Kyleakin Fish Feed Factory

Marine Harvest

Environmental Impact Assessment - Volume 2 of 4: Main Report

Chapter 3: Development Design and Alternatives

Final

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3 Development Design and Alternatives

3.1 Introduction

It is a requirement of the Town and Country Planning (Environmental Impact Assessment) (Scotland) **(Ref. 3-1)** Regulations 2011, and The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2017 (**Ref. 3-2**) to include in the Environmental Statement (ES) a description of the main reasonable alternatives considered and to provide justification for the choice of development taking into account the environmental effects. This is not a requirement to consider alternatives, but rather a requirement to indicate why a particular choice is being made in cases where alternatives have been considered.

This chapter outlines the design process for the Proposed Development, the objectives of the Proposed Development, the outcomes of the Scoping Opinion and the findings of the baseline surveys included in **Chapters 5 to 20**. It also provides an overview of the project design considerations and suitability criteria applied to the Proposed Development and the constraints based approach utilised in the finalisation of project design. The project design process is considered to be appropriate in terms of Proposed Development size and its supporting components.

The design of the Proposed Development has been progressed based on a number of key technical and environmental factors including utilising the existing Allt Anavig Quarry, the capacity to accommodate abnormal loads, minimising disruption to local road users as well as potential impacts on natural and built environment.

3.2 Development Area Selection Process

The Scottish Planning Policy (SPP) 2014 **(Ref. 3-3)** will be carefully considered against the full range of environmental, community, and cumulative impacts, and therefore the onus is on the developer to demonstrate that the site selected is suitable.

The purpose of the Proposed Development is to produce an approximate 170,000 tonnes of fish feed per year for some of Marine Harvest's farms located in the Atlantic Ocean region including those located in Scotland, Norway, Ireland and the Faroe Islands.

Marine Harvest carried out an extensive period of assessment considering sites across the west coast of Scotland for the Proposed Development. The Proposed Development, which is described in more detail in **Chapter 2: Project Description** required particular technical considerations to allow an efficient and sustainable production of fish feed. These considerations included:

- Close proximity to shore lines with accessible deep water.
- Good transport links including sea and road.
- Good access and adequate affordability to electricity and fresh water.
- Adequate land availability.
- A potential work force.
- Close proximity to other fish farms across the Atlantic Ocean Areas.
- An existing pier or the space to construct a pier.

The selection process also considered potential impacts on natural and built environment. For example potential impacts on air quality, noise and odour, hydrogeology and geology ,traffic and transport, hydrology and flooding, aquatic and terrestrial ecology, socio economic factors, cultural heritage and landscape and visual factors. Consideration also had to be given to the local development policies including the Highland wide Local Development Plan (HwLDP), and the West Highland and Islands Local Plan (WHILP). Further detail on the local development plans is outlined in **Chapter 4: Planning Policy.**

The selection process led to a short-list of highly rated sites that included Allt Anavig Quarry. The alternative sites are described in **Section 3.3 and 3.4** below. In selecting the short-list, a large number of alternative sites were assessed and rejected on the basis of desk study findings and/or physical inspection.

From the short-list, a sifting process involving more detailed work on each site was used to rank the sites. The Allt Anavig site was identified as an optimal site for the Proposed Development. In addition, the land owners responded favourably to the idea of Proposed Development.

3.3 Consideration of Alternative Sites

Schedule 4 of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 **(Ref. 3-1)** requires an Environmental Statement (ES) to include:

"An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects".

Similarly Schedule 3 of The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2017 (**Ref. 3-2**) states that an ES should include:

"*A description of the reasonable alternatives (for example in terms of the project design, technology, location, size and scale) studied by the applicant*…"

This is not a requirement to consider alternatives, but rather a requirement to indicate why a particular choice is being made in cases where alternatives have been considered.

