL facility are in compliance with the site's noise emission limit values, as outlined in relevant license conditions (i.e. daytime limit of 55 dB LAr (30minute), evening-time limit of 50 dB LAr(30 minute)

and night-time limit of 45dB LAeq (15-30 minutes)), at specified noise sensitive locations (see Table 12.1).

11.4.11. Blasts have been carried out at the borrow pit with the results in compliance with licence conditions which caps vibration levels at 12mm/second and air overpressure at 1.25dB (Lin) max. peak.

11.4.12. ***Likely Significant Effects***

The following table provides a summary of the likely significant effects:

Do Nothing	**Population** Site would continue to operate to 2030. When the capacity of the BRDA is reached the facility would have to close impacting negatively on employment in the area with knock on negative impacts to the local economy. **Human Health** No alteration to the current ambient environment and the current concentrations of particulates and dust deposition. The noise environment would not be altered with blasting permitted in the borrow pit between April and September.
Construction/Operational Phase	**Population** Would facilitate the ongoing operation of the wider refinery facility to 2039 thereby maintaining employment levels into the longer term which would assist in maintaining population levels in the area with knock on positive impacts to the local economy. **Noise and Vibration** Activities at borrow bit including blasting and rock breaking and crushing. Machinery use and movements on the BRDA **Human Health** Dust generation Noise and Vibration

	Surface and ground water quality deterioration from discharges.

11.4.13. ***Mitigation Measures***

The mitigation measures proposed are summarised in the table below:

Construction/Operational Phase	**Noise and Vibration** Best practice control measures for noise and vibration during operation as per BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2. Method statement for blasting operations to be submitted to the EPA for approval to include the noise, vibration and air-overpressure control measures. Monitoring of noise, vibration and air overpressure at GNI pipelines at 3 no. locations representative of the nearest residential dwellings during any blasting activity. Methods to reduce noise, air overpressure and vibration including : • No more than 1 no. blast per week and time period within which blasts to take place. • Notification of public and sensitive premises before each blast. • Good blast design and appropriate charging, setting out, drilling, stemming, detonation decked charged and in-hole delays etc. • Independent monitoring for verification of results. • Complaints procedures. IE licence requirement for annual operational phase noise monitoring. Mitigation measures to control dust set out in section 11.10 below.

	Mitigation measures to manage impacts to surface and groundwater set out in section 11.8 below.
Closure	In accordance with Closure, Restoration and Aftercare Management Plan.

Cumulative Effects

11.4.14. There are no nearby sources with significant emissions of noise or vibration to overlap with site emissions from the BRDA and borrow pit. Therefore no offsite cumulative impact are relevant.

Residual Effects

11.4.15. It is anticipated to result in a significant positive residual impact in terms of employment generation and economic contribution to the local area.

Assessment: Direct and Indirect Significant Effects

11.4.16. Human health is raised as a substantive concern in the observations to the application with specific issues arising with respect to the fugitive dust from the BRDA and impacts on surface and groundwater. There is a significant overlap with the assessments undertaken in sections 11.8 and 11.9 below to which I refer the Board. To avoid undue repetition I also refer the Board to the assessment in section 10.5 above in which the classification of bauxite and radiation are addressed in the context of health and safety.

11.4.17. A Human Health Assessment for Bauxite Residue and Salt Cake prepared by WSP Canada Inc. is provided in Appendix 7.3. The author evaluated the toxicity of bauxite residue and salt cake and assessed the source-pathway-receptor linkage to understand causal relationship between predicted exposures and bauxite residues, as well as characterised health risks, if any, of nearby human populations with potential exposures released from the proposed development. Tables 4.1 and 4.2 summarise the compositions of bauxite residue and salt cake and indicate the constituents deemed to be chemicals of potential concern (COPCs) carried forward for further evaluation. The risk analysis applied the worst case project emissions of PM_{10} and $PM_{2.5}$ at the project boundary, that emissions of the bauxite residue and salt cake predominantly occurs as particulates or fugitive dusts and that the

constituents would be present in the dust emitted at the same percentage composition as in the solid waste. It is accepted that this a conservative approach given the moisture context of bauxite residue is 21% and salt cake 44% (mean figure). It concludes that bauxite residue and salt cake do not pose a health concern to human receptors.

11.4.18. I consider that the assessment provided is detailed and based on scientific data and that no detail/evidence has been brought forward to query the veracity of the report.

11.4.19. In terms of noise a 3D model has been prepared with the noise level at the nearest sensitive locations predicted for each of the following five stages of BRDA construction:

- Current
- Phase 1 at Stage 10; Phase 2 at Stage 4
- Phase 1 at Stage 12; Phase 2 at Stage 8
- Phase 1 at Stage 14; Phase 2 at Stage 12
- All at Stage 16 including the restoration activity

11.4.20. The assessment shows that the calculated noise level at all locations for all scenarios considered is below the daytime criterion of 55 dB LAr,T. Furthermore, the proposed BRDA raise to higher elevations will result in a reduction in noise level at some locations as a result of additional screening offered by the BRDA stage raise embankments.

11.4.21. I note that since the lodgement of the application blasting has been undertaken in the borrow pit with the results of same in accordance with the parameters detailed in the IE licence. The existing regime of up to 7 no. blasts per year between 1st April and 30th September, only, is to be maintained.

11.4.22. In terms of LCCC's recommendation for a condition requiring the establishment of a community fund. I note that the AAL facility is long established and that the applicant has provided for recreational amenity trails on its lands open to the public. Notwithstanding I consider that there is merit in the local authority's reasoning, namely the scale of the proposed development would extend the life of the overall facility to 2039. Such schemes can have a positive impact to the local community

through the support of positive local initiatives and activities. On this basis I recommend a condition to this effect be attached should permission be granted.

Conclusion – Population and Human Health

11.4.23. I have considered all of the submissions made in relation to population and human health, in addition to the application documentation. I am satisfied that while there is potential for adverse impacts to arise at certain times and phases within the scheme (e.g. blasting at borrow pit) that these would be managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. I note that the emissions arising will continue to be limited, controlled, and monitored in accordance with the IE licence. I recommend that a condition limiting both the number of blasts and the period in which blasting can be undertaken be attached to a grant of permission in the interests of clarity.

11.4.24. I am, therefore, satisfied that the proposal would not have any unacceptable significant direct or indirect impacts in terms of population and human health and would provide for positive impacts in terms of continuing employment and economic benefits to the wider area.

11.5. Biodiversity

Issues Raised

11.5.1. 3rd parties detail issues with regard to European Sites and qualifying interests which I address in section 12 below. Limerick City and County Council requires clarification as to the presence of Meadow Barley.

Environmental Impact Assessment Report

11.5.2. Chapter 6 addresses Biodiversity with supporting detail including bird survey results, Marine Mammal Risk Assessment and a Biodiversity Management Plan provided in Appendices 6.1 to 6.5. The application is also accompanied by a Natura Impact Statement and I refer the Board to the appropriate assessment in section 12 below.

11.5.3. The assessment methodology included a combination of desk top studies using recognised ecological data bases and review of the findings of previous survey work carried out within the wider landholding followed by further ecological surveys

undertaken between 2019-2021 including habitat & botanical studies, baseline bird, mammal and other taxa surveys.

11.5.4. The information provided by the desk top study indicates the Natura 2000 sites that occur within 15km of the site. To avoid undue repetition the potential for significant effects on such sites is addressed in the appropriate assessment in section 12 below.

Baseline

11.5.5. The BRDA is a waste disposal area, the surface of which has limited vegetative cover. Apart from some landscaping on the edges of the stage raises the area is devoid of vegetation. Dry meadows and grassy verges (GS2) and Scrub (WS1) are the dominant habitat types present within the borrow pit extension area. They are considered to be local importance (higher value). In the case of the rockfill and soil storage area the dry calcareous grassland (GS1) has been the subject of ongoing disturbance or has gone rank due to lack of grazing/cutting. There is a small area of immature woodland (WS2) which has been planted along the southern boundary of the rockfill and soil storage area and this is categorised as Local importance (Higher value).

11.5.6. Poulaweala Creek to the east of the proposed borrow pit extension is an important area for a range of wintering waterbirds.

11.5.7. Bird surveys have been undertaken across the wider AAL lands by the author since 2012 including waterbird surveys of Poulaweala Creek, Mangan's Lough and adjoining area of the Shannon Estuary. The diversity of waterbirds recorded in the nearby estuarine and aquatic habitats is reflective of the proximity of Aughinish Island to the River Shannon and River Fergus Estuaries SPA. Eleven of the 75 species recorded during the summer and winter surveys are currently red-listed, or species of high conservation concern in Ireland including Curlew, Golden Plover, Grey wagtail, Kestrel, Meadow pipit, Oystercatcher, Peregrine Falcon, Redshank Redwing, Snipe, Swift and Woodcock.

11.5.8. Between the surveys carried out for the current proposed development and the Nature Trail application a total of 8 of the 22 SCI bird species of the River Shannon and River Fergus Estuaries SPA were recorded. These birds were all recorded in

flight and were not associated with any of the terrestrial habitats within the application site boundary. Several further waterbird species which are SCI species of the SPA have been recorded in dedicated waterbird surveys in Poulaweala Creek.

11.5.9. Barn owl was recorded on trail cameras deployed in 2019-2020, in addition to a recently released White-Tailed Eagle (following a controlled release programme by the OPW).

11.5.10. Otter signs are widespread around the coastal margins. 2 no. artificial holts constructed as part of the mitigation measures of BRDA Phase 2 have not been occupied in recent years. There is an artificial badger sett located c. 120 from the application boundary. Badger, fox, rabbit and hare have been recorded on site.

11.5.11. 8 no. species of bat were recorded. Lesser Horseshoe Bat equated to 0.36% of registrations. The scrub, field boundaries and grassy verge habitat within the proposed borrow pit extension area and the woodland habitats within and adjoining the application site have some local value for foraging and commuting bats. Areas within the BRDA site are likely to be used infrequently by foraging and commuting bats and there is currently very low roosting potential across the proposed development site.

11.5.12. ***Likely Significant Effects***

The likely significant effects are summarised in the table below:

Do Nothing	Site would continue to be managed as part of an industrial complex with existing undisturbed areas not developed as part of the borrow pit extension.
Construction/Operational Phase	Loss of habitats with the borrow pit extension dominated by scrub and improved agricultural grassland which could lead to loss and displacement of locally breeding/roosting birds and foraging area for bats. Development of the borrow pit could potentially decrease the foraging lands available close to the artificial badger sett. Blasting and associated activities at the borrow pit could cause localised disturbance to fauna and avifauna.

11.5.13. ***Mitigation Measures***

Proposed mitigation measures are summarised in the table below:

Construction/Operational Phase	Mitigation measures in relation to management of potential emissions to air and water and management of noise arising from the operation of the borrow pit as detailed in the relevant sections of this EIA. Emissions to be in accordance with IE licence requirements. Blasting only permitted between April and September outside the primary overwintering period of migrant waterbird species. Blasting to be relatively infrequent with c. 7 blasts per year. Preparation of a 5 year Biodiversity Management Plan (2021) which builds on existing biodiversity management at the site. It is to be reviewed every 5 years. The plan details monitoring and best practice conservation measures including: • No clearance of woody vegetation during bird breeding season. • Surveying of areas prior to removal to minimise risk or mortality of mammals and check for Invasive Plant Species. • Invasive Plant Species if present to be treated by specialised contractors supervised by suitability qualified ecologist. • Mammal gates at approx. 250 metre intervals to be provided in the fencing of the borrow pit area. • Monitoring of activity at the artificial badger sett in advance and during initial stages of the borrow pit development. Trail cameras to be deployed and recent sett activity to be reviewed on an annual basis prior to the commencement of the blasting schedule.

	• Any pooled water in the borrow pit to be checked for any breeding frogs. If spawn and/or tadpoles present translocation under licence will be undertaken. • 15 no. bat boxes including 2 no. night roosts for Lesser Horseshoe Bat to be installed on lands within applicant's control, the location of which to be chosen by suitably qualified ecologist. • 15 no. bird nest boxes including at least 1 no. Barn Owl box to be installed on lands within the applicant's control, the location of which to be chosen by suitably qualified ecologist. • Deep excavations or areas of pooled water assessed to either provide escape ramps for fauna or adequate mammal-proof fencing.
Closure	In accordance with Closure, Restoration and Aftercare Management Plan. A Biodiversity Management Plan for the closure phase to be produced with detailed commitments to monitor biodiversity for the 30 years post closure. The side slopes of the BRDA will be subject to progressive restoration and landscaping. Upon closure the final restoration will include capping and seeding of the BRDA dome and establishing a hedgerow pattern consistent with the surrounding landscape. The hedgerows will provide cover for songbirds and small mammals and potential prey for raptor species including Barn Owl. The PIC at the base of the BRDA will be lined with soil and revegetated to form a wetland margin that will collect surface water runoff from the spillways. Water quality is to be monitored for a prolonged period post closure.

Cumulative Effects

11.5.14. No potential for significant cumulative or in combination effects on the local biodiversity were identified in relation to the plans and projects considered. Proposed projects of note such as the Foynes-Limerick N69 Roads scheme took into account potential impacts on biodiversity arising from their own project and in combination with other plans and projects and the detailed mitigation and monitoring commitments greatly lessened the scale and nature of potential residual impacts on biodiversity. Plans and projects might in themselves have identified potential ecological impacts, even some relatively minor residual effects. The potential for residual effects in the plans and projects considered, even when minor in scale or extent, to create larger more significant effects, was considered.

11.5.15. There was no project (or projects) identified where there was potential for significant additive or synergistic effects with the proposed development.

Residual Effects

11.5.16. With implementation of environmental controls and mitigation measures in the medium to longer term residual effects would be slight neutral. In the longer term the landscaping including grasslands and hedgerow provision on the capped BRDA there is likely to be a moderate to significant positive effect on local biodiversity.

Assessment: Direct and Indirect Effects

11.5.17. As noted previously the proposed works will occur within an area which is heavily modified and industrialised and disturbed by human activities. The development will facilitate an extension of life of the overall AAL facility and therefore increase the period during which there will be high-levels of anthropogenic activity in the area and also the duration for which there will be emissions associated with the operation of the plant. Noise and visual disturbances are anticipated to be comparable to those currently arising and to which mammals in the vicinity are likely to be habituated to.

