ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Iona Breakwater Project

Volume I – Non - Technical Summary

IBE1848
F02
September 2023

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
D01	Draft for client review	Various	Dr Laura McAnallen Richard Bingham	Grace Glasgow	16/01/2023
F01	Final	Various	Dr Laura McAnallen Richard Bingham	Grace Glasgow	20/03/2023
F02	Final with updated potential dredge deposit location	Various	Sara Mitchell Richard Bingham	Grace Glasgow	4/09/2023

Approval for issue

Grace Glasgow		4 September 2023

Prepared by:

RPS

Dr Laura McAnallen CSci C.WEM MCIWEM
Associate - Water Environment & Flood Risk Management

Elmwood House
74 Boucher Road, Belfast
Co. Antrim BT12 6RZ

T +44 2890 667 914
E laura.mcanallen@rpsgroup.com

Prepared for:

Argyll & Bute Council

Elsa Simoes
Infrastructure Design Manager

Argyll and Bute Council
Kilmory, Lochgilphead
PA31 8RT

T 01546 604531
E Elsa.Simoes@argyll-bute.gov.uk

Contents

1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared by RPS on behalf of Argyll & Bute Council for the proposed Iona Breakwater Project, hereafter referred to as the 'Proposed Development', for which development consent is sought.

The Proposed Development falls under paragraph 10(m) of Schedule 2 of The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) ("the 2017 MW Regulations"), and as such an Environmental Impact Assessment must be carried out in support of the Marine Licence Application.

This EIAR is a report of the effects, if any, which the Proposed Development, if carried out, would have on the environment, and includes the information specified in Annex IV of the Environmental Impact Assessment Directive and in Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations. The EIAR is the document prepared on behalf of the applicant that presents the output of the assessment conducted on behalf of the applicant, and contains information regarding:

- the Proposed Development;
- reasonable proposed alternatives;
- the baseline scenario;
- the likely significant effects of the project;
- the features and measures to avoid, prevent, reduce or offset significant adverse effects;
- any additional information specified in Annex IV of the EIA Directive and Schedule 4 the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations; as well as
- the Non-Technical Summary.

The EIAR must include the necessary information for the competent authority to reach a reasoned conclusion and should be of a sufficient quality to enable this judgement. Many of the requirements and provisions of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations aim to ensure that the EIAR is of a sufficient quality to effectively serve this purpose.

The EIAR has been prepared following an examination, analysis and evaluation of the direct and indirect significant effects of the Proposed Development in relation to the receiving environment.

2 NEED FOR THE PROJECT

Iona is a small island located to the west of the Isle of Mull. The Sound of Iona, which is orientated north-by-northeast to south-by-southwest and is open to the Atlantic Ocean particularly from the southwest, separates the Isle of Iona and the Isle of Mull. At Iona, an existing ferry terminal, comprising a pier and a steep slipway, is located within the small village of Baile Mòr. A small-scale passenger ferry operates from this location between the Iona ferry terminal and the Fionnphort ferry terminal, on the Isle of Mull.

The overall objective is to provide improved access facilities at both Fionnphort and Iona for the ferry which operates between the two villages across the Sound of Iona.

The current facilities consist of a pier for ferry operations, fishing and some commercial vessels. Berthing is also available for visiting craft. The following parties operate from the pier:

- The Iona ferry route is operated by Caledonian MacBrayne (CalMac) Ferries Ltd with the Motor Vessel (MV) Loch Buie as the assigned vessel. The MV Loch Buie is 30.2m length overall, with a beam of 10m and a draught of 1.6m. The crossing time is typically 10 minutes with the lifeline ferry service providing for passengers and occasional vehicles transported between the islands of Mull and Iona;
- Crab/fishing vessel operators;
- Leisure boat operators; and
- Private boat owners.

The Iona ferry, operated by CalMac, operates daily all year round with the total number of passengers transported to and from Iona recorded in 2009 as amounting to 232,215[1]. This figure at that time represented a 4.48% increase on the previous year's passenger numbers. Of that figure over 70% are visitors to Iona.

After traversing the Sound, the ferry holds its position at Iona using the weight of the ramp and the friction between the ramp and the slipway deck, however the slipway at Iona is currently very vulnerable to waves, particularly from the south, resulting in the ramp of the ferry rising and falling from the deck of the slipway. The instability of the ferry as a result of swells presents a risk to both ferry operators, passengers embarking and disembarking, vehicles and other slipway users.

During storm events or periods of intense wave action, the health and safety risk associated with the current berthing practice mean that the ferry is not able to operate. This means that ferry users are not able to access Iona, or in fact, may become trapped at Iona until the ferry is able to operate again. This presents issues such as lack of accommodation (visitor accommodation on Iona is limited to two hotels, a number of B&Bs, self-catering units, and a campsite), with tourists having to sleep in their vehicles[2]

[1] Sound of Iona Piers Development Framework and Master Plan (2013) – Appendix 2.1

[2] BBC News Article 2021 - https://www.bbc.co.uk/news/articles/ce9n25zeyx1o

and subsequent reputational issues, with tourists unlikely to revisit after having a poor experience. In addition, there is no shelter or indoor waiting area for ferry passengers in times of unfavourable weather conditions. This often presents difficulties where the weather is either wet or windy.

The current berthing practice also has a negative impact on service provision to residents of Iona. These problems have had a direct impact on the lives of the people who live there. A day without a ferry operating, results in essential services to the island being affected – medical, educational, refuse collection, business delivery etc.

In addition to ferry operation, the Island and the Sound bring people visiting on holiday including discernible increases in the total numbers of leisure yachts, which sail around Mull and Iona in the summer season berthing within the Sound as a safe overnight mooring. This is an opportunity for these visitors to eat locally as well as stock up on supplies.

The Proposed Development aims to address these issues by making the connection between the Isle of Mull and Iona safer, more efficient and more attractive to both ferry customers and leisure sailors. The Proposed Development is intended to make the ferry crossings more reliable and safer. It is not intended to increase the frequency of the ferry crossings and thereby no change in vessel traffic is expected as a result of the works.

3 PROJECT DESCRIPTION

The Proposed Development consists of a new rock armour breakwater and dredging. The following detailed drawings are available for reference in Volume III, Appendix 3.1:

- 00040-33-01E Iona location plan, ownership boundary and site boundary;
- 00040-33-02F Iona existing general arrangement and elevation;
- 00040-33-03F Iona proposed general arrangement and elevation;
- 00040-33-04G Iona proposed sections and typical details; and
- 00040-33-102A Proposed dredge deposit location.

The Proposed Development consists of the construction of a new rock armour breakwater (185m crest length) to the south of the existing slipway. Minor overburden dredging (2,017m^2 area, 1,225m^3 dredge volume) will be required in order to accommodate the new navigation channel requirements. Descriptions of these proposed activities are provided in the sub-sections below.

Earlier iterations of the breakwater design include for berthing piles, which were subject to some of the early baseline environmental assessments included in Volume III Appendix, which have fed into the final assessments. All piling has been removed from the final design of the Iona breakwater. The early baseline environmental assessments therefore considered a development with a greater potential environmental impact than is actually proposed. The analysis of environmental impact for the proposed development is therefore rigorous and robust for the final design at Iona. All final assessments included in Sections 6- 19 of the EIAR have considered the environmental impact of the most up to date breakwater design at Iona.