There is an expectation from the Scottish Government as expressed in SPP 2014 **(Ref. 3-3)** that the merits of an individual proposal will be carefully considered against the full range of environmental, community, and cumulative impacts, and therefore the onus is on the Applicant to demonstrate that the site selected is suitable. Alternative sites and design layouts have however been a major part of the design evolution process. The alternative sites assessed are outlined below in **Section 3.4.**

3.4 Assessment of Various Sites

Other potential sites for the Proposed Development were assessed along with the Allt Anavig Quarry to help briefly identify which site is more suitable for the Proposed Development in terms of location, size, access arrangements and power/water supply.

3.4.1 Kishorn

Kishorn being a collective name used to refer to a group of populated settlements located next to the sea loch, Loch Kishorn in the north-west Highlands of Scotland was identified as a potential site due to the existing pier, depth, industrial location with fewer concerns regarding visual and fresh water effects.

However this option was screened out due to the uncertainty from the council about the use of the space for alternative developments. The site also had limited space for the Proposed Development, a sparse local population and the cost was considered too high in terms of the land ownership and the cost of getting grid connection. Furthermore, the road access required the use of minor roads which had the potential for congestion to local traffic.

3.4.2 Arnish- Stornoway

Arnish – Stornoway is located on the Isle of Lewis on the western Isles of Scotland. The site was considered due to its local workforce availability, existing pier, likely support from the local council and industrial location.

However, like the Kishorn site there was limited availability of land for the Proposed Development. The Arnish-Stornoway site also had a ferry access which required the use of lorry deliveries with cancellations during periods of bad weather which could lead to delays in production. In addition, there was also the potential for construction access issues for traffic and personnel volumes.

3.4.3 Irvine Bay

Irvine Bay is located on the eastern shore of the Firth of Clyde, west of Scotland. This site was considered due to the large terrestrial parcel of land available along with local workforce and likely support from the council. The site was also in an industrial location with less concerns regarding potential visual impacts and a relatively effiecent power availablity.

However, the site was considered unacceptable due to the negative issues it illustrated. The site would require an extensive amount of work to construct a berth on a tidal inlet and the tidal inlet itself would be restrctive for marine activities. The site also had limited space with access issues through the current activities of the land owner being required for a new entrance. The topography was made up of sand dunes which has negative implications on high load tall structures. The site also has an existing millennium visitor centre and a foot bridge access, the disposal of which would require demolition increasing costs of development.

3.4.4 Gairloch

Gairloch is located in the north-west Highlands of Scotland and was considered as an option for the Development due to its geographical location, sheltered coastline potential, likely support from the local council and power availability.

Gairloch was considered unviable as there was no a suitable sized land parcel, limited access and a limited workforce availability. Furthermore visual impact was considered to be potentially significant in relation to coastal views. Finally it was found there would be a large number of construction issues for traffic and personnel volumes.

3.4.5 Corpach

The last option was located at Corpach north of Fort William in the Scottish Highlands. The site was considered due to its size and land availability, good road access and as it is in an industrial area. It also had the advantages of good workforce availability, power and water availability.

Corpach was screened out due to the negative implications it would have as a site suitable for the Proposed Development. The distance from marine access to the chosen site was not practical as it did not serve the purpose of lowering traffic volumes from roads. Existing structures on site would have to be demolished and disposed of which would increase costs. The location was in close proximity to a residential area and again the construction issues for traffic and personnel volumes together with the delivery of components would have potentially too much of an impact on the environment as well as the local community.

3.4.6 Allt Anavig

The Allt Anavig site was chosen due to its close proximity to the sea which allows efficient receipt of raw material and delivery of finished product. It is also situated in an area that is catered by an existing pier which can be extended. The dam caters for the needs of the feed plant, without added utilities cost. The site was also zoned for industrial use in the Highland wide Local Development Plan, which was previously used as a quarry and therefore has a large amount of land available for the Proposed Development. The location is also close to a local workforce population. The Isle of Skye is a central location to all Marine Harvest sites in Scotland including the Blar Mhor Processing Plant and various seawater and freshwater farms, allowing feed to be delivered efficiently.