11.5.18. The BRDA which is to be expanded vertically has little biodiversity value with the area of the borrow pit extension not exhibiting any habitats or mammals of specific conservation concern. Standard mitigation measures will address concerns with respect to disturbance and displacement in terms of the borrow pit extension. The Biodiversity Management Plan which was prepared in 2021 is to be reviewed every 5 years and will allow for ongoing assessment and monitoring. As with the permitted

borrow pit, operations within the extended area are to be limited to between 1st April and 30th September so as to avoid the period of overwintering for birds.

11.5.19. There is an overlap in terms of avifauna and the conservation objectives of the adjoining SPA. To avoid undue repetition I address same in the appropriate assessment in section 12 below. With regard to the submission from Environmental Trust Ireland I note that Hen Harrier was not recorded in any bird survey with no suitable habitat for the species recorded within the site.

11.5.20. In response to LCCC's submission the applicant has clarified that Meadow Barley is not present on the site.

11.5.21. Observers raise concerns as to the potential impacts from heavy metals on the marine environment. I refer the Board to the Conceptual Site Model prepared in 2021 to consider whether there was potential for bioaccumulation in the marine environment as a result of the emissions from the plant. A further confirmatory study to collect additional marine sediment data was undertaken in May of 2021 to assess the significance of any potential releases from the plant on the possible elevation of heavy metal concentrations in marine sediments in the immediate vicinity of the plant. The sampling data from the study indicated that no pathways are being realised that may impact on sediment concentrations in the immediate marine environment with the data showing metal sediment concentrations typical of background concentrations for the Irish marine environment. Hence it is concluded that no pathway for heavy metals has realised an impact on marine sediments and therefore, marine benthic species in the immediate vicinity of the plant. These data indicate that there is no pathway from the AAL activity producing a negative impact on the invertebrate prey species of higher faunal organisms, including intertidal feeding birds.

11.5.22. Chapter 16 addresses major accidents and disasters. In terms of vulnerability of receptors it is noted that alkaline water associated with residue released to the estuary may impact on aquatic life with the communities more likely to be affected being sessile sublittoral and littoral communities and benthic communities. It is considered that the impact of release of alkaline water release would be minimal due to the assimilative capacity of the Shannon Estuary.

Biodiversity – Conclusion

11.5.23. I have considered all of the written submissions made in relation to biodiversity as well as the submitted application documentation. I am satisfied that any potential impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. I note that the emissions arising will continue to be limited, controlled, and monitored in accordance with the IE licence. I am therefore satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative effects in terms of biodiversity.

11.6. Land and Soil

Issues Raised

11.6.1. Observers raise concerns about the BRDA stability, potential for containment breach and the components of the residue stored therein.

Environmental Impact Assessment Report

11.6.2. Chapter 8 addresses soils, land and geology with supporting detail provided in Appendices 8.1 and 8.2.

11.6.3. The assessment uses a qualitative method supported by baseline information, preliminary construction and environmental management plan and proposed development design.

Baseline

11.6.4. OS historical mapping indicates that the bulk of the Phase 1 BRDA and the western sector of Phase 2 is constructed over relatively flat, low lying poorly drained farmland with the underlying soils comprising estuarine silts and clays with intermittent overlying thin till layers. The BRDA comprises of made ground primarily of bauxite residue built upwards in a series of 2 metre high ‘upstream’ raises. The stage raises are constructed of processed limestone rock fill which is separated from the underlying bauxite residue by a layer of separation geotextile.

11.6.5. The mapped bedrock geology (GSI, 2021) comprises Waulsortian Formation limestones beneath the eastern sector of the BRDA and in the area of the borrow

pits and the plant. The overlying Rathkeale Formation limestones and mudstones underlie the central and western sectors of the BRDA.

11.6.6. Boreholes in the vicinity of the permitted borrow pit and the proposed extension area encountered fine grained Waulsortian limestone with silty gravelly overburden.

11.6.7. Soil quality monitoring undertaken in 2016 and 2017 indicated that there was no significant impact from the industrial activities. There was no significant acidification or alkalinisation of the soils. Heavy metals detected were generally typical of soil background levels in Ireland. The Radiological Protection Institute of Ireland in a survey conducted in 2008 concluded that the naturally occurring radioactive material (NORM) in the bauxite was in compliance with safe levels and below the threshold at which the facility would come within the scope of the Irish Regulations from a radiological point of view. Further assessment of farmed bauxite was undertaken in 2021 with values comparable to those of 2008.

11.6.8. ***Likely Significant Effects***

The likely significant effects are summarised in the table below:

Do Nothing	The site will continue as permitted with BRDA Phases 1 and 2 to Stage 10 with the material extracted from the permitted borrow pit to facilitate the stage raises. The capacity of the BRDA would be exhausted in 2030 at which the AAL facility would be required to cease operation.
Construction/Operational Phase	Removal of superficial and bedrock deposits in the borrow pit extension during the stripping and extraction process. Activities or events could result in ground contamination during operations include leaks and spills from machinery or stored substances (including from stored imported soil, which is proposed to be imported during the operational and closure phases of the development as soil materials become available locally and to progressively restore the side-slopes of the BRDA). A trigger event e.g., blasting in the proposed or permitted borrow pit areas causing instability or failure within the

	BRDA and/or the SCDC (both existing and proposed facilities).

11.6.9. ***Mitigation Measures***

The proposed mitigation measures are summarised in the table below:

Construction/Operational Phase	The stability of the excavation and stockpiles generated within the proposed Borrow Pit Extension site to be monitored and managed by the Contractors and in line with the Mines and Quarries Act (1965) and the Safety, Health and Welfare at Work (Quarries) Regulations 2008 (as amended). The management of the existing quarry faces, stockpiles and silt ponds to be in accordance with the Health and Safety Authority's 'Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008, (as amended), and the recommendations of geotechnical appraisals carried out on site. The proposed borrow pit extension site to be incorporated into the existing monitoring plan and risk assessments. Security fencing around borrow pit area with exposed edges protected with safety berms. Refuelling to take place using a mobile bowser fuelling plant and only in designated areas suitable for refuelling, with materials to be managed and stored appropriately. Imported commercial soils for proposed restoration will be uncontaminated and sourced from approved and licenced providers in accordance with EPA guidance. Regular inspections, audits, stability assessments and daily walk-over condition and stability checks to be carried out on the proposed BRDA raise, SCDC raise and borrow pit extension in accordance with the Physical Stability Monitoring Plan (Golder 2021). Operating procedures for the BRDA are directed by the series of stand-alone Standard

	Work Method (SWM) documents which are prepared, maintained and updated by the AAL BRDA Engineering Team. Updating of Physical Stability Monitoring Plan, Emergency Plan, BRDA Operational, Safety and Maintenance Manua; (OSM) and the operating Procedures for the BRDA (SWMs) to include the proposed development. Adoption of the existing Environmental Management System (EMS) and other procedures (including Health and Safety) for the Aughinish Site. Installation works to insert (as per existing practice) piezometers, inclinometers and settlement systems in the BRDA, as the facility increases in elevation. Interim landscaping of the side-slopes to take place on a phased basis as the BRDA is raised. Enforcement of final CEMP to include monitoring provisions Regular visual inspections of dam wall integrity. Regular visual inspections of faces in proposed borrow pit extension area.
Closure	In accordance with Closure, Restoration and Aftercare Management Plan. Containment design for the BRDA slopes and dome with water management systems to transfer flows to the PIC. A wetland treatment system has been designed for the aftercare phase. On closure of the borrow pit area, exposed faces will be battered down where necessary and other faces will be left exposed which may offer suitable habitat for nesting birds. Built structures such as the BRDA and SCDC to be capped and vegetated during final closure. Active monitoring of these structures will be continued for a minimum of 5 years after closure and will include stability checks and

	assessments. Passive after-care monitoring to continue for a minimum of an additional 30 years.

Cumulative Impacts

11.6.10. None anticipated

Residual Impacts

11.6.11. The Proposed Development has been designed to integrate and complement the existing structures with the proposed structures. The significance of residual effects on soils, land and geology resulting from the different potential sources of change are predicted to be no greater than imperceptible and, therefore, not significant in terms of the assessment.

Assessment: Direct and Indirect Effects

11.6.12. I refer the Board to section 10.3 of the planning assessment above which addresses BRDA stability and potential for contamination. I also refer the Board to examination of the bauxite residue and its classification therein and to the assessment under section 11.4 above on population and human health.

11.6.13. I note that the most recent Risk Assessment and Break-Out Study for the BRDA (Golder 2019A) is an update of previous risk assessment and break out studies completed in 2006 and 2013. The 2019 update includes an assessment of the operation of the permitted borrow pit and reviewed the potential impacts of blasting on the BRDA. The report identified that the annual probability of slope failure for the sectors of the BRDA closest to the Borrow Pit i.e., Sector F and Sector G, located at the east and northeast flanks of the Phase 1 BRDA, respectively, as being Almost Impossible to Highly Improbable. The site for the borrow pit extension is at a greater distance from the BRDA than the permitted borrow bit and instability resulting from blasting within this area is considered to be even less likely than from the permitted site. If failure of the BRDA were to occur, it would be confined to Sectors F (the eastern flank of the Phase 1 BRDA) and G (the north-eastern flank of the Phase 1 BRDA) of the BRDA. Given the Almost Impossible to Highly Improbable likelihood and localised containment the potential impact magnitude is predicted to be negligible (adverse).

Lands and Soil – Conclusion

11.6.14. I have considered all of the written submissions made in relation to land and soil as well as the submitted application documentation. I am satisfied that any potential impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. I note that the emissions arising will continue to be limited, controlled, and monitored in accordance with the IE licence. I am therefore satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative effects in terms of land and soil.

11.7. Water

Issues Raised

11.7.1. Observers raise issues pertaining to surface and groundwater quality including anomalies in monitoring results. Compliance with the Water Framework Directive and Groundwater Regulations were also cited. LCCC required clarification as to the depth of groundwater in the borrow pit extension.

Environmental Impact Assessment Report

11.7.2. Chapter 10 deals with hydrology and hydrogeology. Details of the assessment methodology employed in the assessment of any potential impact are set out including details of surface and groundwater monitoring undertaken in accordance with the requirements of the IE licence.

Baseline

11.7.3. The overall Aughinish Site is bounded to the north and west by the Shannon Estuary, to the east by Poulaweala Creek and to the southwest by the Robertstown River, to form Aughinish Island. The Poulaweala Creek, a former estuarine channel, which originally divided Aughinish Island from the ‘mainland’ to the south at Island MacTeige and Glenbane West, was partially culverted and infilled with coarse rock fill during the development of the Phase 2 BRDA.

11.7.4. The region drains to the Shannon Estuary. Most of the rivers within the study area drain to the Robertstown River before entering the Shannon Estuary whilst rivers in Foynes within the study area drain directly into the Shannon Estuary.

11.7.5. The BRDA and surrounding catchment is defended by the OPW constructed flood protection works on the north bank (Shannon Estuary) and west bank (Robertstown River) of is the island where a flood tidal defence berm (FTDB) is present. Flooding events have occurred to the east and west outside of Aughinish Island but no flood events have been recorded at the AAL Plant or around the BRDA footprint.

11.7.6. The BRDA is surrounded by PICs, which collect bleed water and runoff from the Phase 1 and Phase 2 facilities and convey it via pumps either to the Effluent Clarifier System (ECS) or to the Storm Water Pond (SWP). The PIC is formed by the construction of the outer and inner perimeter embankment walls, with the inner embankment wall also being the starter stage raise, i.e., Stage 0. The Liquid Waste Pond (LWP) receives treatment water from the ECS. The SWP and LWP are located in the north-east sector of the BRDA.

11.7.7. Separately a perimeter drain is the primary surface water drainage network for the low-lying area between the Toe Drain and the Flood Tidal Defence Berm (FTDB) and is offset from the north and west sectors of the BRDA. Surface water in the perimeter drain is allowed to discharge into the Robertstown River through a penstock, located to the west of the Phase 1 BRDA and via a Flap Valve during periods of low tide. This penstock can be closed via a manual valve should contamination be identified in the perimeter drain or should a significant event occur, that may potentially impact on the water quality in the perimeter drain, neither of which have occurred.

11.7.8. Aughinish Island is located within the Lower Shannon Estuary Transitional Waterbody. On the island, 18 no. groundwater discharge points of measurable flow are identified. 16 no. of the discharges, known as the Estuarine Streams (ES1 to ES16), are located around the perimeter of the plant site. The locations of the springs generally correspond to areas that were infilled during the site regrading works (dominantly fracture zones). The springs are submerged during part of the tidal cycle and their flow varies significantly with seasonal fluctuations in rainfall.

11.7.9. There are 2 no. licenced discharges of treated effluent to the Shannon Estuary from the plant, 1no. for treated industrial process effluent and 1no. for treated sanitary effluent. Both discharge to the same outfall point which is located close to the AAL Marine Terminal. The IE licence sets the emission limit values.

11.7.10. There are 3 no. IE locations where surface water monitoring is carried out; Mangan's Lough, the OPW channel and Phase 2 West Robertstown Gate (see Figure 10.14), the latter being a more recent addition to the monitoring programme. The parameters monitored are pH, electrical conductivity and soda as well as a visual inspection. A review of the annual averages for the parameters between 2008-2020 (part) show average pH levels within the range of 6.8 to 8.2, soda levels have shown fluctuations in annual averages between 2008 and 2020. Following an upward trend between 2013 and 2015 there has been a downward trend with averages for 2020 between 0.18 g/l and 0.9g/l. In terms of electrical conductivity a steady decrease has been noted since 2017 varying between an average of 921 µS/cm at Mangan's Lough to an average of 3388.17µS/cm at Phase 2 West Robertstown Gate in 2020. A surface water metal analysis was undertaken in April 2021 with the results set out in Table 10.6.

11.7.11. The majority of the BRDA site is underlain by the locally a Locally Important Bedrock Aquifer (Rathkeale Formation) while the SCDC, existing borrow pit and the borrow pit extension site sit within a Regionally Important Karstified Bedrock Aquifer (Waulsortian Formation). The latter is an important water resource for County Limerick. The depth of groundwater is between 1.5m and 10m below ground level.

11.7.12. The hydrogeological conceptual model presented by Golder 2015 identified that the groundwater present beneath the site generally comprises a freshwater lens that is both downgradient and isolated laterally from the mainland by being laterally hydraulically isolated by Poulaweala Creek and the Robertstown River and the underlying saline groundwater. It is noted that a portion of the site in the southeast is within the mainland area of Glenbane West, however, groundwater flow in this area is west and north-westwards towards the Poulaweala Creek and the Robertstown River.