3.1 Rock Armour Breakwater

The function of the structure is primarily to provide defence from waves propagating from the prevailing southerly direction and provide protection for slipway users and ferry vessels. The breakwater will result in an overall reduction of wave heights at the structure. This will significantly reduce the risks to ferry operators and passengers and vehicles boarding and disembarking the ferry. The reduction in wave height provides a greater grip between the ferry ramp and the slipway deck.

The design details of the rock armour breakwater are listed below:

- The breakwater will be located approximately 70m south of the existing slipway in Iona.
- Crest length of circa 185m.
- 2:1 slope on outer face (non-slipway side) and 1:1.5 on the inner face (slipway side).
- The proposed maximum crest level will be 7.71m CD.

- Due to high flows through the crest during storm conditions, the crest width will be 4m.
- The base of the breakwater will be lined with a tear resistant geotextile membrane and the bedding placed on top of this layer will comprise of a 500mm deep layer of 300-1000kg graded rock.
- The core will be constructed of 1000 – 3000kg graded rock.
- The outer layer will be constructed of 3000-6000kg graded rock.
- A 3m wide and 2.5m high toe will be constructed on each face of 3000-6000kg graded rock. The toe will not be visible as it will be under a layer of sediment. Therefore, an area of sediment will need to be excavated, however this material will be replaced after construction is completed.
- At the end of the breakwater, a 5:1 batter will be constructed of 1000-3000kg of graded rock.
- The overall footprint of the breakwater is approximately 2.18ha.
- The rock armour breakwater will be constructed of clean quarried rock.
- The estimated volume of rock armour required for the proposed breakwater is 149,812 tonnes.
- It is likely that local sources of rock armour will not be suitable, however Glensanda Quarry (Aggregate Industries) in Oban has been identified as a quarry which will be capable of producing rock armour material to a grading sufficient for the application at Iona. The quarry is equipped with marine loading facilities.

3.1.1 Dredging

In order to accommodate the new navigation channel requirements, some dredging works will be required, however these will be minor in nature and comprise overburden dredging only. The approximate dredge area is 2,017m^2. The approximate dredge volume to be removed is 1,225m^3. It is proposed that this is carried out by a backhoe dredger, with the material potentially deposited at MA035 Portnahaven, the closest open dredge deposit location.

In November 2020, Argyll & Bute Council commissioned Structural Soil Limited to undertake a ground investigation at the Proposed Development site. This included three seabed sediment cores within the dredge area and six grab samples in the vicinity of the breakwater. The sediments were analysed for a suite of chemical parameters and screened against Marine Scotland Revised Action Levels (AL) 1 and 2, in order to identify any contamination which may be present. All samples within the dredge area were below the revised AL1 and AL2 Action Levels.

3.1.2 Other Technical Information relating to Proposed Development

- Design Life: The design life of the structure is 120 years in accordance with the UK National Annex to BS EN 1990:2002, Category 5.

- Transport of Material to site: Materials are expected to be transported to site by barge and installed from a barge. Transport by road will be minimal – there is no estimated impact on the road transport network.
- Duration of Works: The duration of the works at Iona is estimated to be 52 weeks.
- Dredging: It is expected that dredging work will last for a maximum of 1 week. The dredge pocket will be undertaken prior to breakwater construction.
- Maintenance: Maintenance dredging will be required after construction is complete. The frequency of maintenance dredging will be established as part of the construction contract following the construction of the breakwater. Maintenance of the breakwater will be required as rock armour will move/adjust for a period of time. Defect period is expected to be 104 weeks during which the breakwater will be monitored, and any movement recorded and reported. After this, the breakwater will be inspected as part of the ongoing seabed bathymetric surveys regime. Systematic surveying of the UK's coastal waters is administered by the Maritime and Coastal Agency (MCA) under the Civil Hydrology Programme[3].
- Services: Mains electric is known to be present well to the north of the site and the proposed works will have no interference with these services.
- Current ferry services: Given that the breakwater is proposed to be located c.70m south of the existing slipway, it is expected that current ferry operations are not likely to be disturbed during the construction phase. Dredging activities are expected to be undertaken overnight to minimise any disturbance during this time.

[3] The Civil Hydrography Programme - https://www.gov.uk/guidance/the-civil-hydrography-programme

4 ASSESSMENT OF ALTERNATIVES

Assessment of reasonable alternatives is mandatory under the EIA Directive. The process allows for adjustment to minimise environmental impact thus minimising significant effects on the environment.

Alternatives are different ways of carrying out a Project in order to meet its agreed objective(s). There are a range of alternative types that can be considered in relation to a Project. These relate to the following:

- Design;
- Technology;
- Location;
- Size; and
- Scale.

Under the '*Settlement and Spatial Strategy',* laid out in the Argyll & Bute Local Development Plan (LDP)[4], a key objective laid out for Oban, Lorn and the Isles is:

"A better connected and accessible place with improved ferry services, road, rail and active travel links…"

Further to this under '*Key Policy Theme: Improving our Connectivity and Infrastructure Together'* Argyll & Bute Council list the enhancement of key ports and harbours as a key issue for the LDP in terms of connectivity. It is also highlighted that the continual improvement of strategic links (including lifeline ferry services) is a key aim of the LDP up to 2024. This highlights the important foundation the LDP provides to port and harbour development and highlights how the Proposed Development can directly contribute to achieving the objectives of the LDP.

The Sound of Iona Piers Development Framework and Master Plan (2013) aimed to contribute to the wider regeneration and revitalisation of the settlements on either side of the sound of Iona. The purpose of this Framework and Master Plan was to identify a range of proposals that have the ability to, at least, attract funding and be deliverable in a realistic timeframe to meet the Plan's overall objectives. The plan laid out a number of structural and non-structural options that may be explored and developed for the regeneration of the Sound of Iona. The Framework and Master Plan was intended to inform thinking and priorities at a strategic level rather than offering detailed analysis on individual development options. However, one option which was brought forward, was the construction of a breakwater at Iona. The requirement considered a rock boulder breakwater, in order to permit tidal flows through the body of the breakwater whilst absorbing the energy of waves impacting the breakwater. The Proposed development

[4] Argyll & Bute Local Development Plan - https://www.argyll-bute.gov.uk/ldp

therefore aims to help achieve the objectives of the Framework and Master Plan by developing the structural options outlined in the report.

Strategic level studies have indicated that a breakwater developed at Iona would help to achieve a number of strategic level objectives for the area. As such, project level assessments were undertaken to determine the feasibility of breakwater installation. Various options were assessed, including breakwater alternatives, such as the addition of a new pier attached to the existing slipway or at a location south of the existing slipway. However, these were not feasible/ practical and therefore a rubble mound breakwater was brought forward for feasibility studies.