However, as identified during the site selection stage Allt Anavig also has some negative implications including dredging and visual impacts. The potential impacts will be assessed within the ES with mitigation measures incorporated as appropriate. Therefore despite the few negative implications of the site, Allt Anavig was considered the optimal site for the Proposed Development.

3.5 Design Strategy Approach

3.5.1 Allt Anavig Constraints

Constraints that have helped determine the final design of the Proposed Development were identified as part of the EIA process through desk based assessment, consultation and site surveys. These constraints, based on the relevant technical topic, are described below in sections **3.5.1.1 to 3.5.1.13**.

3.5.1.1 Hydrogeology and Geology

Constraints associated with the hydrogeology and geology of the Development Area has been determined through a review of a desk-based assessment conducted by Fairhurst (Fairhurst 2016) (**Chapter 5: Hydrogeology and Geology**) and consultation with statutory consultees. This was augmented by intrusive ground investigation works designed by Fairhurst and conducted by BAM Ritchie's. The assessment of constraints has identified contaminated land sources associated with previous land use and activities. **Figure 5.1** identifies the contaminated land within the Development Area. Previous exploitation of resources from the quarry also imposes constraints on the development; for example, where land has become unstable due to mining which restricts the areas for development.

3.5.1.2 Air Quality and Odour

Existing constraints within and outside the Development Area have been identified which have determined the final design of the Proposed Development. Sites of Special Scientific Interest (SSSIs) which are designated at a national level, Special Protection Areas (SPA), Special Areas of Conservation (SAC), designated at a European level are located within the local vicinity of the Development Area. These act as a constraint to the Proposed Development as point source emissions of acidic compounds and nitrogen-containing species from the Proposed Development could potentially affect these sensitive habitats. Unnamed ancient woodlands are also adjacent to the southern Development Area boundary which can cause a constraint to the design as it will have to give consideration to ecological receptors.

Also due to the nature of the area there are residential receptors and places of business or leisure where people may be exposed to air pollutants for short or long term averaging periods. The Development Area is generally bordered by agricultural land with a single residential receptor within 350m of the Development Area boundary. If the construction phases of the development were to produce excessive dust emissions, it is possible that significant impacts may be experienced at this property if suitable mitigation measures are not employed. Therefore the final design must give consideration to these sensitive receptors.

3.5.1.3 Noise

With regards to noise constraints the nearest residential properties are to the south-east and east. The location of the most constraining receptor is dependent on the background noise levels measured versus the predicted noise levels from the Proposed Development. The most significant noise constraints within the Development Area are the activities on the pier, followed by the noise breakout from the process room.

3.5.1.4 Traffic and Transport

Desktop assessments were undertaken to determine Traffic and Transport numbers for the Proposed Development. It has been identified that the A87 trunk road, A887 trunk road and A82 trunk road all serve the Proposed Development. The majority of the construction material and deliveries needed are expected to be transported to the site by road which poses a constraint to the existing traffic levels within the Development Area in terms of delay, accidents and safety during construction

3.5.1.5 Hydrology and Flood Risk

Pre application discussions with SEPA confirmed that an existing culvert running through the Development Area and in the location of the building foot print would either have to be avoided or diverted.

3.5.1.6 Terrestrial Ecology

In relation to terrestrial ecology, an area of ancient woodland was identified within the Development Area that has influenced design layout. Otters are present within the Development Area and their disturbance generally should be avoided. Severance of habitat (connectivity between the shore and settlement pond) and loss of otter habitat should also be avoided.

The potential pollution of watercourses during construction and operation required careful consideration in designing the Proposed Development. Furthermore potential disturbance to breeding birds and pine marten needs to be considered during the construction phase.