11.7.13. In terms of groundwater vulnerability the area underlying the BRDA is classified as varying between 'Extreme' (east and central portion of the site) and 'Low' (western portion).

11.7.14. A number of karst features have been identified in the vicinity of the site but none within the footprint of the site. Possible areas of fractured bedrock and karst were identified in the borrow pit. 6 no. boreholes were drilled to approx.15 m depth below

ground level at the borrow pit. BH1, BH2, BH3, BH5 and BH6 encountered cavities within the limestone, whilst no cavities were observed in BH4. Water strikes during drilling were noted in BH1 and BH2 at elevations of 3.82 mOD rising to 7.32 mOD, and at 8.03 mOD respectively. No other water strikes were noted. The recovery of the water level was sufficiently slow that test pumping was not possible. The boreholes have been monitored for groundwater level. BH3, BH4 and BH5 have been found to be dry. On the basis of the findings for the site investigations, it is concluded that there are limited groundwater inflows and or isolated perched units of groundwater within the borrow pit and borrow pit extension areas.

11.7.15. Groundwater monitoring at the BRDA and plant area is carried out under the IE licence. Results of water quality metal analysis undertaken in April and July 2021 are presented in Table 10.7 with Table 10.8 presenting the dissolved metal results from monitoring wells near the borrow pit site (April to August 2021).

11.7.16. In summary:

- pH levels are within the AAL facility threshold level of 6.0 to 9.0 pH and within the Groundwater Regulations 2010, as amended, threshold of 9.5 pH.
- Electrical conductivity is within the threshold value save at MW2 which has been consistently above the Groundwater Regulations limit of 1,875 µS/cm.
- Soda levels in MW2 mirror conductivity and chloride is comparatively elevated.
- pH levels in MW2 averaged 7.5 pH between December 2020 and September 2021 and total alkalinity is trending downwards.
- Aluminium is below the threshold value of 150 µg/l during the monitoring period.
- MW2 is at a distance from the industrial site along the margin of Poulaweala Creek and is strongly influenced by saline intrusion.
- Chloride levels have been consistently above 24 m/l in MW1, MW3, MW4, MW6, MW7 which indicates saline influence in these wells.

- MW2 is at a distance from the industrial site along the margin of Poulaweala Creek and is strongly influenced by saline intrusion. Concentrations are considered likely to be a result of this intrusion.
- Other exceedances occur in isolation to other parameters i.e., just a single metal exceeding a threshold value in a round of readings (usually zinc or arsenic and sometimes mercury) and then are not present for future rounds and hence are considered to be natural.

Likely Significant Effects

11.7.17. ***Likely Significant Effects***

The likely significant effects are summarised in the table below:

Do Nothing	The site will continue as permitted with BRDA Phases 1 and 2 to Stage 10 with existing water management system in place. On completion it will be closed in accordance with the Closure, Restoration and Aftercare Management Plan (CRAMP). The permitted borrow pit will be extracted to a depth of 8.5mOD. BRDA would be exhausted in 2030 at which the AAL facility would be required to cease operation.
Construction/Operational Phase	Mobilisation of leachate by operational works e.g. earth movements that could impact water quality and use. Changes in groundwater levels and regimes and therefore water availability. Refuelling leaks or spills in the borrow pit extension. Leaks and spills of substances during storage, transport, use and/disposal. Suspended solids from operational activities such as excavations and earth movement. Potential for seepage to occur from the perimeter channel or from the storm water pond. Seepage from the BRDA site.

11.7.18. ***Mitigation Measures***

The proposed mitigation measures are summarised in the table below:

Construction/Operational Phase	Amendments to surface water management system which form part of the proposed development. Existing systems and monitoring installations to manage and limit the potential impacts including: • Refuelling • Leaks and spills from stored and used substances • Seepage from the BRDA Best construction practices within the development area and compliance with CEMP to be finalised. Testing of the lining system for the SCDC to take place after construction to ensure the seams are air-tight and the panels have not been damaged to ensure the potential for leakages is reduced. Groundwater and surface water quality monitoring in compliance with IE licence requirements. Regular visual inspections of dam wall integrity and faces of borrow pit extension.
Closure	In accordance with Closure, Restoration and Aftercare Management Plan. Refuelling of machinery and plant in designated areas. Hazardous materials to be managed and stored appropriately. Active monitoring of the observation well field to be continued for 5 years minimum after closure and will identify any potential contamination at an early stage which can be remediated. Passive monitoring for after care phase for a minimum of an additional 30 years.

	On closure of the borrow put exposed faces will be battered down where necessary and other faces will be left exposed which will reduce the potential pathway for contaminants.

Cumulative Effects

11.7.19. The Proposed Development has been designed to integrate and complement the existing structures with the proposed structures, and no cumulative impacts are anticipated with the addition of the proposed extensions.

Residual Effects

A summary of the sources of impact, predicted magnitudes of residual impact and subsequent residual effect significance is presented in Table 10. In all cases the residual effect is Not Significant and not greater than Slight

Assessment: Direct and Indirect Effects

11.7.20. I refer the Board to my assessment in section 10.7 above.

11.7.21. The IE licence details surface water discharges and monitoring requirements in addition to groundwater monitoring requirements. The EPA is the competent authority in terms of compliance with these requirements. Extensive data is available from this monitoring which has informed the applicant's assessment. The data is site specific and provides for scientific certainty and does not present any lacunae as asserted by observers.

11.7.22. There are no licence discharges to surface or groundwater from the BRDA. There are 2 no. licenced discharges from the overall facility which are not affected by the proposed development.

11.7.23. In terms of groundwater there are no source protection areas or preliminary source protection zones within the study area. 14 no. wells have been identified in the study area, 2 no. of which are being used for domestic and agricultural purposes. As noted above the groundwater under the site comprises of a freshwater lens that is both downgradient and isolated laterally from the mainland by being laterally hydraulically isolated by Poulaweala Creek and the Robertstown River and the underlying saline groundwater. It is noted that a portion of the site in the southeast is within the mainland area of Glenbane West, however, groundwater flow in this area

is west and north-westwards towards the Poulaweala Creek and the Robertstown River. The said 14 no. wells are not identified as being part of the same hydrogeological system in which the site is located.

11.7.24. Observers raise concerns in term of anomalies in groundwater monitoring results including the high levels of electrical conductivity along the northern boundary. I consider that the applicant's reasoning for same to be acceptable and can be attributed to saline intrusion associated with the adjacent estuary. The fact that lower levels of conductivity were recorded in monitoring wells at a further remove from the estuarine area would support this reasoning.

11.7.25. Results for heavy metal concentrations in groundwater are set out in Table 10.7 with elevated levels of arsenic, cadmium, iron, magnesium, nickel and zinc recorded on occasion. However, these exceedances occur in isolation to other parameters and do not form part of a continuing trend which could be attributed to consistent trends in terms of elevated concentrations. As noted above the Seepage and Water Quality Assessment in Appendix H of the Engineering Design Report (Appendix A of EIAR) concludes that there is negligible seepage through the base of the BRDA either in the lined or unlined phases due to the underlying depth of bauxite residue and the characteristics of the underlying estuarine soils.

11.7.26. The data contained in the EIAR and NIS including the Conceptual Site Model and further confirmatory study on marine sediment data show that metal sediment concentrations in the estuarine deposits to the north of the site are comparable to typical background concentrations in the Irish marine environment.

11.7.27. On the basis of the assessment provided based on extensive monitoring data and investigations I consider that the conclusion reached that the proposed development would have no impact on surface and groundwater to be reasonable. As noted previously the applicant is legally obliged to conform with the IE licencing requirements with the EPA the competent authority in terms of enforcement.

11.7.28. In response to LCCC's query the applicant confirmed that from the details available via groundwater monitoring, levels at the borrow pit extension range from 1.064mOD to 8.073mOD. With a depth of 8.5mOD the borrow pit will be above the water table. Thus the lowest level of excavation will retain c. 0.5 metres above the maximum groundwater level and dewatering will not be required.

11.7.29. In terms of An Taisce's and observers' submissions with respect to the Water Framework Directive (WFD) I refer the Board to my assessment in sections 10.7.16 and 10.7.17 above.

Water: Conclusion

11.7.30. I have considered all of the written submissions made in relation to water as well as the submitted application documentation. I am satisfied that any potential impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. I note that the emissions arising will continue to be limited, controlled, and monitored in accordance with the IE licence. I am therefore satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative effects in terms of water.

11.8. Air and Climate

Issues Raised

11.8.1. A number of 3rd parties have raised matters with respect to air quality and fugitive dust and impacts on human and animal health. Compliance with the Climate Action and Low Carbon Development Act, 2015, as amended, was also raised. There is an overlap with the planning assessment and section 11.4 of this EIA and I recommend that they be read in tandem. There is also criticism of the extent to which climate change has been assessed.

Environmental Impact Assessment Report

11.8.2. Chapter 11 addresses air quality with supporting details provided in Appendices 11.2 and 11.2. Details of the air dispersion modelling methodology (AERMOD) is set out. Chapter 17 addresses climatic factors.

Baseline

11.8.3. Ambient dust deposition monitoring is carried out monthly at 35 locations, 2 no. which are outside the overall AAL facility. The average dust fall levels measured at the locations were within the TA Luft limit value of 350 mg/(m^2*day) over the years 2016 to 2020. The monthly average across all sites ranged from 9 - 111

mg/(m^2*day). Overall, dust fall levels were found to be low, with the annual average across all locations reaching, at most, 32% of the TA Luft limit value.

11.8.4. Results of directional dust deposition monitoring at 4 locations within or near the AAL boundary from January 2020 to December 2020 confirmed that average dust fall levels measured at these locations were within the TA Luft limit value of 350 mg/(m^2*day) with a maximum monthly average of 232 mg/(m2 *day) at DG14 in February 2020. In terms of directional variation, it would be expected that the west facing directional results would be higher than the other three directions if the BRDA was contributing a significant fraction of the measured dust deposition levels. However, little variation was recorded between the average west results and the average overall results indicating that there is no significant contribution above background levels from the BRDA to locally deposited dust.

11.8.5. PM_{10} data is available from monitoring carried out at five stations in the vicinity of the facility which shows low levels of PM10 with annual averages ranging from 7.9 to 10.3 µg/m^3. Maximum 24-hr levels (as a 90th percentile) are also well below the ambient air quality standard peaking at 47% of the limit value. Similarly, data from $PM_{2.5}$ monitoring carried at the five stations show low levels with annual averages ranging from 5.0 to 7.4 µg/m^3 peaking at 30% of the limit value.

11.8.6. To minimise dust AAL has installed a network of automatic water sprinklers to manage the surface of the BRDA. The system uses treated BRDA run-off water with the entire BRDA surface wetted every 4 hours.

11.8.7. Bauxite residue and salt cake are not odorous.

11.8.8. For 2019, total national greenhouse gas emissions are estimated to be 59.90 million tonnes carbon dioxide equivalent (Mt CO2eq) with 45.71 MtCO2eq of emissions associated with the Effort Sharing Decision sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2019 at 35.3% of the total, with the transport sector accounting for 20.3% of emissions of CO2.

11.8.9. ***Likely Significant Effects***

The likely significant effects are considered to be as follows:

Do Nothing	The site will continue as permitted with BRDA Phases 1 and 2 to Stage 10 with no alterations to the ambient environment. The permitted borrow pit will be extracted to a depth of 8.5mOD. The requirements of the IE licence in terms of emissions would apply. No alteration in the current ambient environment and current GHG emissions from the facility
Construction/Operational Phase	Dust from activities at the borrow pit. Fugitive dust emissions from BRDA and SCDC CO_2 emissions from BRDA and SCDC operations calculated to be 1,026 tonnes. CO_2 emissions from borrow pit operations is calculated to be 117 tonnes.

11.8.10. ***Mitigation Measures***

The mitigation measures proposed are summarised in the table below:

Construction/Operational Phase	Dust minimisation plan prepared (Appendix 11.2) including measures recommended in the Institute of Air Quality Management ' Guidance on the Assessment of Dust from Demolition and Construction Version 1.1'. Extensive network of automatic water sprinklers on BRDA and use of raised residue berms to reduce wind speed thus reducing potential for dust migration off-site (Best Available Technology). Continuation of existing practices including placement of residue berms on the residue surface, residue farming, managing residue placement and water levels, inspection and water washing of plant roads.

	Ongoing tree and hedge planting and hydroseeding along BRDA perimeter. Monitoring programme for PM_{10}, $PM_{2.5}$ and dust in accordance with IE licence. Visual inspections as part of daily management programme. Proactive procedures for dealing with complaints. AAL is captured in the context of the EU-wide ETS. Best practice measures in operation and maintenance of vehicles.
Closure	In accordance with Closure, Restoration and Aftercare Management Plan.

Cumulative Effects

11.8.11. There are no nearby sources with emissions of PM_{10}/$PM_{2.5}$, dust, odour and heavy metals of sufficient magnitude to overlap with site emissions from the existing and proposed BRDA and borrow pit and thus therefore no offsite cumulative impacts are anticipated.

11.8.12. If continued operations at the Alumina Plant are approved as a result of the increased BRDA this, in turn, would result in GHG emissions arising from continued marine transportation to and from the Alumina Plant.

11.8.13. There are no nearby non-ETS sources with GHG emissions of sufficient magnitude to overlap with site emissions from the BRDA and borrow pit. Other nearby facilities under the ETS are regulated on an EU-wide basis. The geographical location of a given development within the EU is not relevant as there is only one EU-wide target which is applicable to the ETS, and thus the cumulative direct and indirect climate assessment of relevance in this context is the GHG emissions associated with the EU under the ETS.

Residual Effects

11.8.14. The proposed development will lead to indirect GHG emissions from AAL continuing up to 2039. However, the ETS market will have to meet a target of a 61% reduction by 2030 based on annual reductions of 4.2% compared to the previous annual

reduction level of 2.2% per year and thus it is likely that there will be a gradual reduction in GHG emissions from the facility under the facility's ETS Permit.

11.8.15. The overall combined operational phase GHG emissions, after mitigation, due to the direct and indirect operational phase of the proposed development will be negative, long-term and significant

Assessment: Direct and Indirect Effects

11.8.16. In view of the monitoring that has been carried out on the site as required by IE licencing, the data available on which the assessment is based (including the dispersion modelling), is site specific and provides for scientific certainty. USEPA new generation dispersion model AERMOD(10) (version 19191) was used. I consider the applicant has taken a conservative approach to its assessment and is based on the worst case scenario.