In a 2019 Feasibility Study undertaken by Byrne Looby (Byrne Looby, 2019), it was identified that the existing marine infrastructure between Fionnphort and Iona is in urgent need of investment. The primary investment required is the installation of coastal protection structures in order to reduce wave heights and reduce safety risks to passengers and operators. Five different options, as well as construction methodologies, were explored with regard to the Iona Breakwater Project. These options were:

- Option 1A – Rock armour breakwater development 70m south of the slipway at Iona with an overall crest length of 140m
- Option 1B – Rock armour breakwater development 70m south of the slipway at Iona with an overall crest length of 177m
- Option 2A – Rock armour breakwater development 210m south of the slipway at Iona with an overall crest length of 140m
- Option 2B – Rock armour breakwater development 210m south of the slipway at Iona with an overall crest length of 235m
- Option 3 – Same as option 2B, but with an additional rock armour breakwater 170m from the slipway at Iona with an overall crest length of 118m

Byrne Looby identified Option 1B as the preferred option, and this layout was generally accepted by the stakeholders, provides a good degree of protection to the slipway and is a medium cost solution. This option was then taken forward by Argyll & Bute Council. As such, in 2020, Argyll and Bute Council commissioned JBA Consulting to undertake a morphodynamic modelling assessment to investigate the impact of the proposed new breakwater on sedimentation at Iona and to assess how this would impact the morphodynamics in the Sound of Iona and determine areas where significant sedimentation or erosion would occur.

In 2021, Argyll & Bute Council appointed RPS to undertake an expert review of all works carried out to date. This included the requirement for more detailed information relating to crest levels and overtopping, toe design and the interaction with tidal, flow or sediment transport regimes within the Sound. As such, Argyll & Bute Council, aided by RPS have refined the preferred option on the basis of findings from coastal process hydrodynamic modelling. In particular, detailed Computation Fluid Dynamic (CFD) breakwater overtopping modelling was undertaken to refine the breakwater cross

section and crest levels to reduce the height of the breakwater, to reduce the visual impact of the proposed structure yet ensuring that it remains effective.

5 PROJECT SCOPING AND CONSULTATION

Consultation with statutory and non-statutory bodies has been undertaken from project inception by Argyll & Bute Council in order to ensure the considerations of local stakeholders and community groups are taken on board throughout the design process.

An EIA Scoping Report, developed by RPS, was submitted to Marine Scotland Licensing Operations Team (MSLOT) in August 2021, accompanying a request for a Scoping Opinion. A subsequent EIA Scoping Opinion was received from MSLOT in May 2022. The Scoping Opinion was adopted by the Scottish Ministers, under regulation 14 of the EIA Regulations and forms the basis of the EIAR.

Through the scoping process, the issues which were likely to be important during the environmental impact assessment were identified. The scoping process identified the sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors, which are likely to be affected, and defined the appropriate level of detail for the information to be provided in the EIAR.

The following potential issues were initially proposed to be scoped out:

- Land, Soils, Geology and Hydrogeology;
- Air Quality;
- Material Assets;
- Traffic and Transportation; and
- Waste.

Following the receipt of the feedback included within the Marine Scotland Scoping Opinion, RPS shared the Scoping Opinion with each of the chapter lead authors to ensure that all feedback was incorporated into the EIAR and that all relevant guidance and legislation was adhered to. The main changes to the structure of the EIAR were:

- The scoping in of a Greenhouse Gas Assessment chapter and a Waste chapter;
- The development of a standalone Ornithology chapter; and
- The inclusion of a separate Risk of Major Accidents & Disasters chapter (in addition to Navigation & Safety).

6 NAVIGATION & SAFETY

This chapter of the EIAR describes the likely significant impacts to Navigation from both the construction and the operation of the proposed breakwater and capital dredging in Iona, plus the wider effects of vessel traffic transiting to locations outside of the immediate area of study.

The result of this assessment is based on the assumption that the proposed breakwater and capital dredging in Iona will not lead to any substantial increase in vessel traffic. The breakwater will be located outside an established Statutory Harbour Authority (SHA) and therefore the competent authority with respect to navigational safety is the Maritime and Coastguard Agency (MCA).

In order to assess the impact of the Proposed Development on navigation and shipping within the study area (and the routes that work vessels take), a full Navigational Risk Assessment (NRA) was conducted. The study area for the assessment comprised the marine works within the Sound of Iona, plus the route the dredger and disposal craft will take between the dredge site at Iona and the proposed disposal site. In addition to this, consultation with marine stakeholders took place in the form of a Hazard Identification Workshop on the 9th September 2021 to help inform the assessment further.

Based on the existing understanding of the scale of the marine works, together with the navigational baseline and stakeholder comments from the Scoping Opinion, the potential effects during the construction phase that are considered to be potentially relevant and require further assessment are listed below:

- Ferry or tour boat allision with marine works;
- Dredger flooding whilst engaged in operations;
- Dredge/construction plant impact with marine works during construction phase;
- Recreational or fishing vessel allision with marine works;
- Dredge/construction plant collision with recreational/fishing vessel;
- Tug and tow collision with recreational/fishing vessel;
- Tug and tow collision with ferry/tour boat;
- Accidental spill during marine works;
- Heavy lift failure, or failure of lifting gear; and
- Small non-powered craft displaced by marine works.

Based on the existing understanding of the scale of the marine works, together with the navigational baseline and stakeholder comments from the Scoping Opinion, the potential effects during the operational phase that are considered to be potentially relevant and require further assessment are listed below:

- Ferry or tour boat allision with the breakwater; and

- Small non-powered craft displaced by the breakwater.

The following mitigation measures were identified to ensure marine safety at Iona:

- Marine liaison officer;
- AIS coverage;
- Notices to mariners;
- Availability of pollution response equipment;
- Weather forecasting;
- Operational weather limits;
- Promulgation of information;
- Aids to navigation (provision and maintenance of);
- Safety boat;
- Passage planning;
- Operational planning;
- Review of available powers;
- Update Admiralty List of Radio Signals (ALRS) volume 6, and Sailing Directions;
- Shore side facility maintenance programme;
- Communications; and
- Safety – Lighting.

A further three additional mitigation measures were listed in risk assessments that were not brought forward as having a 'Significant' or higher current risk.

- Hydrographic surveying program;
- Loading/unloading plan; and
- Operation planning.

Following the implementation of mitigation measures and incorporation of the controls into operating procedures, the residual effects are likely to be reduced to minor adverse, which is concluded to be as low as reasonably practicable (ALARP) as applied within the context of the Port Marine Safety Code (PMSC).

There is no potential for cumulative impacts on navigational safety during the operational phase due to the implementation of adequate risk controls that are needed to ensure marine safety. There will be no significant cumulative impacts during the construction phase.

7 TERRESTRIAL BIODIVERSITY

This chapter considers the likely significant effects on terrestrial ecological receptors associated with the construction, operation and decommissioning of the Proposed Development. The effects associated with the construction phase of the Proposed Development on terrestrial ecological receptors can be considered representative of reasonable worst-case decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

Terrestrial biodiversity surveys were designed to assess the presence and use by Protected and Notable species of the intertidal and near shore coastal habitats within the Iona Breakwater development zone. The surveys focussed particularly on the qualifying species of coastal/ marine designated sites of nature conservation interest associated with the Sound of Iona and wider area within the Seas of the Hebrides.