3.5.1.7 Coastal Processes and Aquatic Ecology

Chapter 10: Aquatic Ecology submitted as part of the original planning application has since been superseded by the following chapters which cover the marine aspects of the Proposed Development:

- Chapter 16: Navigation
- Chapter 17: Water Quality
- Chapter 18: Coastal Processes and Geomorphology
- Chapter 19: Marine Ecology
- Chapter 20: Cumulative Impacts

The constraints relevant to each technical topic, are described below in sections **3.5.1.11 to 3.5.1.14.**

3.5.1.8 Socio Economic

The brand and reputation of the Isle of Skye has become synonymous with undeveloped natural landscapes attracting tourists into the area. The rural setting of the Development Area has also been identified as a constraint for the community in terms of integration and social cohesion. An increase in the number of workers could potentially result in additional pressures on local services, such as community, education and recreation facilities.

3.5.1.9 Cultural Heritage

No historic buildings have been identified within the study area. However, three Category B Listed Buildings outside the study area have been identified. Six Historic Landscape Types (HLTs) were identified within the study area, and one Inventory Garden and Designed Landscape (Kyle House Garden; Asset 2) located outside the study area along with one undesignated archaeological site.

The setting of the Category B Listed Kyleakin Lighthouse could potentially be impacted by the presence of a construction site and plant, materials stockpiles and the movement and lighting associated with construction activity and operation.

3.5.1.10 Landscape and Visual

The Proposed Development is sited in a potentially sensitive landscape location. Design constraints were identified at an early stage, as well as opportunities for mitigation, and these have been influential in the continued design evolution of the Proposed Development.

The key landscape and visual design constraints relate to the scale and form of the Proposed Development. The scale and form of the proposed buildings and associated structures differ from other built features in the immediate area, which are generally smaller in scale and more traditional in character. The exception to this is the Skye Bridge, which is close to the Development Area and slightly higher than the air stack tower and production buildings. The waterfront buildings in Kyle of Lochalsh are similar in scale to the lower production buildings and pier structures at the site and in Kyle of Lochalsh share similar forms to the pier structures of the Proposed Development.

3.5.1.11 Navigation

The key navigation constraints relate to the safe navigation of operation vessels to and from the facility and also in transit near the BUTEC firing range.

A navigation risk assessment has been carried out to understand consider the navigational risks, the outcomes of which will influence the operation of the fish feed factory. Such measures to reduce risk would include provision of a tidal flow atlas and a Port Emergency plan.

3.5.1.12 Water Quality

It is intended that operation of the Proposed Development will abstract freshwater from the adjacent stream and use this in the production of fish feed. The process water will then be discharged into the marine environment using a long sea outfall.

Consideration of the final location of the outfall was constrained by acknowledging the proximity to the flame shell bed and also maximising dilution of the discharge.

3.5.1.13 Coastal Processes and Geomorphology

Although relatively sheltered from wave action the local environment is characterised by strong tidal flows. In the design of the pier extension consideration was given to an extension which would achieve the operational requirements for the facility but minimise the effects on the environment such as changes to coastal processes.

To maximise the side slope stability along the dredged area to the eastern side of the pier the design has adopted the reuse of excavated cobbles for protection of the slope.

3.5.1.14 Marine Ecology

A number of ecological constraints arise from the presence of sensitive features, such as designated sites, in the local area. These have influenced design considerations and construction activities, such as the modifications made to the dredging extent in late 2016 to ensure that the dredged area was >10m from the boundary of the flame shell bed.

Marine mammals such as harbour porpoise are likely to be present in the area. Given the requirement for some piling activities as far as reasonably possible the piles will be installed by vibration methods, vibro-piling generating less underwater noise than impact piling.

From site investigation borehole tests it is considered that it will not be possible to achieve full penetration to design depth of all piles by vibration techniques alone, and it is expected therefore that impact driving will be necessary to complete pile installation after vibro-installation has been carried out.

In line with good practice soft start procedures will be used during impact driving, and durations of impact driving will be minimised as far as possible by maximising installation by use of vibration equipment.

3.6 Design Evolution

The EIA and iterative design process has resulted in a design which is considered to meet the objectives of the Proposed Development and are most appropriate in context of the Development Area's constraints.