11.8.17. Predicted PM_{10} and $PM_{2.5}$ concentrations due to emissions from the BRDA plus the borrow pit and its associated traffic movements are below the ambient air quality standards at the AAL boundary and beyond the boundary. Dust deposition levels at the worst-case off-site location would be significantly lower than the limit value of 350 $mg/m^2/day$.

11.8.18. The emission of heavy metals from the BRDA was also modelled based on the assumption that the percentage of heavy metals identified in the sampling of the farmed bauxite residue in 2020 are also emitted into and dispersed by the atmosphere in the same ratio. The results indicate that based on the reported heavy metal concentration over the period, all heavy metals are in compliance with the relevant ambient annual mean air quality standard.

11.8.19. I am satisfied that the dispersion modelling is robust with a suite of mitigation measures already operational at the BRDA details which have a proven efficacy. I note that the emission limits including dust and monitoring of same are requirements of the IE licence. I am satisfied that no significant impacts are likely in relation to air quality

11.8.20. The proposed development will lead to indirect GHG emissions from the Alumina Plant continuing beyond 2030. AAL operates under the ETS under permit register no. IE-GHG038-10361-3 with an annual allocation in 2020 of 721,490 tonnes CO_{2eq} and an estimated annual emission total of 1,450,000 tonnes CO_{2eq} as stated in the

permit although 2020 actual emissions were verified as 1,224,809 tonnes CO_{2eq}. If the BRDA raise occurs it is likely that GHG will continue to be emitted in line with BAT and under the conditions of the site's IE and ETS Licences.

11.8.21. The EU ETS is governed by Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC ('the ETS Directive,'). The system works on the 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by installations covered by the system and is reduced over time so that total emissions fall. The sectors covered by the system include power and heat generation, energy-intensive industry sectors, and commercial aviation. Since the commencement of Phase 3 of the ETS (2013-2020), there is a single, EU wide cap on emissions, in place of the previous system of national caps. The ETS is, therefore, centrally controlled by the EU and Member States do not have individual targets. The current target of the EU ETS is to reduce emissions from the existing EU ETS sectors by 62% by 2030 compared to 2005 based on annual reductions of 4.3% from 2024 to 2027 and 4.4% from 2028. Maritime related emissions are regulated under Regulation (EU) 2015/757 on the monitoring, reporting and verification of greenhouse gas emissions from maritime transport. Regulation (EU) 2015/757 was amended in 2023 by Regulations 2023/957. AAL falls under the ETS and thus will need to reduce GHG emissions in line with the 2030 target.

11.8.22. In view of the stipulated reduction requirements it is likely that there will be a gradual reduction in GHG emissions from the facility under the facility's ETS Permit. Under the EU ETS, AAL will continue to be regulated and will continue to pay gradually increasing carbon cost.

11.8.23. I note the current Climate Action Plan 2024 provides the national context within which all industry has to operate, with sectoral emission ceilings detailed so as to align with the objectives to deliver the required GHS emissions abatement to meet Ireland's 2030 and 2050 climate targets.

11.8.24. I submit that to preclude the continued operation of the AAL facility beyond 2030 by a refusal of permission for the subject development would, most likely, require the identification of alternative sites for such alumina production elsewhere. In a global

context certain regions would not be subject to the same oversight, regulation and control as in the instant case. The continuing need for alumina must be accepted and in this context I note, in particular, the requirements of the renewable energy industry the expansion of which will be required to mitigate and adapt to the effects of climate change. I acknowledge the primacy of the Climate Action and Low Carbon Development Act, 2015, as amended. Having regard to the importance of alumina to the renewable energy industry I do not consider that a grant of permission in this instance would be contrary to the Board's obligations under section 15 of the Act.

11.8.25. Climate change factors have been taken into account in the construction planning and I refer the Board to Section 17.3.1 of the EIAR and Appendix G of the Engineering Design Report which assess the potential of a breach occurring as a result of climate change with specific regard had to rising sea levels and increased rainfall. The risk assessment concluded that after allowing for the potential effects of climate change the risk associated with a containment breach or bauxite reside release was either highly improbable or very unlikely depending on the scenario considered.

Conclusion: Air and Climate

11.8.26. I have considered all of the written submissions made in relation to air and climate as well as the submitted application documentation. I am satisfied that any potential impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. I note that the emissions arising will continue to be limited, controlled, and monitored in accordance with the IE licence. I am therefore satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative effects in terms of air and climate.

11.9. Material Assets

Issues Raised

11.9.1. The proximity of the gas transmission pipe and potential for the proposed works to adversely impact on same is raised by observers.

Environmental Impact Assessment Report

11.9.2. Chapter 13 addresses Material Assets – Waste Management, Chapter 14 addresses Traffic and Transport with supporting details provided in Appendix 14.1. Chapter 15 addresses site services with supporting details provided in Appendix 15.1

Baseline

11.9.3. The current activities being undertaken at the site relate to an EPA licenced waste management activity. As required by the licence a Waste Management Manual has been prepared which outlines the waste management principles applied at AAL and are intended to assist effective waste management.

11.9.4. Traffic generation associated with the AAL facility predominantly consists of employee and contractor car trips and HGV delivery trips including rock and other raw materials arising from the overall AAL facility. A traffic survey was undertaken in April 2021 when it was understood traffic levels on the N69 national secondary road were lower than those than would have been present under pre-COVID circumstances. To address this difficulty publicly available data for the year 2019 from a local TII counter on the N69 was used in determining typical traffic volumes and factored up to future year levels using TII growth factors. This factored traffic data provided the baseline from which the proposal was assessed.

11.9.5. Internal site traffic movements are also required as part of the operation of the facility. Bauxite residue is deposited within the BRDA by way of piped infrastructure and is not transported by vehicle. The main source of internal transport movements to the BRDA from the main plant area relate to the transport of process sand (from the sand separation area) to the BRDA using a dumper truck and internal HGV trips transporting salt cake material from the organic removal facility within the plant area to the BRDA also using a dumper truck. Other internal trips primarily relate to the movement of vans onsite, with the exception of a large crane which travels across the site once per week.

11.9.6. In terms of services a gas transmission pipe which feeds the Combined Heat and Power Plant (CHP) plant runs to the east and north of the permitted borrow pit. The closest distance from the proposed borrow pit extension to the transmission pipe is at the south-east corner, where the 50m minimum distance agreed with GNI is maintained. Marker posts are positioned at regular intervals above the pipe.

11.9.7. ***Likely Significant Effects***

The likely significant effects are considered to be as follows:

Do Nothing	The BRDA will continue to be used as permitted until capacity is exhausted. Borrow pit will be worked as per permission. On cessation of activity of the facility traffic movement would reduce
Construction/Operational Phase	Minor quantities of waste estimated. No significant traffic related impacts predicted. Reduction in HGVs arising from sourcing of rock material on site. Average of 12.7 HGV trips (one way) per day. Small number of seasonal workers required for borrow pit extension.

11.9.8. ***Mitigation Measures***

The mitigation measures proposed are summarised in the table below:

Construction/Operational Phase	**Waste Management** Existing AAL waste management policies and IE licence requirements. Monitoring and records kept of all waste moved from the site. **Traffic** None **Site Services** Continuing site protection measures in place for overhead lines in vicinity of stockpile area. Works on and around the gas transmission lines will be conducted in accordance with the Construction Management Plan and the GNI 'Code of Practice for Working in the

	Vicinity of the Transmission Network' as well as further consultation with appointed GNI personnel. Project specific Construction Environmental Management Plan prepared. Pre-construction consultation and authorisation will be achieved for all of the relevant infrastructure connections Any works required to material assets on or around the site to be carried out in conjunction with the relevant provider to ensure minimal disruption.
Closure	In accordance with Closure, Restoration and Aftercare Management Plan.

Cumulative Effects

11.9.9. The proposed Foynes to Limerick (including Adare Bypass) scheme will provide an alternative high-quality route to the N69 between Foynes and Askeaton to the west and east of the proposed development site respectively. This scheme has been forecast to produce a c. 78% reduction in AADT on the N69 at Ballyculhane between Foynes and Askeaton (in the vicinity of the L1234/ N69 junction) in both its year of opening (2023) and year of opening + 15 years (2038) and would have a positive cumulative effect.

Residual Effects

11.9.10. None anticipated.

Assessment: Direct and Indirect Effects

11.9.11. The permitted onsite borrow pit and its proposed extension subject of this application would result in a reduction in the number of HGV movements which will have a positive impact on the surrounding road network.

11.9.12. I consider that the proposed development would not impact on site services with the necessary protocols which are already in place to be maintained in terms of consultation(s) with the necessary operators. I note that the setback distance and Peak Particle Velocity (PPV) limits for the gas transmission pipe have been agreed with Gas Networks Ireland.

Material Assets: Conclusion

11.9.13. I have considered all of the written submissions made in relation to material assets as well as the submitted application documentation. I am satisfied that any potential impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. I note that the emissions arising will continue to be limited, controlled, and monitored in accordance with the IE licence. I am therefore satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative effects in terms of material assets.

11.10. Cultural Heritage

Issues Raised

11.10.1. DAU and Limerick City and County Council recommend implementation of mitigation measures.

Environmental Impact Assessment Report

11.10.2. Chapter 5 addresses Archaeological, Architectural and Cultural Heritage with supporting details provided in Appendices 5.1 and 5.2.

11.10.3. The assessment methodology included a combination of desk top studies using recognised data bases supported by mapping sources and aerial imagery followed by a site inspection and geophysical survey of the area of the proposed borrow pit extension. A number of statutory and voluntary bodies were consulted.

11.10.4. A small area of the site was not accessible due to dense vegetation.

Baseline

11.10.5. The site is within an existing industrial complex. There are 19 archaeological sites located within and in the immediate vicinity of the planning application site. Ten of these sites are recorded monuments and the remaining nine are listed in the SMR only and do not receive statutory protection, as they represent a record of excavation.

11.10.6. The nearest recorded monument is site ref. LI010-108 Enclosure which is immediately south of the north-eastern extent of the planning application site. See Figure 5.1

11.10.7. ***Likely Significant Effects***

11.10.8. The likely significant effects are as follows:

Do Nothing	Site would continue to be managed as part of an industrial complex. Any unknown subsurface archaeological sites would remain in situ.
Construction/Operational Phase	There is potential for impacts on unknown subsurface archaeological features. Although recorded monument ref. LI010-108 has no above surface presence the proximity of the proposal would result in a slight negative impact on its setting.

11.10.9. ***Mitigation Measures***

The mitigation measures proposed are summarised in the table below:

Construction/Operational Phase	Programme of targeted archaeological test trenching in the north-east (undisturbed part of the site). In the event of archaeological features, finds and/or deposits being encountered during the monitoring, all relevant authorities to be notified. Preservation in situ or preservation by record (excavation) may be required.
Closure	None

Cumulative Effects

11.10.10. As any archaeological remains identified within the planning application site will be subject to full preservation by record, no cumulative impacts upon the archaeological resource have been identified.

Residual Impacts

11.10.11. There will be no residual effects on the archaeological, architectural and cultural heritage resources.

Assessment

11.10.12. I am satisfied that the impacts on cultural heritage would be negligible. The footprint of the BRDA is not being altered. The recommendations of the DAU and Limerick City and County Council in terms implementation of the mitigation measures, including archaeological monitoring of the borrow pit extension, are noted and would be ensured by way of condition should approval be granted.

Cultural Heritage – Conclusion

11.10.13. I have considered all of the documentation in relation to cultural heritage. I am satisfied that any potential impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. I am therefore satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative effects in terms of cultural heritage.

11.11. Landscape

Issues Raised

11.11.1. No material issues raised.

Environmental Impact Assessment Report

11.11.2. Chapter 9 addresses landscape and visual impact with supporting detail provided in Appendices 9.1 and 9.2, in addition to a booklet of photomontages.

Baseline

11.11.3. The application site is within an existing industrial facility on the Shannon Estuary in proximity to the port facilities at Foynes to the west with both Tarbert and Moneypoint power stations, also on the estuary, further west again. Gouldings Fertiliser and Wyeth Nutritionals are to the east of the overall AAL complex. Lands in the vicinity are relatively flat and in agricultural use. The built structures of the complex are the

primary built features in the wider landscape setting whereas the red-brown colouring of the bauxite residue is locally prominent.

11.11.4. There are no areas of designated visual amenity in the vicinity with the nearest scenic route being the N69 from Foynes to the county border near Tarbert to the west and the R473 Ennis to Kilrush Road through Killadysert in County Clare on the northern side of the estuary. The nearest protected view/prospect is located along the N69 from Foynes to Glin.

11.11.5. The site is within Landscape Character Area Shannon Estuary Integrated Coastal Management Zone.

Likely Significant Effects

11.11.6. The likely significant effects are as follows:

Do Nothing	Site would continue to be managed as part of an industrial complex with no increase in BRDA. Progressive restoration will be implemented on the site slopes after which the dome and final restoration landscaping will be completed. There would be no extension to the borrow pit over that as permitted.
Construction/Operational Phase	Increase in height will make the BRDA more prominent in the landscape with continuation of the operation of the BRDA into the long term. Excavation of the borrow pit and dynamic movement and storage of excavated rock within the site.

11.11.7. ***Mitigation Measures***

The mitigation measures proposed are summarised in the table below:

Construction/Operational Phase	Progressive restoration and landscaping with completion of each group of stage raises, including provision of localised areas of landscape mounds on the completed terraces and slopes of the BRDA so as to disrupt the rhythmic and continuous appearance of the stage raises and provide adequate depth of soil for planting that will comprise grasses

	and low-level herbaceous vegetation around the edges of the mounds and leading to mixed ground cover and shrubs towards the centre of the mounds. Trees will also be planted within the central areas where the soil depth is greatest. Landscape mounds to be provided to the undeveloped stages of the permitted BRDA so as integrate both developments.
Closure	In accordance with Closure, Restoration and Aftercare Management Plan. Final restoration to include restoration of stage 11 to 16 and seeding of the dome. Hedgerows to be planted across the dome to establish a field pattern to break down the overall scale. Perimeter interceptor channel around the base of the BRDA to be lined with soil and revegetated to form a wetland that will collect surface water runoff from the spillways and lead to the storage pond and clarifier.