The study area for the purpose of the assessment comprises a set of buffers from the Proposed Development site that are of varying distance, depending on the nature of the potential receptor. These include:

- Sites designated for terrestrial biological features within 5km;
- Special Areas of Conservation (SACs) designated for otters within 20km;
- Records of Notable and Protected Species within 2km;
- Preliminary Ecological Appraisal (PEA) within 100m;
- Phase 1 Habitat survey within 100m; and
- Species survey of Otter within 200m.

Those designated sites identified by the desk study relating to non-avian ecological receptors comprise eight Local Nature Conservation Sites (LNCS). Given the distance and lack of connectivity from the Proposed Development to the LNCSs it is considered that there will be no impacts on them due to the works and as such they are not considered further in this chapter.

There were no SAC's designated for Otters within 20km of the Proposed Development site.

The Notable and Protected Species that have been recorded within 2km of the Proposed Development site included the Eurasian otter, west European hedgehog and common lizard. Of the species recorded, none were identified within the Proposed Development site boundary.

During the Preliminary Ecological Appraisal (PEA) survey undertaken on 16th of June 2021, two trees were found within the survey area, neither of which had potential bat roost features. The buildings in Baile Mòr village within the survey buffer could offer moderate potential for roosting bat species utilising the area. Therefore, the site has been assessed as having negligible potential for foraging, commuting and roosting bat species, with the terrestrial habitats to the west offering moderate potential for roosting bats and low potential for foraging and commuting.

The Proposed Development site offers no suitable habitat for reptiles. The survey buffer to the west has been assessed as having the potential to support common lizard (*Zootoca vivipara*) and slow worms (*Anguis fragilis*). This is due to the presence of semi-improved neutral grassland and an area of coastal grassland. The desk study only identified the presence of common lizards in Iona.

During the otter survey undertaken on 16th June 2021, no field signs of otter were recorded. In addition, there is limited connectivity within the survey area from the coastal habitats to inland freshwater foraging habitats. Due to the high levels of disturbance associated with the presence of a ferry terminal and the local village it is unlikely that the habitats in the survey area are used as refugia by otters.

A Phase 1 Habitat Survey was undertaken within 100m of the Proposed Development site. The Proposed Development is located offshore and as such the terrestrial habitats recorded were limited to an area of boulders/ rocks above high tide. The coastal habitats in the western site buffer are a mixture of coastal rock/sand habitats and grassland habitats (coastal/ semi-improved/ amenity). A number of buildings associated with the ferry terminal and the local village were also located in the survey area. The majority of the survey area was occupied by open sea.

Given the above information, the following non-avian Important Ecological Features (IEFs) have therefore been identified for the main Proposed Development site and are considered further in the assessment:

- Habitats; and
- Otters.

The following potentially significant impacts have been identified for the works associated with the construction phase of the Proposed Development:

- Temporary disturbance/ loss of habitat arising from activities within the terrestrial area of the Temporary Work Area (namely the establishment of a work compound and storage of rock);
- Temporary disturbance/loss of habitat due to airborne noise and visual disturbance from construction activities;
- Permanent loss of habitat arising from reclamation of seabed during the construction of a new rock armour breakwater to the south of the existing slipway; and
- Temporary effects on prey species due to underwater noise arising from construction activities (notably dredging and vessel noise), increased suspended sediment concentrations and sediment deposition.

The following potential impacts have been identified during the operational phase of the Proposed Development:

- Long term increase in disturbance to habitat arising from increased levels of marine activity due to improved ferry services;

- Long term increase in disturbance of habitat due to airborne noise and visual disturbance associated with the increase in terrestrial activity; and
- Long term effects on prey species due to noise arising from vessels and potential for pollution events linked with increased levels of marine activity.

The only impact predicted to have a minor (though not significant) effect relates to injury to otters during construction. The following mitigation describes methods that will reduce the risk for otters:

- Production of an Otter Species Protection Plan and adherence to all recommendations made within;
- Production of a Construction and Environmental Management Plan (CEMP). This will be produced by the principal contractor on award of the works; and
- An Ecological Clerk of Works (ECoW) will be appointed to monitor the works in respect to otter activity.

No additional mitigation measures are required for the operational phase of the Proposed Development. The Environmental Management Plan (EMP) will manage the risks from all operational activities, facilities and cargo handled by the port and will include best practice measures to control pollution following standard guidelines.

It is expected that cumulative impacts between the Proposed Development and other projects in the vicinity will be negligible or non-existent.

Furthermore, residual impacts on habitats and otters after mitigation measures have been implemented would be of minor magnitude and negligible significance.

In addition to the above, a Habitats Regulation Appraisal (HRA) has been undertaken to determine the potential for the Proposed Development to have a Likely Significant Effects (LSE) on designated sites in the UK national network of sites (‘European sites’). The initial screening process (Stage 1: Screening) did not identify any sites designated for terrestrial biodiversity to be taken forward for determination of LSE via a Stage 2 Appropriate Assessment.

8 MARINE BIODIVERSITY

This chapter of the EIAR presents the existing environmental baseline established from desk studies, site specific surveys and consultation as well as the likely significant effects on marine ecological receptors. The chapter also aims to identify assumptions and limitations encountered in compiling the environmental information. Finally, the chapter identifies any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the likely significant effects identified.

The Marine Biodiversity Study Area includes the Proposed Development boundary. The area has been defined to encompass the maximum spatial extents of likely significant effects on identified receptors, based on professional judgement. To consider all receptors that may have connectivity with the Proposed Development and its local surroundings, ecological information was sought from the wider region and included an area of approximately 100 km radius from the Proposed Development.

The following designated sites fall within the 100km radius of the Proposed Development:

- Sea of the Hebrides MPA;
- Inner Hebrides and the Minches SAC;
- Tresnish Isles SAC;
- Loch Sunart to the Sound of Jura MPA;
- Eileanan agus Sgeiran Lios mor SAC;
- South-East Islay Skerries SAC; and
- Sound of Barra SAC.

A number of benthic Important Ecological Features (IEFs) were identified within the Marine Biodiversity Study Area. These include:

- Littoral rock;
- Littoral sediment;
- Infralittoral rock, and
- Sublittoral sediment.

The following IEFs for fish and shellfish ecology were identified within the Marine Biodiversity Study Area:

- Demersal fish;
- Benthopelagic and pelagic fish;
- Migratory fish;
- Elasmobranchs;
- Shellfish assemblage; and

- Spawning / Nursey grounds.

The following IEFs for marine mammals were identified within the Marine Biodiversity Study Area:

- Harbour porpoise;
- Minke whale;
- Bottlenose dolphin;
- Common dolphin;
- Killer whale;
- White-beaked dolphin;
- Harbour seal; and
- Grey seal.

A number of site-specific surveys were also undertaken, including:

- Seabed sediment analysis;
- Benthic intertidal survey; and
- Benthic subtidal survey.