3.6.1 Design Strategy

The design strategy utilised by the Applicant will be made in accordance with, but not limited to, the current versions of the standards highlighted in Section 8 'List of European, UK and Scottish Regulations and Design Standards' **(Ref. 3-4)** and the designs shall comply with all regulatory requirements.

3.6.2 Initial Design

The initial design produced by the project team prior to a full understanding of the above mentioned constraints is shown on **Figure 3.1.**

3.6.3 First Iteration

Following feedback from the Public Information Days, scoping opinions, discussions with consultees and investigation of the Development Area's constraints a further iteration of the design layout was produced as shown in **Figure 3.2.**

This incorporates the following improvements to the design:

- A reduction in pier length for the purpose of minimising impacts on flame shell beds and on minimising visual impacts. This also reduced the length of the conveyors and pipework increasing the operational efficiency of the plant.
- Changing the pier to an L shape allowed increased flexibility for shipping access.
- A reduction in the stack height from 80m to 60m.
- Reduction of building heights and changes to their orientation to improve the visibility and particularly positioning the building as far back into the quarry as possible to increase the masking provided by the landscape surrounding it. The raw material and finished product storage space need to be optimised for efficient storage, which requires straight walls and square corners, the quarry floor is an irregular shape, where possible the slopes of the quarry will be dug into to accommodate the building, however the slopes are not stable and cannot be dug into extensively. This has resulted in some areas of space behind the storage areas.
- Avoidance of ancient woodland.
- Colour schemes were selected that reduced the visibility of the buildings.
- The development of secondary access to enable the quarry and other businesses to continue to operate without being affected by construction and operation of the feed plant. This will be the subject of a separate planning application.

3.6.4 Application Design

Following further design considerations from an operational basis and from findings of the environmental assessments, additional amendments to the design were incorporated as follows:

- A diversion of the existing culvert was included to avoid any culvert being beneath the building footprint.
- A dedicated area for the excavated material was included within the site layout, and appropriate associated drainage incorporated. The retention of the settlement pond was also incorporated into this design feature.
- Noise insulation of building has been a consistent feature of the design in order to minimise the noise emanating from the processing building, this is in place in the upper floors of the building, lower floors are constructed from concrete to absorb vibration and minimise noise.
- The location of the raw material silos and stack were moved to a position where they were behind the main processing building from the perspective of most viewpoints, so that the light colour of the galvanised exterior was hidden from view.
- Use of the existing water supply within the quarry as well as effective treatment of the water from the processing allowing re-use of the water where required.
- Construction of a long sea outfall to facilitate process discharge and maximise dilution and dispersion.
- Use of a temporary jetty during the capital dredging activity rather than pumping dredged material onshore. This will significantly reduce sediment runoff from the settlement ponds.
- Reduction of the dredging extent to ensure that the dredged boundary is >10 m from the edge of the flame shell bed.

The application design is shown on **Figure 2.1.**

3.7 Conclusions

A number of technical constraints and environmental sensitivities have been identified during the site selection and design process of the Proposed Development. These have been considered and avoided through an iterative design process as far as possible with a suite of mitigation measures being proposed, as discussed in the respective chapters of the ES.

The design of the proposed development has developed in a manner which reduces impacts on aspects of the natural and built environment wherever possible to provide a design that is most appropriate in the context of the site constraints including:

3.8 References

Ref 3-1: Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 available at: http://www.legislation.gov.uk/ssi/2011/139/contents/made

Ref 3-2: The Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2017 (2017 No. 588), Environmental Protection Licensing (Marine) Marine Management, coming into force 16th May 2017

Ref 3-3: Scottish Planning Policy (SPP) 2014 available at: http://www.gov.scot/Resource/0045/00453827.pdf

Ref 3-4: Section 8 List of European, UK and Scottish Regulations and Design Standards available at: http://www.gov.scot/resource/doc/217736/0102070.pdf