Cumulative Effects

11.11.8. The capacity extension at Foynes Port and the Foynes to Limerick Road scheme are considered in terms of cumulative effects. In terms of the former the extension would form part of an increasing intensification of port/industrial/infrastructural development within this landscape. Cumulative effects would be notable for areas in proximity to the development but not in the wider landscape. In terms of the road scheme cumulative effects would be limited due to the fact that road scheme passes through low-lying land where the topography and vegetation would limit views of the road upgrade to the localised area.

Residual Effects

11.11.9. On completion, visibility of the BRDA will be greater than present but in some views that of the AAL plant will be reduced. In terms of landscape context and the landscape character areas assessed the residual effects range from slight/moderate, neutral, long term to imperceptible, neutral long term. Residual effects for each

viewpoint are given. The residual effects range from slight/moderate, negative, long term at viewpoints close to the site (i.e. viewpoints 2 and 3) to slight, slight/moderate, positive long term at mid-distance viewpoints (i.e. viewpoints 18 and 19).

Assessment: Direct and Indirect Effects

11.11.10. The Board is advised that the site is within Landscape Character Area 06 - Shannon Coastal Zone (titled Shannon ICZM on Map 6.1) in the current Limerick City and County Development Plan 2022. Policy EH P8 with respect to LCAs is comparable to that of the previous plan (Policy EH P2).

11.11.11. The increase in height will make the BRDA more prominent in the landscape. However the nature of the mound geometry will result in a smaller surface area of bauxite residue being exposed within the filling of each consecutive stage with the most conspicuous characteristic of the operation (the red brown colour of the residue) reducing over time. The nature of the proposed development is dynamic due to the progression of the BRDA stages, changing volumes of stockpiling and successive planting/seeding works. The intention of the mitigation proposals is to ensure that the extents of unmitigated rock side-slopes are kept to a minimum throughout the operational phase as far as is operationally feasible.

11.11.12. I consider that the visual impact of the proposed development requires to be assessed in the context of its location within a landscape characterised by large scale industrial development including the AAL facility itself, Foynes Port to the west and Gouldings Fertiliser. and Wyeth Nutritionals to the east.

11.11.13. Photomontages from 22 no. publicly accessible locations are provided and I consider that they are representative of both near and medium distance views available from the surrounding landscape and are adequate for the purposes of assessment. Each of these locations have been assessed in terms of visual receptor sensitivity, visual impact magnitude and the significance of the visual impact for the various stages including post restoration and cumulative (see section 9.7.2).

11.11.14. Views in the short distance are largely from low lying positions and due to the vertical angle of the view and intervening screening by landform the visibility of the red bauxite residue is minimal. Views of the BRDA are in the context of the wider industrial facility. Upon completion of the BRDA and establishment of mitigation measures it will be better integrated with the surrounding landscape. I refer the

Board in particular to viewpoints 3 and 6 – 12 which are to the south and south-east of the AAL facility.

11.11.15. With greater distance the increase in the BRDA is less discernible to the eye but has the impact of assisting the screening of industrial plant in the background. See viewpoints 12 and 13

11.11.16. With distance views of the AAL facility and the bauxite residue area become more intermittent with landform and vegetation providing screening. When visible the views show a gradual increase in the height of the BRDA. Intermittent views of the AAL facility are available when travelling along N69 between Glin and Foynes with the BRDA viewed in the context of the industrial plant on the site and Foynes Port in the foreground (photomontages 17, 18)

11.11.17. Views of the facility from elevated ground to the south-west provide the most uninterrupted views of the facility. The existing facility and the BRDA area are visible in current views with the red/brown colour of the residue dominant. The vertical expansion with each stage being smaller than that previously, and the progressive landscaping will have the effect of gradually reducing the visual impact of the facility (see photomontage 19 and 19 (zoom) from Knockpatrick graveyard).

11.11.18. The increase in the BRDA will be largely indiscernible to the human eye from the northern side of the estuary due to the intervening distances. Views from the River Shannon are represented in photomontage 21 where the increase in height of the BRDA would be visible but with progressive restoration and landscaping would not limit the visual impact.

11.11.19. The borrow pit extension would not be visible/discernible in any of the views

Landscape – Conclusion

11.11.20. I have considered all of the written submissions made in relation to landscape as well as the submitted application documentation. I am satisfied that any potential impacts would be avoided, managed and mitigated by the measures which form part of the proposed scheme, the proposed mitigation measures and through suitable conditions. I am therefore satisfied that the proposed development would not have any unacceptable direct, indirect or cumulative effects in terms of landscape.

11.12. Interaction of the Foregoing

11.12.1. Chapter 18 of the EIAR addresses interaction of impacts with a matrix provided in Table 18.1. I would concur that the most dynamic interactions pertain to human beings with other interactions between biodiversity, soils, hydrology, air quality and noise and between land and soil, water and air and climate.

11.12.2. I have considered the interrelationships between factors and whether these might, as a whole, effect the environment, even though the effects may be acceptable when considered on an individual basis. In my assessment of each environmental topic, I have considered the likelihood of significant effects arising as a consequence of interrelationship between factors. Most interactions e.g. the impact of noise and air quality on the population and human health are addressed under individual topic headings. Given the generally modest impacts which are predicted to occur having regard to the nature of the proposed development, mitigation measures, or as a consequence of proposed conditions, I do not foresee any likelihood of any of these interrelationships giving rise to significant effects on the environment.

11.12.3. In conclusion, I am satisfied that there are no such effects and, therefore, nothing to prevent the approval for the development on the grounds of interaction between factors.

11.13. Major Accidents and Disasters

11.13.1. The requirements of Article 3(2) of the Directive include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned. This is addressed in chapter 16 of the EIAR. I consider that there is an overlap with the assessment of BRDA stability in section 10.3 above and recommend that the sections be read in tandem.

11.13.2. At the outset I note that the site is not a SEVESO site thus the provisions of the COMAH Regulations do not apply.

11.13.3. In accordance with the requirements of the Waste Management Regulations AAL have put in place an Accident Prevention Plan, a Safety Management System for implementing it, and an Internal Emergency Plan, which specifies the measures to be taken on site in the event of an accident. Correspondingly, and as required by

the Waste Management Regulations, the local authority, LCCC, has drawn up an External Emergency Plan specifying the measures to be taken off-site in the event of an accident relating to the BRDA.

11.13.4. As noted previously the BRDA and ancillary infrastructure have been classified in accordance with CDA Guidelines and adopt the target level criteria for design parameters (inflow design flood, seismic event and factors of safety for static, pseudo-static and post-seismic stability) which are dependent on the consequence of failure.

11.13.5. Tailings dams are classified according to the consequence in the event of failure and takes into account the incremental loss of life, environmental impact and economic impact that a failure of the dam may inflict on downstream or upstream areas, or at the dam location itself. Incremental losses are those over and above losses that might have occurred in the same natural event or condition had the facility not failed. The BRDA facility has been classified with a High Hazard Potential Classification (HPC) to account for the clean-up and restoration costs of the adjacent designated sites and for the potential for significant loss of important wildlife/fish habitat. The SWP and LWP are deemed to have a Low HPC.

11.13.6. AAL has undertaken a Dam Safety Review of the BRDA which is summarised in the EIAR. The review consisted of a 4 Stage Assessment comprising of:

Stage 1 – Establishing the context of the area including sensitive receptors and infrastructure,

Stage 2 – Identifying the potential hazards including the proposed development's vulnerability to accidents and disasters,

Stage 3 – Risk assessment which classified the risk from 'minor' to 'catastrophic',

Stage 4 – Assessment of the likelihood of the event happening.

11.13.7. For assessment purposes potential major accidents or disasters are classified as either 'natural hazards' or 'industrial hazards'. The former include seismic events, storm events, tidal surges as well as climate change impacts on these events. Industrial hazards includes incidents at the plant and fire and explosion.

11.13.8. In total 17 no. risk scenarios were identified. I refer the Board to Table 16.5 which provides a summary of the risk scenario, potential cause and effects, likelihood value and basis for same, the consequent value and basis for same. In all scenarios a score value of low (between 1 and 9) was recorded.

11.13.9. 5 no. 'Low' risk scenarios for BRDA collapse were determined to have a Very Serious consequence, fitting into the Major Emergency classification, but all have a highly improbable or negligible likelihood.

11.13.10. 2 no. 'Low' risk scenarios for the borrow pit extension (collapse of pit face) and the GNI transmission line (rupture of pipe) were determined to have a Serious consequence, fitting into the Major Emergency classification, but had a very unlikely likelihood.

11.13.11. The remaining risk scenarios for the proposed development were determined to have Minor or Limited consequence, fitting into the Normal Emergency classification, and had likelihoods ranging from unlikely to highly improbable or negligible.

11.13.12. I also have regard to the Risk Assessment and Break-Out Study for the Bauxite Residue Disposal Area (BRDA) which is attached as an appendix to the Engineering Design Report which assesses the risk of containment breach and associated bauxite residue release for the various zones within the BRDA. The failure mechanisms identified include:

- Earthquake Event - leading to slope failure or dynamic liquefaction.
- Tidal Surge or Wave Event (River Shannon) - leading to erosion induced slope failure.
- Storm Event - leading to erosion induced slope failure.
- Blast Event (Borrow Pit) - leading to static liquefaction induced slope failure or dynamic liquefaction.
- Slope Instability – as a result of either strength failure through the bauxite residue or erosion of the side-slopes.
- Static Liquefaction - of the unfarmed bauxite residue (leading to lower or overall slope failure) or farmed bauxite residue (leading to upper slope failure). Trigger events such as rate of rise, excessive strain / creep within the

bauxite residue, foundation creep or a storm event leading to erosion induced slope failure are potential mechanisms that could result in static liquefaction.

- Foundation Failure – as a result of strength failure through the foundation soils leading to overall slope failure via static liquefaction.
- Overtopping Event (Discharged Bauxite Residue) - leading to erosion induced slope failure.

11.13.13. I note the monitoring instrumentation installed on the side slopes of the BRDA which measure settlement, lateral and downslope movement and piezometric elevation. These instruments are read, interpreted and audited at frequencies in accordance with the conditions of IE Licence P0035-07 and with the Physical Stability Monitoring Plan. Existing geotechnical monitoring and design preventative measures are assessed to be sufficient for the control of major accidents and disasters related to the BRDA and SCDC. In addition the management of the construction works are to be carried out in line and in accordance with all monitoring provisions identified in the Construction and Environmental Management Plan (CEMP) the IE licence and the AAL Environmental Manual for Contractors.

11.13.14. I consider that the applicant's approach to risk assessment and consideration of major accidents and disasters is comprehensive and robust which allows for a full and proper assessment. I submit that the embedded design measures for the BRDA and the borrow pit, in addition to the detailed ongoing monitoring to be undertaken and the emergency response plans in place, will ensure that the potential for adverse impacts arising from a major accident or disaster will not arise.

11.14. Reasoned Conclusion on Significant Effects

Having regard to the examination of the environmental information contained above, and in particular to the EIAR and supplementary information provided by the applicant, and the submissions from observers and from prescribed bodies in the course of the application, it is considered that the main significant direct and indirect effects of the proposed development on the environment are as follows:

Population and Human Health

- The proposed development will extend the life of the facility for approximately 9 no. years which will have positive impacts on the local economy and employment in the area.
- Activities, including blasting associated with the extension of the borrow pit, will give rise to noise and vibration. Activities will be limited to the period between 1st April and 30th September and the number of blasts restricted to 7 no. per annum. Blast events will continue to be controlled and monitored in accordance with an Industrial Emissions Licence.
- Emissions arising from the facility will continue to be limited, controlled, and monitored in accordance with an Industrial Emissions Licence

Biodiversity

- Habitat loss for the borrow pit extension will impact on habitat of generally low ecological value with no rare or protected species recorded. Impacts will be mitigated by the management, monitoring and habitat enhancement measures proposed.
- Activities, including blasting associated with the extension of the borrow pit, will give rise to noise and vibration giving rise to disturbance to fauna and avifauna. Activities will be limited to the period between 1st April and 30th September avoiding the overwintering period for avifauna. The number of blasts will be limited to 7 no per annum. Blast events will continue to be controlled and monitored in accordance with an Industrial Emissions Licence

Air and Climate

- Emissions arising to air will continue to be limited, controlled, and monitored in accordance with an Industrial Emissions Licence.
- The development will lead direct and indirect Greenhouse Gas Emissions from the Alumina Plant continuing beyond 2030. Under the EU Emissions Trading Scheme, the applicant will continue to be regulated and will continue to pay gradually increasing carbon costs.

Landscape

- The increase in height will make the BRDA more prominent in the landscape. However the nature of the mound geometry will result in a smaller surface area of bauxite residue being exposed within the filling of each consecutive stage with the most conspicuous characteristic of the operation (the red brown colour of the residue) reducing over time. The nature of the proposed development is dynamic due to the progression of the BRDA stages, changing volumes of stockpiling and successive planting/seeding works. This impact is balanced by the nature of the landscape which is considered to be a moderated working landscape characterised by industrial development and which is robust.

In conclusion, having regard to the significant direct and indirect effects of the proposed development on the environment I am satisfied that the proposed development would not have any unacceptable, direct, indirect or cumulative effects on the environment.

12.0 Appropriate Assessment

Introduction

12.1.1. The requirements of Article 6(3) as related to appropriate assessment of a project under part XAB, sections 177U and 177V of the Planning and Development Act 2000, as amended, are considered fully in this section. The areas addressed in this section are as follows**:**

- Compliance with Article 6(3) of the EU Habitats Directive.
- Screening the need for appropriate assessment.
- The Natura Impact Statement and associated documents.
- Appropriate assessment of implications of the proposed development on the integrity of European sites.

Compliance with Article 6(3) of the EU Habitats Directive

12.1.2. The Habitats Directive deals with the conservation of natural habitats and of wild fauna and flora throughout the European Union. Article 6(3) of this Directive requires

that any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. The competent authority must be satisfied that the proposal will not adversely affect the integrity of the European site before consent can be given.

12.2. Screening the need for Appropriate Assessment

12.2.1. The requirements of Article 6(3) as related to screening the need for appropriate assessment of a project under part XAB, section 177U of the Planning and Development Act 2000, as amended, are considered fully in this section.

Background on the Application

12.2.2. The applicant has submitted a document titled 'Reports in support of the Appropriate Assessment Process' dated November 2021 prepared by Ecology Ireland Ltd. & RSK Group. The document contains a Report on Screening for Appropriate Assessment (Sections 2-5) and a Natura Impact Statement (Section 6). The report was prepared in line with current best practice guidance and provides a description of the proposed development and identifies European Sites within a possible zone of influence of the development. It has regard to ecological, geological and hydrological field surveys and investigations which informed the application and as presented in the EIAR.