The unmanned aerial vehicle (UAV) and intertidal walkover were undertaken at Iona during low tide periods between 22 August 2021 and 24 August 2021. A total of 86 quadrat samples/target notes and 385 UAV images were collected.

No Priority Marine Features (PMFs) were recorded during the intertidal survey at Iona. There were no observations of seagrass '*Zostera marina/angustifolia'* or seagrass '*Zostera marina/angustifolia'* beds, invasive non-native species (INNS), or maerl (dead or alive) made within the intertidal area. Kelp was observed/noted at two locations in the northern portion of the Iona survey area; however, these observations alone did not provide enough evidence to confidently define boundaries and extent of features potentially representative of kelp bed habitats.

The subtidal survey took place at Iona between 20th August 2021 to 23rd August 2021 and involved the completion of 21 drop down camera (DDC) stations, 28 DDC transects and the collection of 20 grab samples. DDC sampling resulted in the collection of 1,033 still images supporting the classification of biotopes.

The prevailing sediment type within the Iona survey area was found to be sand, with 80% of stations dominated by Slightly Gravelly Sand ((g)S) representing EUNIS BSH A5.2 (Sand and Muddy Sand) and 20% as Gravelly Sand (gS) representing EUNIS BSH A5.1 (coarse sediment). Sand (0.63 mm to 2 mm) was the main sediment fraction present at all stations with content varying between 75.8% to 99.6%. Mud content was low with a maximum of 1.6%.

The Priority Marine feature (PMF) seagrass '*Zostera marina/angustifolia'* beds (A5.5331) was recorded during the subtidal survey. Seagrass '*Zostera marina/angustifolia'* beds with at least 5% coverage were

identified across 23% of all DDC stations and 25% of DDC transects. Areas of dense seagrass '*Zostera marina/angustifolia'* coverage (76-100% coverage) were mostly observed in the near-shore areas across 9.5% and 17.8% of all DDC stations and transects, respectively. In total, seagrass '*Zostera marina/angustifolia'* habitats (A5.5331) covered 5.1% of the surveyed area (circa 9422 m^2) and were confined to the shallow subtidal zone towards the southern extent of the survey area, perpendicular to the shoreline and almost exclusively present in areas of kelp habitat (A5.52). Aerial imagery results suggest that the seagrass '*Zostera marina/angustifolia'* beds observed are very likely to extend along the coast beyond the areas mapped and potentially along much of the shallow subtidal areas of the Sound of Iona.

Other PMFs, 'Kelp and seaweed communities on sublittoral sediment' (A5.52) and 'Kelp beds' (A3.125) were recorded, encompassing 31.4% and 0.001% of the surveyed area, respectively. No live maerl was identified, however dead maerl was observed across 14% and 21% of all DDC stations and transects, respectively.

The potential impact on the above receptors was assessed and the significance of this impact determined during both the construction and operational phases of the Proposed Development.

With regard to the construction phase:

- The assessment determined that all effects regarding the temporary disturbance/ loss of habitat arising from the displacement/compaction of the seabed by anchors and jack-up barge spud legs, were either negligible or minor, which is not significant in EIA terms.
- The assessment determined that the majority of effects regarding the permanent loss of habitat arising from the placement of material on the seabed for the breakwater, were all minor with the exception of moderate impacts, which are significant in EIA terms on the Seagrass '*Zostera marina/angustifolia'* PMF. Permanent habitat loss arising from the placement of material on the seabed for the breakwater is likely to have a significant effect on the seagrass '*Zostera marina/angustifolia'* PMF found within the breakwater footprint. As the receptor is being directly affected due to the placement of rock armour, there will be no possibility of being able to mitigate for this loss.
- The assessment determined that all effects regarding the effects of underwater noise arising from construction activities, were found to be negligible.
- The assessment determined that the potential for disturbance and collision risk to marine mammals from increased vessel traffic during construction should be scoped out of the assessment as there will be no significant increase in vessel traffic outside of the normal working ferry traffic movements during the construction of the Proposed Development.

With regard to the operational phase:

- The assessment determined that all effects regarding the permanent habitat creation arising from the placement of material on the seabed for the breakwater were considered to be minor (positive).

- The assessment determined that changes in the hydrodynamic regime due to the presence of the breakwater have the potential to alter/change the hydrodynamic regime of an area, which may result in benthic ecology receptors being directly affected, by leading to increases or decreases in sediment disposition, currents and/or water flow. This was assessed fully within the Coastal Processes Chapter.

Given the above outputs of assessment, the assessment of Likely Significant Effects has deemed the effect of 'Permanent habitat loss arising from the placement of material on the seabed for the breakwater' on '*Zostera marina/angustifolia'* beds on lower shore or infralittoral clean or muddy sand' (A5.5331) to be moderate, which is significant in EIA terms.

As such, a 'Seagrass Compensation and Monitoring Plan' has been proposed. An assessment has already been undertaken in the form of the intertidal and subtidal survey, with the extent of biotopes derived. This data will be used to inform the 'Seagrass Compensation and Monitoring Plan'. However, the approach will be agreed upon with Marine Scotland, its advisors, and in consultation with seagrass restoration projects, with reference to documents such as Seagrass restoration in Scotland - handbook and guidance (Kent et al., 2021) and the Seagrass Restoration Handbook (Gamble et al., 2021).

In addition to the above, a HRA has been undertaken to determine the potential for the Proposed Development to have a LSE on designated sites in the UK national network of sites ('European sites'). The potential for LSE could not be excluded at the screening stage for three European sites (Inner Hebrides and Minches SAC; Treshnish Isles SAC; and Eileanan agus Sgeiran Lios mor SAC.), without further evaluation, or the application of mitigation measures intended to reduce effects of the Proposed Development on the European sites concerned.

A subsequent assessment to inform a Stage 2 Appropriate Assessment of the implications of the Proposed Development on European sites allowed the introduction of measures intended to avoid or reduce the potential adverse effects of the Proposed Development on European sites. These measures ensure that the Proposed Development will not undermine the conservation objectives of the sites concerned, and as such will not adversely affect the integrity of any European site.

9 ORNITHOLOGY

This chapter considers the likely significant effects on ornithological receptors associated with the construction, operation and decommissioning of the Proposed Development. The effects associated with the construction phase of the Proposed Development on ornithological receptors can be considered representative of reasonable worst-case decommissioning effects, therefore a separate assessment of the decommissioning phase has not been undertaken as part of this assessment.

This study details the results of the near shore coastal surveys undertaken to inform the assessment of the Proposed Development, which is described in Chapter 3: Project Description.

The surveys were designed to assess the presence and use by protected and notable bird species of the intertidal and near shore coastal habitats within the Iona Breakwater development zone. The surveys focussed particularly on the qualifying species of coastal/marine designated sites of nature conservation interest associated with the Sound of Iona and wider area within the Seas of the Hebrides.