12.2.3. The applicants AA Screening Report concluded that the potential for likely significant effects on 3 no. European Sites cannot be ruled out at the screening stage and that an appropriate assessment of the project is required.

Screening for Appropriate Assessment- Test of likely significant effects

The project is not directly connected with or necessary to the management of a European Site and, therefore, it needs to be determined if the development is likely to have significant effects on a European site(s).

Brief Description of the Proposed Development

12.2.4. The AAL facility comprises of an overall site area of c. 601 hectares on Aughinish Island located on the southern side of Shannon Estuary. The facility operates with an IE Licence issued by the EPA under ref. P0035-07.

12.2.5. The processing plant occupies the northern section of the site with the lands to the south-west accommodating the BRDA. There is a storm water pond (SWP) and liquid waste pond (LWP) to the north-east of the BRDA with a borrow pit roughly in the centre of the overall holding.

12.2.6. The proposed development entails the vertical expansion of the BRDA including the SCDA and extension of the borrow pit. Upgrades to the existing water management infrastructure and continued use of the existing stockpile area are also proposed. This would facilitate increased storage which would allow for the extension of the life of the AAL facility from 2030 to 2039.

12.2.7. **Submissions and Observations**

- Development Applications Unit, Department of Housing, Local Government and Heritage notes that the footprint of the BRDA is not being increased and the borrow pit is not within a designated site.
- An Taisce states that the potential impacts to water quality as a result of bauxite and salt cake disposal, particularly a failure of containment in the BRDA, must be fully addressed to ensure compliance with the Habitats and Birds Directives. The long term plan for the site should be established and assessed against Ireland's environmental legal obligations, particularly with regard to Natura 2000 sites and water quality.
- Submissions from observers raise issues including risk to water quality, potential for major accident and impacts on adjoining European Sites and impact of activities including blasting on avifauna and marine mammals.

12.2.8. The following is my summary of the information in relation to the potential impacts identified in the screening stage:

European Site	Qualifying Interests	Distance Connection
Lower River Shannon SAC (site code 002165)	Sandbanks which are slightly covered by sea water all the time [1110], Estuaries [1130], Mudflats and sandflats not covered by seawater at low tide [1140], Coastal lagoons [1150], Large shallow inlets and bays [1160]Reefs [1170], Perennial vegetation of stony banks [1220], Vegetated sea cliffs of the Atlantic and Baltic coasts [1230], Salicornia and other annuals colonising mud and sand [1310], Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330], Mediterranean salt meadows (Juncetalia maritimi) [1410], Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260], Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410], Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0], Margaritifera margaritifera (Freshwater Pearl Mussel) [1029], Petromyzon marinus (Sea Lamprey) [1095], Lampetra planeri (Brook Lamprey) [1096], Lampetra fluviatilis (River Lamprey) [1099], Salmo salar (Salmon) [1106], Tursiops truncatus (Common Bottlenose Dolphin) [1349], Lutra lutra (Otter) [1355]	0.01km Site immediately adjoining SAC Discharges may enter the aquatic environment and impact on water quality. Borrow pit activities may result in disturbance and displacement of qualifying interests.

River Shannon and River Fergus Estuaries SPA (site code 004077)	Cormorant (Phalacrocorax carbo) [A017],Whooper Swan (Cygnus cygnus) [A038],Light-bellied Brent Goose (Branta bernicla hrota) [A046], Shelduck (Tadorna tadorna) [A048],Wigeon (Anas penelope) [A050],Teal (Anas crecca) [A052], Pintail (Anas acuta) [A054], Shoveler (Anas clypeata) [A056], Scaup (Aythya marila) [A062], Ringed Plover (Charadrius hiaticula) [A137], Golden Plover (Pluvialis apricaria) [A140], Grey Plover (Pluvialis squatarola) [A141], Lapwing (Vanellus vanellus) [A142], Knot (Calidris canutus) [A143], Dunlin (Calidris alpina) [A149], Black-tailed Godwit (Limosa limosa) [A156], Bar-tailed Godwit (Limosa lapponica) [A157], Curlew (Numenius arquata) [A160], Redshank (Tringa totanus) [A162], Greenshank (Tringa nebularia) [A164], Black-headed Gull (Chroicocephalus ridibundus) [A179], Wetland and Waterbirds [A999]	0.01km Site immediately adjoining SPA Discharges may enter the aquatic environment and impact on water quality. Borrow pit activities may result in disturbance and displacement of special conservation interests.
Barrigone SAC (site code 000432)	Juniperus communis formations on heaths or calcareous grasslands [5130], Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210], Limestone pavements [8240], Euphydryas aurinia (Marsh Fritillary) [1065]	0.45km to the south/south-east of overall site. Potential connection via suitable plant food for qualifying

		interest Marsh Fritillary. Potential for fugitive dust and impacts on qualifying interests
Stack's to Mullaghareirk Mts., West Limerick Hills & Mt. Eagle Bog SPA (site code 004161)	Hen Harrier (Circus cyaneus) [A082]	6.6km to south-west of overall site. No direct or indirect hydrological link Location relative to site and lack of suitable habitat
Askeaton Fen Complex SAC (site code 002279)	Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210] Alkaline fens [7230]	8.1km to south-east of overall site. No direct or indirect loss of habitats. No hydrological link.
Curraghchase Woods SAC (site code 000174)	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] Taxus baccata woods of the British Isles [91J0]	11km to south-east of overall site. No hydrological link

	Vertigo moulinsiana (Desmoulin's Whorl Snail) [1016] Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303]	No direct or indirect loss of habitats. At a remove from mapped Desmoulin's Whorl Snail Outside 2.5km foraging range of Lesser Horseshoe Bat

Mitigation Measures

No measures designed or intended to avoid or reduce any harmful effects of the project on a European Site have been relied upon in this screening exercise.

Screening Determination

12.2.9. The proposed development was considered in light of the requirements of Section 177U of the Planning and Development Act 2000, as amended. Having carried out screening for appropriate assessment of the project, it has been concluded that the project individually (or in combination with other plans or projects) could have a significant effect on European Sites Lower River Shannon SAC (site code 002165), River Shannon and River Fergus Estuaries SPA (site code 004077) and Barrigone SAC (site code 000432) in view of the sites' conservation objectives, and appropriate assessment (and submission of a NIS) is therefore required.

12.3. Appropriate Assessment of Relevant European sites

12.3.1. The following is an objective assessment of the implications of the proposal on the relevant conservation objectives of the European sites using the best scientific knowledge in the field. All aspects of the project which could result in significant effects are assessed and mitigation measures designed to avoid or reduce any

adverse effects are examined and assessed for effectiveness. I have relied on the following guidance:

- DoEHLG (2009) Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government, National Parks and Wildlife Service.
- EC (2021) Assessment of plans and projects in relation to Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EC
- EC (2018) Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC.

Natura Impact Statement

12.3.2. The NIS prepared by Ecology Ireland Ltd. and RSK Group outlines the methodology used for assessing potential impacts on the habitats and species within the European Sites that have the potential to be affected by the proposed development. It predicts the potential impacts for these sites and their conservation objectives, it suggests mitigation measures, assesses in-combination effects with other plans and projects and it identifies any residual effects on the European sites and their conservation objectives.

12.3.3. The NIS was informed by the following studies, surveys and consultations:

- Desk top studies,
- Mapping and aerial photography,
- Previous reports prepared including Annual Environmental Reports to the EPA and Environmental Reports in relation to project and plans in the wider area.
- Details of the monitoring of emissions from the operation of the facility.
- Field surveys including habitat surveys, aquatic surveys, bird surveys and mammal surveys,
- Technical assessments relating to water quality and air,

- A Conceptual Site Model prepared to consider the potential for bioaccumulation in the marine environment as a result of the emissions from the refinery plant.

12.3.4. The report concluded that, subject to the implementation of best practice and the recommended mitigation measures, the proposed development would not result in adverse effects, alone or in-combination, on the integrity of Lower River Shannon SAC (site code 002165), River Shannon and River Fergus Estuaries SPA (site code 004077) and Barrigone SAC (site code 000432) including in respect of their qualifying features that were scoped in for appropriate assessment.

12.3.5. Having reviewed the NIS and the supporting documentation, I am satisfied that it provides adequate information in respect of the baseline conditions, clearly identifies the potential impacts, and uses best scientific information and knowledge. Mitigation measures are summarised in Section 6 of the NIS. I am satisfied that the information is sufficient to allow for appropriate assessment of the proposed development.

12.3.6. **Lower River Shannon SAC (site code 02165)**

This is a very large site stretching along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head, a distance of some 120 km. The site encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Rivers within the sub-catchments of the Feale the Mulkear are within the designated site.

Lower River Shannon SAC (site code 002165)	
Qualifying Interests and Conservation Objective Restore (**R**) Maintain (**M**)	Potential for Significant Effect Attributes and Targets: NPWS Conservation Objectives
Sandbanks which are slightly covered by sea water all the time [1110] (**M**)	**NO** – Distribution not proximate to site (see maps 3, 7, 8, 9, 10, 11, 12, 13, 14 & 15) Significant effects can be ruled out.

Large shallow inlets and bays [1160] (**M**) Reefs [1170] (**M**) Perennial vegetation of stony banks [1220] (**M**) Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] (**M**) Salicornia and other annuals colonising mud and sand [1310] (**M**) Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] (**M**) Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] (**M**) Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] (**R**) Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] (**R**)	

Estuaries [1130] (**M**) **Map 4**	**YES** – habitat covers all the tidal range of the site. Habitat area (stable/increasing); community distribution (conserve specified community types in natural condition).
Mudflats and sandflats not covered by seawater at low tide [1140] (**M**) **Map 5**	**YES** – habitat around Aughinish Island. Habitat area (stable/increasing); community distribution (conserve specified community types in natural condition).
Coastal lagoons [1150](**R**) **Map 6**	**YES** – Poulaweala & Quayfield loughs Habitat area (stable/increasing; favourable reference area including 2.5ha Quayfield and Poulaweala loughs); habitat distribution (no decline); salinity and hydrological regimes (within natural ranges); barrier (appropriate hydrological connections between lagoon and sea); water quality (chlorophyll a, MRP and DIN within natural ranges); macrophyte colonisation (to max. depth); typical plant and animal species (maintain number and extent);negative indicator species (absent or under control).
Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] (**R**) **Map 12**	**YES** – areas on Robertstown Creek Estuary Habitat area (stable/increasing); distribution (no decline); physical structure (maintain natural circulation of sediments and organic matter; creek pan structure and natural tidal regime); Vegetation structure (maintain range of coastal habitats including transitional zones, structural variation without sward; >90% of saltmarsh area vegetated; no significant expansion of common cordgrass); vegetation composition (maintain range of sub- communities with typical species)

Mediterranean salt meadows (Juncetalia maritimi) [1410] (**R**) **Map 12**	**YES** – areas on Robertstown Creek Estuary Habitat area (stable/increasing - Aughinish 2,407ha); distribution (no decline); physical structure (maintain natural circulation of sediments and organic matter; creek pan structure and natural tidal regime); Vegetation structure (maintain range of coastal habitats including transitional zones, structural variation within sward; > 90% of area outside creeks vegetated; no significant expansion of common cordgrass); vegetation composition (maintain range of sub- communities with typical species)
Petromyzon marinus (Sea Lamprey) [1095] (**R**)	**YES** – Marine and freshwater species which may occur locally Distribution (>75% of main stem length of rivers accessible from estuary); Juvenile population structure (at least 3 age/size groups present); Juvenile density in sediment (at least 1/m^2); Extent of distribution and spawning habitat (no decline); Availability of juvenile habitat (more that 50% samples sites positive).
Lampetra fluviatilis (River Lamprey) [1099] (**M**)	**YES** – Marine and freshwater species which may occur locally Distribution (access to all water courses down to 1st order stream); Juvenile population structure (at least 3 age/size groups present); Juvenile density in sediment (at least 2/m^2); Extent of distribution and spawning habitat (no decline); Availability of juvenile habitat (more that 50% samples sites positive).
Lampetra planeri (Brook Lamprey) [1096] (**M**)	**NO** – exclusively freshwater species Significant effects can be ruled out.

Salmo salar (Salmon) [1106] (**R**)	**YES** – may occur locally Distribution (100% of river channels down to 2nd order accessible from estuary); Adult spawning fish (CL for each system exceeded); Salmon fry abundance(=/> 17 fry/5 min sampling); No.& distribution of redds (no decline); water quality (at least Q4 at EPA sampled sites).
Bottle Nose Dolphin (**M**) **Map 16**	**YES** - may occur locally Access to suitable habitat (no artificial barriers to site use); habitat use (critical areas maintained in natural condition); disturbance (human activities not to adversely affect population)
Lutra lutra (Otter) [1355] (**R**) **Map 17**	**YES** – occurs on Aughinish Island Distribution (no decline); Extent of terrestrial habitat mapped and calculated as 596.8ha above high water mark & 958.9ha along river banks/ponds (no decline); Extent of marine habitat 4,461.6ha (no decline); Extent of freshwater habitat river 500.1km and lake/lagoon 125.6ha (no decline); Couching sites and holts (no decline); Fish biomass available (no decline); Barriers to connectivity (no increase).

12.3.7. **River Shannon and River Fergus Estuaries SPA (site code 004077)**

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry. The site has vast expanses of intertidal flats which contain a diverse macroinvertebrate community, e.g. Macoma-Scrobicularia-Nereis, which provides a rich food resource for the wintering birds. Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Elsewhere in the site the shoreline comprises stony or shingle beaches.

River Shannon and River Fergus Estuaries SPA (site code 004077)	
Qualifying Interests and Conservation Objective - Maintain (**M**)	Potential for Significant Effect Attributes and Targets: NPWS: Conservation Objectives
Cormorant (Phalacrocorax carbo) [A017]	**YES** Breeding population, productivity rate, breeding colonies, available prey biomass (no decline); barriers to connectivity (no increase); population trend (stable/increasing); distribution (no significant decrease in range, timing or intensity of use of areas)
Whooper Swan (Cygnus cygnus) [A038] Light-bellied Brent Goose (Branta bernicla hrota) [A046] Shelduck (Tadorna tadorna) [A048] Wigeon (Anas penelope) [A050] Teal (Anas crecca) [A052] Pintail (Anas acuta) [A054] Shoveler (Anas clypeata) [A056] Scaup (Aythya marila) [A062] Ringed Plover (Charadrius hiaticula) [A137] Golden Plover (Pluvialis apricaria) [A140]	**YES** Population trend (stable/increasing); distribution (no significant decrease in range, timing or intensity of use of areas by species).