Given the coastal location of the Proposed Development, consideration was given to screening protected areas within foraging ranges of seabirds, using seabird ranging distances from Woodward *et al.,* (2019). Given that the Proposed Development is so small as a proportion of these foraging ranges, has such a small zone of influence (ZoI) (including habitat footprint), and impacts being largely temporary (during construction), and there being so few individuals recorded within the survey area, the screening process completed concluded the more distant sites designated for their ornithological features (Special Protection Areas (SPAs)) could be excluded from the assessment. Although within the Woodward *et al.,* (2019) foraging ranges of certain species (e.g., kittiwake and gannet) from these SPAs, the risk of any likely significant effects from the Proposed Development to these birds were concluded to be *de minimus* and therefore have not been considered further. SPAs within 30km were given further consideration however, as a precaution.

The study area for the purpose of the assessment comprised a set of buffers from the Proposed Development site that were of varying distance, depending on the nature of the potential receptor. These include:

- International designated sites within 30km of the site boundary designated for ornithological features (e.g., SPAs/ Ramsar sites);
- Sites designated for all other ornithological features with 5km, where there may exist ecological connectivity between the Site and qualifying bird populations (e.g., Sites of Special Scientific Interest (SSSI), Local Nature Reserves (LNR) and Sites of Importance for Nature Conservation (SINCs);
- Records of notable and protected species within 2km; and
- Monthly Through the Tide Counts (TTTC) for intertidal and nearshore birds within 500m.

The desk study identified the following three international sites with seabirds or migratory waterbirds as qualifying interest features within 30km of the Proposed Development. These sites are:

- Treshnish Isles SPA;
- Coll and Tiree SPA; and
- North Colonsay and Western Cliffs SPA.

A fourth SPA, Cnuic agus Cladach Mhuile, was located within the 30km search radius, designated for its breeding population of golden eagles.

No other statutory designated sites (e.g., SSSIs) located within a 5km search radius of the Proposed Development.

A total of 16 bird species were recorded during the surveys undertaken between April and August 2021, of which two were qualifying species for SPAs within 30km: black-legged kittiwake and great northern diver.

All other species recorded in the survey area were typically coastal birds which included gulls, other seabirds (e.g., shags, cormorant and Manx shearwater) and waterfowl (e.g., Canada and greylag geese).

All of these species recorded are common and widespread and regularly occur in the coastal waters of west Scotland either throughout the year, or during the breeding or non-breeding season. All species were recorded in very low or low numbers compared to their national breeding and wintering populations, revealing the site to be of local importance for these species.

The predicted effects on the assessed Important Ornithological Features (IOFs) at the site comprise disturbance of short duration during construction. Other effects of habitat loss and/or population decline (of wintering populations) are considered to be absent or negligible. Therefore, discussion and assessment of potential effects on IOFs is focussed on the effects of disturbance during construction.

The response of roosting (and feeding) waders to disturbance at the Proposed Development is difficult to predict, as studies have revealed that this is affected by the species involved, type of disturbance, degree of habituation, availability of alternative roost/feeding locations, and other factors such as the individual bird's condition and need for feeding or resting.

Kirby *et al.* (1993) studied disturbance effects on waders roosting at the Dee Estuary, including oystercatcher. Roosting oystercatcher exhibited a 'medium' response to disturbance (redistributing to alternative roosts outside the study area but within the estuary).

Several studies show that the behavioural response to disturbance is mediated significantly by habituation to the source of disturbance. For example, Urfi *et al.* (1996) found that oystercatcher 'escape distance' (i.e., the distance at which birds take flight on approach of people) reduced when people are present more frequently, which is likely to be true at this location given the existing ferry services and regular anthropogenic disturbance. However, habituation to one source of regular disturbance would not necessarily lead to greater tolerance of novel disturbance, such as construction activity.

Studies at major construction sites within estuaries has been demonstrated to lead to reduced densities of waders and wildfowl at Cardiff Bay (Burton *et al.*, 2002). Noise is often a significant source of

construction-related disturbance, particularly where activities such as piling are undertaken. Kusters *et al.* (1998) found that the strength of reaction to noise and other disturbance was greater when large numbers of birds are closely aggregated (such as roosting birds).

Pollution events could result in a slight reduction of prey availability and injury/fatality to species present using the site. However, the magnitude of change in relation to injuries or fatalities is considered to be minor.

The impact of disturbance caused by construction activities is predicted to be of local spatial extent, short term duration, and reversible. Given that there is suitable alternative roost and foraging locations within a short distance of the location of proposed construction activity, the overall magnitude of change for all species is assessed as minor or negligible.

When considering the conservation value and low sensitivity at the site level, the overall assessment is deemed to be minor or negligible adverse. In terms of the EIA Regulations this is deemed a non-significant effect.

In summary, the only predicted effect on sensitive IOFs is disturbance during construction. Species regarded as particularly sensitive to disturbance are waders and waterfowl at high-tide roosts and foraging areas and shag, which were recorded in moderate abundance in the near shore zone.

Due to the localised and temporary nature of the activities and the small number of birds affected as a result, these were considered to be of minor to negligible adverse impact.

In addition to the above, a HRA has been undertaken to determine the potential for the Proposed Development to have a LSE on designated sites in the UK national network of sites ('European sites'). The initial screening process (Stage 1: Screening) did not identify any sites designated for ornithological features to be taken forward for determination of LSE via a Stage 2 Appropriate Assessment.

10 TERRESTRIAL NOISE & VIBRATION

This chapter outlines the noise and vibration impact assessment for the Proposed Development and assesses the potential impacts and likely significant effects of noise and vibration associated with the construction of the proposed development.

The specific objectives of the noise and vibration assessment are to:

- Describe the existing noise baseline;
- Define the assessment methodology and significance criteria used in completing the noise and vibration impact assessment;
- Describe the potential effects, including direct, indirect and cumulative effects;
- Describe the mitigation measures proposed to address the likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation.

A baseline noise monitoring survey consisting of attended and unattended noise measurements was conducted within the vicinity of the Proposed Development site.

The noise monitoring location (NML) was chosen to be representative of the nearest construction noise receptors within and near the Proposed Development site. The purpose of the noise monitoring survey was to determine the baseline noise levels at the nearest noise sensitive receptors and to assess these levels in accordance with the relevant guidance to determine the following:

- The applicable BS 5228 construction noise threshold limit in accordance with British Standard BS5228, Code of Practice of Noise Control on Construction and Open sites; and
- Evaluate the noise climate in the Noise and Vibration Study Area.

Background vibration monitoring was not undertaken as there are currently no vibration sources on site.

Noise sensitive receptor locations, referenced as construction noise receptors, were obtained from the following data sources:

- Aerial mapping included Google and Bing aerial maps.

During the construction phase, there is potential for noise impacts at the nearest noise sensitive properties from construction plant and equipment. The effect of construction noise has been assessed in full within the noise and vibration chapter.

The construction noise targets are set out along with the assessment methodology and results of the construction noise predictions.

Construction noise mitigation measures are detailed such that noise targets are met throughout the construction phases.

No operational noise or vibration impacts resulting from the operation of the Proposed Development are anticipated. There will be no significant effects arising from the operational phase.

Overall, it is concluded that there is the potential for moderate to major significant impacts arising from the Proposed Development during the construction phase. These are associated with the dredging activity, should this occur over the night-time period, however these effects will be temporary in nature.