Grey Plover (Pluvialis squatarola) [A141] Lapwing (Vanellus vanellus) [A142] Knot (Calidris canutus) [A143] Dunlin (Calidris alpina) [A149] Black-tailed Godwit (Limosa limosa) [A156] Bar-tailed Godwit (Limosa lapponica) [A157] Curlew (Numenius arquata) [A160] Redshank (Tringa totanus) [A162] Greenshank (Tringa nebularia) [A164] Black-headed Gull (Chroicocephalus ridibundus) [A179]	
Wetland and Waterbirds [A999]	**YES** Habitat area (stable and not significantly less than 32, 261ha)

12.3.8. **Barrigone SAC (site code 000432)**

The site comprises an area of dry, species-rich, calcareous grassland and patches of scrub on a gentle, north-east-facing slope. The underlying limestone outcrops occasionally, and the proximity of the site to the Shannon Estuary adds a maritime influence.

Barrigone SAC (site code 000432)	
Qualifying Interests and Conservation Objective Restore (**R**) Maintain (**M**)	Potential for Significant Effect Attributes and Targets: NPWS: Conservation Objectives
Juniperus communis formations on heaths or calcareous grasslands [5130] **(R)** Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] **(R)** Limestone pavements [8240] **(M)**	**NO** No evidence of adverse effects from emissions from AAL. NPWS threats and pressures reported as species composition change (succession) and abandonment of pastoral systems (lack of grazing) Significant effects can be ruled out
Euphydryas aurinia (Marsh Fritillary) [1065] **(M)**	**NO** Devil's Bit Scabious not recorded within site. Species has not been recorded in SAC in recent years. Significant effects can be ruled out.

Potential direct and indirect effects:

12.3.9. Taking account of the characteristics of the proposed development in terms of its location and the scale of works, the following issues are considered for examination in terms of implications for likely significant effects on European Sites:

- Indirect habitat loss or deterioration from the effects of run-off or discharge into the aquatic and intertidal environment through impacts such as increased siltation, nutrient release and/or contamination;

- Indirect habitat loss or degradation of habitats from emissions to air such as fugitive dust;
- Disturbance and displacement of key species from borrow pit activity including blasting and night time illumination.

12.3.10. The AAL facility has been subject to continuous and extensive monitoring arising from the requirements of the IE licence, the most recent iteration being P0035-07. Emission limits are set by the regulatory authority (EPA) to ensure that there is no damaging impact upon the receiving environment. I note that the most recent licence review was subject of appropriate assessment by the competent authority on which it concluded that the *activities will not adversely affect the integrity of any European Site and has decided to impose conditions for the purposes of ensuring they do not. It has determined that the activities, if managed, operated and controlled in accordance with the licence, will not have any adverse effect on the integrity of any of those sites.*[2] It was satisfied no reasonable scientific doubt remains as to the absence of adverse effects on the integrity of those European Sites.

12.3.11. There is a significant body of scientific evidence available on the operation of the existing AAL facility and the nature of the emissions arising from the diffuse and points sources therein. The monitoring regime provides for detailed information on which to assess potential impacts from the proposed development on the designated European Sites. The said information is site specific and provide for scientific certainty.

Air Quality (including dust)

12.3.12. Results of dust monitoring show 100% compliance with the TA Luft limit of 350 mg/m^2/day limit between 2014 and 2020 and the emission limit values for dust as required by the IE licence. Results of directional dust deposition monitoring at 4 locations within or near the AAL boundary showed that the BRDA does not significantly contribute to locally deposited dust levels.

12.3.13. PM_{10} data is available from monitoring carried out at five stations in the vicinity of the facility over the same period of 2014-2020 with annual averages ranging from 7.9 to 10.3 $\mu g/m^3$ which is significantly lower that the Café Directive limit of 40 $\mu g/m^3$

[2] Licence P0035-07, EPA

Similarly, $PM_{2.5}$ monitoring shows annual averages ranging from 5.0 to 7.4 µg/m^3, significantly less than the 25µg/m^3 Directive limit.

12.3.14. On the basis of the information available it can be concluded that there is no emission pathway which could have a negative impact on the nearby Natura 2000 sites.

Surface Water

12.3.15. All water from the AAL facility is discharged from the site via licenced discharge point W1-1 and is subject to control and monitoring requirements as set out in the IE licence. A maximum daily value of 30,000m^3 is permitted. Monitoring of flow, temperature, pH, BOD, suspended solids, total organic carbon, total phosphorus, soda, aluminium, oils, fats and greases, toxicity and heavy metals is required. I refer the Board to Table 6.4 which provides a summary of the review of effluent monitoring results for 2014-2020 against licence limits.

12.3.16. Surface water monitoring is carried out at 3 no. locations in the vicinity of the BRDA site in accordance with IE licence. The parameters monitored are pH, electrical conductivity and soda as well as a visual inspection. Tables 6.5a – 6.5g provide surface water monitoring results for 2014-2020.

12.3.17. The limits set out in the IE licence are being met

12.3.18. A further baseline water characterisation survey was undertaken around Aughinish Poer in 2018 and 2019 with sampling taken at various stages of the tide. The findings of the assessments showed that:

- Volatiles, phenols and BTEX were non-detectable upstream, and downstream of the jetty
- Mercury levels were all below the method limits of detection at all sampling locations (<0.03 µg/l)
- Zinc levels in 2019 were lower than the previous sampling event in 2018. The highest concentration of zinc detected was 82 µg/l on a mid-flood tide 500 m upstream of the jetty. Levels of zinc were higher than other heavy metals
- Total dissolved solids (TDS) levels were significantly higher in the 2019 sampling event than those recorded in 2018.

12.3.19. A Conceptual Site Model (CSM) (see Appendix 2) was prepared to consider whether there was potential for bioaccumulation in the marine environment as a result of emissions from the refinery plant. Such bioaccumulation could be significant, especially in relation to the effective extension of operations that the proposed development would facilitate. The CSM considered all the major priority pathways for entry of potential containment sources from the entire manufacturing site into the environment. The model considered the available scientific evidence and the fundamental source-pathway-receptor model to evaluate the potential pathways that could connect activities at the refinery plant and the immediate marine and terrestrial environments. A further confirmatory study to collect additional marine sediment data was undertaken in May 2021 (RSK 2021; Appendix B) to assess the significance of any potential releases from the refinery plant on the possible elevation of heavy metals concentrations in marine sediments in the immediate vicinity of the refinery plant. The sampling data from the study indicated that no pathways are being realised that may impact on sediment metal concentrations in the immediate marine environment and that metal sediment concentrations were around the typical background concentrations for the marine environment in Ireland

12.3.20. The CSM concludes that the potential for chemicals (heavy metals) from the refinery plant's current and future activities to impact on the health of the environment - through environmental exposure routes was assessed as very unlikely, given the comprehensive qualitative and quantitative review of evidence.

12.3.21. On the basis of the detail provided there is no evidence that heavy metals concentrations are elevated in the marine sediments, and consequently no evidence that toxic impacts would occur to the marine benthic biota. These data indicate that there is no pathway from the AAL activity producing a negative impact on the designated prey species of intertidal feeding birds and other higher fauna in the designated estuarine Natura 2000 sites.

Groundwater

12.3.22. The site is underlain by 2 no. separate aquifers, a locally important bedrock aquifer in the western portion of the site and a regionally important karstified bedrock aquifer in the eastern portion of the site where the borrow pit extension is located. The

groundwater vulnerability is classified as between ‘low’ to ‘extreme’ under the BRDA. There are 34 no. observation wells at the BRDA.

12.3.23. The groundwater monitoring results presented in the Annual Environmental Reports for 2014 to 2018 were reviewed. Average pH ranges between 6.6 to 8.2. Electrical conductivity is heavily influenced by saline intrusion. Details of levels of soda, fluoride, chloride and various heavy metals are also set out. A review of the groundwater monitoring undertaken at the site as part of licence requirements, found that pH, aluminium and conductivity are elevated in a few of the estuarine streams feeding into the River Shannon. These ESs, where levels are slightly elevated, are recovered to the plant effluent treatment system. The on-going capital investment in drains, sumps and bunds in the Plant Area will support protection of the groundwater at the site.

Noise and Vibration

12.3.24. The vehicular movement associated with the vertical extension of the BRDA would be comparable to that existing.

12.3.25. Activity in the borrow pit extension will be comparable to that carried out in the permitted borrow pit area. The noise levels and vibration including air overpressure are detailed in the IE licence. Activities at the existing borrow pit are limited to the period between 1st April and 30th September with 7 no. blasts per annum.

Light Pollution

12.3.26. Lighting requirements will not alter. A lighting study was undertaken as part of the NIS for the EPA licence review which concluded that there is no likelihood that nighttime illumination could impact on any European Site. The lighting is sparse and is cowled inwards towards the site.

Mitigation Measures

12.3.27. The IE licence sets out limits on emissions to the receiving environment, including air, water and noise limits with the AAL facility having an excellent compliance record. The applicant is committed to an annual programme of improvement and renewal including structural improvements to bunds, sumps and drains in the process area.

12.3.28. The only proposed change in emissions from the proposed development is the noise and vibration associated with the proposed borrow pit operations. The measures proposed are the same as applicable to the existing borrow pit including:

- No rock-blasting will take place during the overwintering period for birds (October to March inclusive).
- Rock blasting will only take place during daylight hours April to September inclusive
- Construction operations will take place during the hours of daylight to minimise disturbances to faunal species active in the nocturnal/crepuscular period.
- The borrow pit area will not be lit at night (with the exception of low-level switchable safety lighting). Any lighting systems present will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness.
- To allow mammals to commute across the active borrow pit site openings of 200mm will be provided in the boundary fence at intervals of 100-200m along the fenced area.
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at planned locations and double-handling of stripped soil will be avoided insofar as possible by implementation of a materials storage plan.

In-combination Effects

12.3.29. Section 5.8.1 of the NIS assesses the projects and ongoing activities occurring in the wider landscape for any in combination effects with the proposed development with a list of the projects provided in Table 5.1. Given the distances involved, the nature of the activities to be undertaken and the fact that these major projects would have been subject to appropriate assessment and, where appropriate, mitigation measures incorporated to minimise impacts on the receiving environment, it is concluded that there is not potential for significant cumulative or in combination effects.

12.3.30. I have also considered the policies and objectives outlined in the current Limerick City and County Development Plan and I consider that the range of environmental and natural heritage policy safeguards proposed in the plan are sufficient to ensure no in combination impacts with the proposal development.

Assessment

12.3.31. The overall AAL facility operates under lE Licence P0035-07 and as such the emission limits are set by the regulatory authority (EPA) to ensure that there is no damaging impact upon the receiving environment. The setting of limits and the monitoring of the emissions to ensure compliance with these levels, is therefore intrinsically mitigation of the impacts of various types of emission that the regulatory authority understands to pose a potential threat to the receiving environment. It is reasonable to conclude that in the absence of such appropriate environmental controls, monitoring and limits, that outputs and emissions arising from the proposed development site could adversely impact upon the integrity of Natura 2000 sites within the zone of influence. However, in the context of this site and its continued operation it is important to recognise that control of sources of potential emissions are already strictly controlled.

12.3.32. I also note that the AAL facility has been operation for in the region of 40 years and has developed and expanded over this time. It is not unreasonable to suggest that birds and mammals have habituated to noise and vibration with bird surveys and otter surveys demonstrating this as they continue to use the site.

12.3.33. The NIS in its assessment is required to assess the qualifying interests of the relevant European Sites. Matters arising with respect to protected plants Meadow Barley or short eared owl as referenced by Futureproof Clare CLG which are not qualifying interests are not required to be addressed in the document.

Lower River Shannon SAC

Qualifying Interests – Estuaries; Mudflats and Sandflats not covered by seawater at low tide; Coastal lagoons; Atlantic Salt Meadows Mediterranean Salt Meadows; River lamprey; Salmon

12.3.34. With respect to the submission by Futureproof Clare CLG I note that the conservation objectives for estuaries and mudflats and sandflats not covered by

seawater at low tide is to maintain their favourable conservation condition defined by their respective attributes and targets.

12.3.35. There is no evidence that the activities at, or emissions from the licensed AAL facility are negatively impacting upon the conservation objectives for the qualifying interests in the area.

12.3.36. The proposed development will not result in any alterations to the existing discharge to the Shannon estuary with the discharge limits and monitoring requirements subject to the IE licence. I also note the conclusions of the Conceptual Site Model (CSM) which concludes that the potential for chemicals (heavy metals) from the refinery plants current and future activities to impact on the health of the environment - through environmental exposure routes was assessed as very unlikely, given the comprehensive qualitative and quantitative review of evidence.

12.3.37. There is no concern of adverse impacts on the conservation objectives of the qualifying interests from the proposed development.

Qualifying Interest – Bottlenose Dolphin

12.3.38. There is no evidence that the activities at, or emissions from the licensed AAL facility are negatively impacting upon the conservation objectives of the qualifying interest in the area.

12.3.39. I note that the Shannon Estuary is a busy waterway providing access to Limerick and Foynes Ports in addition to the vessels travelling to and from the AAL facility bringing in raw materials and shipping out alumina. In addition there are smaller craft movements including those operated by tourism related enterprises. I reiterate the fact that the most recent study of bottlenose dolphin[3] concluded that the population is stable and it is not unreasonable to suggest that the species has habituated to the nature and extent of activity.

12.3.40. The comments with respect to water quality above are also relevant with regard to this qualifying interest.

[3] Bottlenose dolphin survey in the Lower River Shannon SAC 2018_report to NPWS, Department of Culture, Heritage and the Gaeltacht

12.3.41. In terms of noise and vibration from the borrow pit activities including blasting, I have regard to the Marine Mammal Risk Assessment in relation to blasting operations at the borrow pit which is provided in Appendix 6.4 of the EIAR. The assessment follows a request from the EPA during the IE licence review. It concludes that as the blasting is to occur on land and not underwater it would not pose any risk (death/injury) or disturbance to marine mammals. It is entirely reasonable to submit that the same conclusion applies to the proposed borrow pit extension. The NIS notes that the author of the said MMRA confirmed this to be the case. I note that blasting is limited to between April 1st and September 30th with approx. 7 blasts per period. Blasting has already been undertaken with the borrow pit extension resulting in a greater separation from the estuary and it is reasonable to conclude that the impacts arising would dissipate with distance. Vibration and air overpressure limits are defined in the IE licence and blasts carried out to date have been in compliance with same.

12.3.42. There is no concern of adverse impacts on the conservation objectives of the qualifying interest from the proposed development.

Qualifying Interest - Otter

12.3.43. Otter activity is largely confined to the coastal area around Aughinish Island where the existing AAL facility has been in operation for a period of in excess of 40 years. There is no evidence that the activities at, or emissions from the licensed AAL facility are negatively impacting upon the conservation objectives of the qualifying interest in the area.

12.3.44. The issues with regard to water quality and noise and vibration as detailed above are relevant.

12.3.45. Quarry activities are to be confined to daylight hours when otter is less likely to be present in the area. The quarry is to be operate between 1st April and 30th September only with 7 no. blasts per annum proposed. The extension area is further from the estuary than the current permitted area.

12.3.46. There is no concern of adverse impacts on the conservation objectives of the qualifying interest from the proposed development.

Lower River Shannon SAC - Conclusion:

12.3.47. Having regard to the nature and scale the proposed development, I am satisfied that following the implementation of the mitigation measures the proposed works would not have an adverse impact on the habitats and species in Lower River Shannon SAC. There would be no resultant adverse effects on these QI habitats with respect to their attributes and targets (incl. habitat area, habitat distribution, physical structure, vegetation structure, or vegetation composition).

12.3.48. I am satisfied that the proposed development individually or in combination with other plans or projects would not adversely affect the integrity of this European site in light of its conservation objectives (subject to the implementation of mitigation measures) and that no uncertainty remains.

River Shannon and River Fergus Estuaries SPA (site code 004077)

Special Conservation Interests: Cormorant, Whooper Swan, Light-bellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Scaup, Ringed Plover, Golden Plover, Grey Plover, lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank, Black-headed Gull, Wetland and Waterbirds.

12.3.49. There is no evidence that the activities at, or emissions from the licensed AAL facility are negatively impacting upon the conservation objectives for the special conservation interests in the area.

12.3.50. To avoid undue repetition I refer the Board to the assessment of surface water and the CRM above which are relevant for the SCIs. On the basis of the detail provided there is no evidence that heavy metals concentrations are elevated in the marine sediments, and consequently no evidence that toxic impacts would occur to the marine benthic biota. These data indicate that there is no pathway from the AAL activity producing a negative impact on the designated prey species of intertidal feeding birds and other higher fauna in the designated estuarine Natura 2000 sites.

12.3.51. There is no suitable habitat for breeding cormorant on the site.

12.3.52. Quarry activities are restricted to the period between 1st April and 30th September to avoid the overwintering period with blasting limited to 7 no. events per annum.

12.3.53. I also note that there are extensive areas of suitable habitat in the wider area including inter tidal mudflats for the special conservation interest.

12.3.54. There is no concern of adverse impacts on the conservation objectives of the qualifying interests from the proposed development

River Shannon and River Fergus Estuaries SPA - Conclusion:

12.3.55. I am satisfied that the proposed development individually or in combination with other plans or projects would not adversely affect the integrity of this European site in light of its conservation objectives (subject to the implementation of mitigation measures outlined above).

12.3.56. I am satisfied that the proposed development individually or in combination with other plans or projects would not adversely affect the integrity of this European site in light of its conservation objectives (subject to the implementation of mitigation measures) and that no uncertainty remains.

Issues Raised

12.3.57. Observers consider that the 15km radius used to screen European Sites is arbitrary and that other sites should have been screened in and subject to appropriate assessment. I consider that the screening exercise identified the sites which could potentially be affected by the proposed development. I concur with the approach that sites in the wider area that have no hydrological connection or other connection were ruled out for further evaluation. In terms of Askeaton Fen Complex SAC I note that the groundwater beneath Aughinish Island comprises a freshwater lens isolated laterally from the mainland by being laterally hydraulically isolated by Poulaweala Creek and the Robertstown River and the underlying saline groundwater. In terms of Hen Harrier which is the special conservation interest of Stack's to Mullaghareirk Mts., West Limerick Hills & Mt. Eagle Bog SPA (site code 004161) the species was not recorded in the bird surveys undertaken with no suitable habitat within the site. I consider that the screening out of the sites for further assessment was entirely appropriate.

Appropriate Assessment – Conclusion

I consider that it is reasonable to conclude on the basis of the information on the file, which I consider adequate in order to carry out a stage 2 appropriate assessment, that the proposed development, individually or in combination with other plans and projects would not adversely affect the integrity of European sites Lower River Shannon SAC (site code 002165), River Shannon and River Fergus Estuaries SPA

(site code 004077) and Barrigone SAC (site code 000432) or any other European site, in view of the sites' conservation objectives.

13.0 **Recommendation**

Having regard to the foregoing I recommend that permission under Section 37G of the Planning and Development Act, 2000, as amended, be granted for the following reasons and considerations subject to the conditions. The conditions include a standard environmental condition which requires the implementation of mitigation measures set out in the EIAR (condition 2). Additional environmental conditions are recommended where additional measures are proposed to address specific issues raised in the report (conditions 4 and 7).

14.0 **Reasons and Considerations**

In coming to its decision, the Board had regard to:

(a) the established use of the site including the Alumina Processing Plant, Bauxite Residue Disposal Area and borrow pit,

(b) the provisions and extent of the Industrial Emissions licence governing the site.

(c) the nature, scale and extent of the proposed development

(d) the national, regional and local policy support for the proposed development including:

- National Planning Framework, 2018,
- Strategic Integrated Framework for the Shannon Estuary,
- Regional Spatial and Economic Strategy for the Southern Region,
- Limerick City and County Development Plan, 2022,

(e) The documentation and drawings submitted with in the application, including the Environmental Impact Assessment Report and the Natura Impact Statement,

(f) The submission on file, including those from prescribed bodies, the local authority and observers,

(g) The report of the inspector.

Environmental Impact Assessment

The Board completed an environmental impact assessment of the

i. the nature, scale and extent of the proposed development,

ii. the Environmental Impact Assessment Report and associated documentation submitted in support of the application,

iii. the submissions made in the course of the application; and

iv. the inspector's report.

The Board considered that the Environmental Impact Assessment Report, supported by the documentation submitted by the applicant, adequately considers alternatives to the proposed development and identifies and describes adequately the direct, indirect, secondary and cumulative effects of the proposed development on the environment.

The Board agreed with the examination, set out in the inspector's report, of the information contained in the Environmental Impact Assessment Report and associated documentation submitted by the applicant and submissions made in the course of the application.

The Board considered, and agreed with the inspector's reasoned conclusions, that the main significant direct and indirect effects of the proposed development on the environment are as follows:

Population and Human Health

- The proposed development will extend the life of the facility for approximately 9 no. years which will have positive impacts on the local economy and employment in the area.
- Activities, including blasting associated with the extension of the borrow pit, will give rise to noise and vibration. Activities will be limited to the period between 1st April and 30th September and the number of blasts restricted to 7

no. per annum. Blast events will continue to be controlled and monitored in accordance with an Industrial Emissions Licence.

- Emissions arising from the facility will continue to be limited, controlled, and monitored in accordance with an Industrial Emissions Licence

Biodiversity

- Habitat loss for the borrow pit extension will impact on habitat of generally low ecological value with no rare or protected species recorded. Impacts will be mitigated by the management, monitoring and habitat enhancement measures proposed.
- Activities, including blasting associated with the extension of the borrow pit, will give rise to noise and vibration giving rise to disturbance to fauna and avifauna. Activities will be limited to the period between 1st April and 30th September avoiding the overwintering period for avifauna. The number of blasts will be limited to 7 no per annum. Blast events will continue to be controlled and monitored in accordance with an Industrial Emissions Licence

Air and Climate

- Emissions arising to air will continue to be limited, controlled, and monitored in accordance with an Industrial Emissions Licence.
- The development will lead direct and indirect Greenhouse Gas Emissions from the Alumina Plant continuing beyond 2030. Under the EU Emissions Trading Scheme, the applicant will continue to be regulated and will continue to pay gradually increasing carbon costs.

Landscape

- The increase in height will make the BRDA more prominent in the landscape. However the nature of the mound geometry will result in a smaller surface area of bauxite residue being exposed within the filling of each consecutive stage with the most conspicuous characteristic of the operation (the red brown colour of the residue) reducing over time. The nature of the proposed development is dynamic due to the progression of the BRDA stages, changing volumes of stockpiling and successive planting/seeding works. This impact is balanced by the nature of the landscape which is considered to

be a moderated working landscape characterised by industrial development and which is robust.

The Board completed an environmental impact assessment in relation to the proposed development and concluded that, subject to the implementation of the mitigation measures set out in the Environmental Impact Assessment Report, and subject to compliance with the conditions set out below, the effects on the environment of the proposed development, by itself and in combination with other development in the vicinity, would be acceptable. In doing so, the Board adopted the report and conclusions of the inspector.

Appropriate Assessment

The Board agreed with and adopted the screening assessment and conclusion carried out in the Inspector's report that Lower River Shannon SAC (site code: 002165), River Shannon and River Fergus Estuaries SPA (site code 004077) and Barrigone SAC (site code 000432) are the only European Sites in respect of which the proposed development has the potential to have a significant effect.

The Board considered the Natura Impact Statement and associated documentation submitted with the application for approval, the mitigation measures contained therein, the submissions and observations on file, and the Inspector's assessment. The Board completed an appropriate assessment of the implications of the proposed development for the affected European Sites, namely Lower River Shannon SAC (site code: 002165), River Shannon and River Fergus Estuaries SPA (site code 004077) and Barrigone SAC (site code 000432) in view of the sites' conservation objectives. The Board considered that the information before it was adequate to allow the carrying out of an appropriate assessment. In completing the appropriate assessment, the Board considered, in particular, the following:

i. the likely direct and indirect impacts arising from the proposed development both individually or in combination with other plans or projects,

ii. the mitigation measures which are included as part of the current proposal, and

iii. the conservation objectives for the European Sites.

In completing the appropriate assessment, the Board accepted and adopted the appropriate assessment carried out in the Inspector's report in respect of the potential effects of the proposed development on the integrity of the aforementioned European Sites, having regard to the site's conservation objectives.

In overall conclusion, the Board was satisfied that the proposed development, by itself or in combination with other plans or projects, would not adversely affect the integrity of the European Sites, in view of the sites' conservation objectives.

Proper Planning and Sustainable Development

It is considered that, subject to compliance with the conditions set out below, the proposed development would accord with national, regional and local planning policy, would not have significant negative effects on the environment, would not give rise to a risk of pollution, would not seriously injure the amenities of property in the vicinity, would not be detrimental to the visual or landscape amenities of the area, and would not interfere with traffic safety. The proposed development would, therefore, be in accordance with the proper planning and sustainable development of the area.

15.0 Conditions

1. The development shall be carried out and completed in accordance with the plans and particulars lodged with the application, except as may otherwise be required in order to comply with the following conditions. Where such conditions require details to be agreed with the planning authority, the developer shall agree such details in writing prior to commencement of development and the development shall be carried out and completed in accordance with the agreed particulars.

   Reason: In the interest of clarity.

2. The mitigation measures including monitoring measures contained in the submitted Environmental Impact Assessment Report (EIAR) shall be implemented

Reason: To protect the environment.

3. The mitigation measures contained in the submitted Natura Impact Assessment (NIS) shall be implemented.

   Reason: To protect the European Sites within the Shannon Estuary.

4. All mitigation measures in relation to archaeology and cultural heritage as set out in the Chapter 5 of the EIAR included in application documents shall be implemented in full. The planning authority and the National Monuments Service shall be furnished with a final archaeological report describing the results of any archaeological investigative work/ excavation required, following the completion of all archaeological work on site and any necessary post-excavation specialist analysis. All resulting and associated archaeological costs shall be borne by the developer.

   Reason: To ensure the continued preservation [either in situ or by record] of places, caves, sites, features or other objects of archaeological interest.

5. All vegetation removal shall take place outside the bird nesting period.

   Reason: In the interest of protecting biodiversity.

6. Construction and demolition waste shall be managed in accordance with a construction and demolition waste management plan, which shall be submitted to and agreed in writing with the planning authority prior to the commencement of development. This plan shall be prepared in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects" published by the Department of the Environment, Heritage and Local Government in July 2006.

   Reason: In the interest of sustainable waste development.

7. A Construction and Environmental Management Plan (CEMP) shall be submitted to an agreed in writing with the planning authority prior to the commencement of development. The CEMP shall include but not be limited to construction phase controls for dust, noise and vibration, waste management, protection of soils, groundwaters, and surface waters, site housekeeping, emergency response planning, site environmental policy, and project roles and responsibilities.

   Reason: In the interest of environmental protection and orderly development.

8. Blasting at the borrow pit shall not take place outside the period between 1st April and 30th September in any year and shall be limited to a maximum of 7 no. blasting events annually.

   Reason: In the interest of orderly development and to limit the extraction of blasting to the period specified in the application.

9. A Community Benefit Fund shall be established to support facilities and services which would benefit the community in the local area. Details of the fund including specific contribution amount and its management and operation shall be submitted for the written agreement of the planning authority prior to commencement of development.

   Reason: It is considered reasonable that the operator of the facility shall contribute towards the cost of environmental recreation or community facilities which would be of benefit to the local community.

10. The developer shall pay to the planning authority a financial contribution in respect of public infrastructure and facilities benefiting development in the area of the planning authority that is provided or intended to be provided by or on behalf of the authority in accordance with the terms of the

Development Contribution Scheme made under section 48 of the Planning and Development Act 2000, as amended. The contribution shall be paid prior to commencement of development or in such phased payments as the planning authority may facilitate and shall be subject to any applicable indexation provisions of the Scheme at the time of payment. Details of the application of the terms of the Scheme shall be agreed between the planning authority and the developer or, in default of such agreement, the matter shall be referred to An Bord Pleanála to determine the proper application of the terms of the Scheme.

Reason: It is a requirement of the Planning and Development Act 2000, as amended, that a condition requiring a contribution in accordance with the Development Contribution Scheme made under section 48 of the Act be applied to the permission.

I confirm that this report represents my professional planning assessment, judgement and opinion on the matter assigned to me and that no person has influence or sought to influence, directly or indirectly, the exercise of my professional judgement in an improper or inappropriate way.

Pauline Fitzpatrick
Senior Planning Inspector

February, 2025