With construction mitigation measures in place as proposed through the CEMP and associated appendices, construction noise monitoring, and temporary construction noise barrier, the noise impacts associated with night-time dredging are predicted to be reduced to temporary slight or moderate.

11 WATER QUALITY

This chapter of the EIAR assesses the potential impact of the Proposed Development on water quality within the receiving environment. Existing water quality in the vicinity of the Proposed Development is established based on available water quality information. The assessment of impacts includes analysis and interpretation of baseline data acquired from existing water quality monitoring stations included in the Scottish Environment Protection Agency (SEPA) Water Framework Directive (WFD) monitoring programme. The potential impacts related to the construction and operational phases of the Proposed Development have been assessed and mitigation measures proposed to reduce significant environmental impacts on the receiving water environment.

WFD status for relevant waterbodies near to the Proposed Development was assessed to establish the baseline scenario. The overall WFD Status of each of these waterbodies is listed below:

- Sound of Iona ID: 200063 – High Status
- West Mull ID: 200083 – High Status
- South Mull ID: 200059 – High Status

There are designated sites in the vicinity, in particular the Sea of the Hebrides MPA, the Inner Hebrides and the Minches SAC and the Cnuic agus Cladach Mhuile SPA. The SAC is designated for migrating harbour porpoise, the SPA for golden eagle, while the MPA conservation objectives encompass basking shark, Fronts, minke whale and marine geomorphology of the Scottish Shelf.

The key issues in relation to water quality throughout the construction phase is associated with the physical disturbance in the marine environment, particularly dredging activities and the potential impact this may have on the Inner Hebrides and the Minches SAC.

Sediments were collected from the proposed dredge area and were analysed for a suite of chemical parameters and screened against Marine Scotland revised Chemical Action Levels (cAL1 and cAL2) in order to identify any contamination which may be present. All samples within the dredge area were below the revised cALs (both cAL1 and cAL2).

Coastal process modelling of sediment plume dispersal has determined that the impact of the construction activities, i.e., dredging of sediment, will result in low impact due to the larger particle size present leading to immediate settlement from any overspill. Furthermore, sand and gravels dumped at the open licensed offshore dumping site are expected to remain at the site and not increase the background level of suspended sediments outside the area. The magnitude of the potential impacts arising from dredged sediment entering the aquatic environment are therefore considered to be minor with regard to localised water quality and negligible in relation to the wider coastal water body.

Additional pressures with regards to the potential for oil/ fuel spillages both during the construction and operational phases of the Proposed development have been assessed. The use of oils and chemicals on-site requires significant care and attention and will adhere to the requirements of the Water

Environment (Controlled Activities) (Scotland) Regulations 2011 and GPP2, Above Ground Oil Storage Tanks.

The key issue in relation to the water environment throughout the operational phase of the Proposed Development is the direct permanent long term habitat loss within the new breakwater footprint which could impact on the seagrass which is a biological element contributing to the water body status. However, this will also create permanent habitat occurrence due to the presence of the rubble mound breakwater. The new rubble mound breakwater is likely to be colonised by species, therefore having a beneficial effect on benthic ecology. With the exception of the loss in footprint of seagrass currently present, the remaining biological elements are deemed to be of low vulnerability, high recoverability and local to international importance. Therefore, the assessment determined the significance of effect on the biological elements, other than seagrass (angiosperms) as minor (positive) and not significant in EIA terms. In order to counteract the loss in seagrass habitat a 'Seagrass Compensation and Monitoring Plan' has been proposed with compensatory measures to ensure there is no net loss in this habitat within the water body.

The Proposed Development is therefore not expected to have a significant effect on water quality or the ability of the waterbody to continue to achieve its WFD objectives.

12 FLOOD RISK

This section of the EIAR considers the potential impact of the proposed development on flood risk within the study area. It defines the baseline flood risk from a desk-based assessment and consultation, sets out the methodology to determine the potential effects of the proposed development on local flood risk, and then assesses the potential impact of the proposed development and the residual impact following mitigation. The assessment was carried taking account of Scottish Planning Policy (SPP), SEPA guidance and the Argyll & Bute Council Local Development Plan.

A review of the strategic flood mapping developed by SEPA identifies a risk of coastal flooding within the proposed site for all mapped events (high, medium and low likelihood). Under Scottish Planning Policy the site would be considered as 'Medium to High Risk', where the annual probability of coastal flooding is greater than 0.5% (1:200 years). No other potential sources of flooding were identified within the site.

As described in the SEPA 'Flood Risk & Land Use Vulnerability Guidance', the proposed works can be classified as 'Water Compatible Uses' which are generally suitable for development in all flood risk areas, including 'Medium to High Risk' areas. It is important to note that the developments permitted in these areas will be at risk of flooding, so mitigation measures are required. Policy SG LDP SERV 7 'Flooding and Land Erosion' of the Argyll & Bute Local Development Plan Supplementary Guidance states that '*Essential development such as navigation and water-based recreation use, agriculture and essential transport' is acceptable in 'medium to high risk areas'*. The development is in accordance with this policy.

During construction, there is a risk of flooding to the works from extreme tidal events that will need to be managed. Floodline operated by SEPA and the Scottish Flood Forecasting Service (SFFS), which is a partnership between SEPA and the Met Office, can be used by the Contractor to ensure that the risk of flooding to the construction works is minimised.

It should be noted that the existing slipway and pier are currently at risk of coastal flooding, and this will still be the case with the proposed development. As the site is already operating for the same use there will be no new receptors introduced into the flood hazard area and therefore there is no increase to the overall flood risk.

The proposed development will be at risk of coastal flooding during the operational phase. Mitigation measures are elements of design that may be used to manage flood risk to the development, or to avoid an increase in flood risk elsewhere. The proposed rock armour breakwater has been designed for extreme tidal events and therefore no mitigation measures are proposed to manage flood risk to the development itself. The impact of the proposed development on the existing tidal regime is determined to be negligible and no mitigation measures are required to avoid an increase in flood risk elsewhere. Whilst the physical infrastructure of the proposed development will not be adversely impacted by flooding, mitigation measures are required for the users of the proposed development. Tidal warning will be the key mitigation measure for the operation of the site. The Floodline Warning Service and the Scottish Flood Forecast can be used. If an extreme event is forecast, any sailings from the ferry terminal

are likely to be cancelled. The entire area is at risk of coastal flooding so it likely to be closed and evacuated, which will prevent people from being in the area.

13 COASTAL PROCESSES

This chapter assesses the potential impact of the Proposed Development on the coastal processes in the Sound of Iona, including information about the tidal regime and the inshore wave climate, to enable the competent authority to determine the potential impacts on coastal processes.

RPS used the MIKE 21 hydrodynamic numerical modelling software package developed by the Danish Hydraulic Institute (DHI), to address potential coastal processes impacts / issues. This was achieved by developing a range of two-dimensional numerical models to represent:

- the pre-project scenario; and
- the post-project scenario with the Iona breakwater in place.

These models were used in conjunction with hydrographic survey data and site-specific sediment data to assess the potential construction and operational impacts of the proposed development in the context of the following coastal processes:

- The tidal regime;
- The inshore wave climate at high water springs;
- Littoral currents; and
- Sedimentology.

Modelling was used to show the tidal regime within the Sound of Iona. Analysis showed that tidal currents are greatly increased in the shallows between Iona and Fionnphort and around the island of Eilean nam Ban. These currents diminish rapidly as the tide flows into deeper waters to the north and south.

The wave climate baseline within the Sound of Iona is characterised by a dominance of south-westerly waves attributed to large Atlantic swells. However, smaller storms from the south, north and east also contribute to the wave climate within the sound. The prevailing wind conditions are also from the south-west.

The baseline for littoral currents within the sound of Iona was also examined using modelling. Following analysis, it was found that the presence of the north-east going waves increases the currents on the flood tide whilst reducing them on the ebb.

The baseline scenario for the sedimentology within the Sound of Iona was established through analysis of grab samples and bore holes in the central section of the Sound. The area is composed mainly of fine to coarse sands and gravel, with minimal silts at the nearshore areas. There is limited migration of the sandwaves within the Sound of Iona with most of the sandwave crests not moving significantly between 2016 and 2022.

The process of dredging unavoidably causes disturbance of sediment on the channel bed and dispersal of some material in the water column, however, due to the dredging area containing sand and gravel, the impact of dredging would be low due to the immediate settlement of the sand and gravel particles

from any overspill. Sand and gravels dumped at the licensed offshore dumping site are expected to remain at that site and not increase the background level of suspended sediments outside of the area. Within the working area, other activities such as the construction of the breakwater and the use of jack-up barges would have a minimal impact on the coastal processes. Changes in the coastal processes would become apparent as construction progresses, these changes in their entirety are assessed in the operational section below.

During the operational phase, the tidal regime is predicted to remain substantially unchanged during operation. Given the localised nature and small absolute magnitude of any predicted changes in tidal current velocity, it is unlikely that there will be any significant change in net scouring or deposition of sediments within the centre of the Sound of Iona.

It was found that the wave heights at the breakwater sites were not significantly affected by changes in water levels during the operational phase of the Proposed Development.

In terms of changes to littoral currents during the operational phase, the presence of the structures has a limited influence on the reduced flow and there is little difference between changes in littoral current magnitude and the tidal flows alone due to the breakwater. During the flood tide, the outside of the breakwater exhibits an increase in littoral current, while an increase is also observed during the ebb tide. There are areas where littoral currents are reduced within the lee of the breakwater for both phases of the tide.

The potential for the greatest scour to occur around the ends of the proposed breakwater occur during flood tide when the greatest littoral current speeds occur due to the tidal flow and wave climate travelling in the same direction, from the south to the north of the Sound of Iona.

The effect of wave diffraction at the breakwater results in a steep gradient in the wave heights, and therefore in the wave energy, between the waves beyond the breakwater compared to those behind the breakwater.

An anticlockwise eddy flow will result in sediment being carried into the lee of the breakwater which will tend to infill the proposed dredged pocket immediately to the east and north-east of the end of the slipway. Thus, it is expected that regular maintenance dredging of this pocket will be required to keep the approach to the slipway.

As the impacts associated with the construction phase are expected to be negligible, no mitigation measures are proposed during capital dredging and disposal operations.

During the operational phase, scour protection is proposed to mitigate the impact of scour around the toe of the breakwater during periods of maximum flood velocity. Maintenance dredging would be required after construction is completed. The frequency of maintenance dredging would be established as part of the construction contract following the construction of the breakwater. Maintenance of the breakwater would be required as rock armour would move/adjust for a period of time.

In terms of the potential for in-combination effects of the Proposed Development with other projects, the potential development at Fionnphort would be most relevant as it most likely has the greatest

possibility of creating in-combination effects upon the coastal processes within the Sound of Iona when the two developments are in operation.

The effects associated with both developments on the tidal regime are deemed negligible due to the small changes in current velocities in the centre of the Sound of Iona. The cumulative effects on the wave climate, littoral currents and sedimentology were deemed to be negligible.

The Proposed Development is not expected to have a significant effect on coastal processes or make a significant change to the existing morphology after mitigation measures are fully implemented during construction and operation.

14 POPULATION & HUMAN HEALTH

This chapter outlines the population health assessment for the Proposed Development at the existing Iona Ferry Terminal. This chapter assess potential impacts and likely significant effects (both adverse and beneficial) on population health associated with the construction and operation of the Proposed Development. The issues covered in this assessment include:

- Open space, leisure and play;
- Transport modes, access and connections;
- Education and training;
- Employment and income; and
- Noise and vibration.

As study areas do not necessarily define the boundaries of potential health effects, particularly mental health effects, the population and health chapter uses study areas to broadly define representative population groups, including in relation to sensitivity, rather than to set boundaries on the extent of potential effects.

The health assessment has regard to the zones of influence defined by other EIAR chapters.

The baseline scenario for population and human health found the following:

- Demography, Socio-economic Circumstances and Deprivation – on the isle of Iona, unemployment is low, overall deprivation is low and deprivation in terms of crime and housing is also low.
- Life Expectancy and Physical Health – for Mull, Iona, Coll and Tiree, male life expectancy is similar to the Scottish average whereas female life expectancy is higher.
- Mental Health and Lifestyle Factors –for Mull, Iona, Coll and Tiree, alcohol related hospital admissions and child healthy weight in primary 1 were better than the Scottish average

Construction phase impacts of the Proposed Development were found to result in minor adverse (not significant) effects on bio-physical and social environmental, and minor beneficial effects on economic environmental aspects of health. A brief description of the findings of the assessment of effects is listed below:

- Bio-physical environment – The changes would result in a very limited effect in the health baseline of the site-specific populations. The temporary and localised construction noise effects are not expected to affect health inequalities.
- Social environment – There may be a very slight adverse change in the health baseline for the local population. Physical activity is a local public health priority and the scientific literature on the benefits of physical activity to health is well established, however the level of change due to the Proposed Development is small and can be appropriately mitigated. No widening of health inequalities would be expected, and no influence is expected on the ability to deliver local or national health policy.

- Economic environment – The professional judgment is that training and upskilling opportunities can be provided to the local community as well as prioritisation of employment for the construction workforce. These opportunities are likely to affect a small part of the population and to last for a relatively short period of time, yet increased income can have beneficial health effects even in the short-term. No widening of health inequalities would be expected, and no influence is expected on the ability to deliver local or national health policy.

Operational phase impacts of the Proposed Development were found to result in minor beneficial (significant) effects on social environmental aspects, and minor beneficial (not significant) effects on socio-economic conditions. A brief description of the findings of the assessment of effects is listed below:

- Social environment – This assessment conclusion is supported by a strong evidence base in the scientific literature for a *causal* relationship between physical activity and good physical and mental health, and professional judgement on the effect of physical and perceived safety for the uptake of healthy behaviours.
- Socio-economic conditions – The professional judgment is that improved access on and off Iona can lead indirectly to improvements in education, training, employment, job quality and income. This has the potential to be beneficial for health and wellbeing, although not significant at a population level. While the change is likely to affect only a small sub-set of the population, this has the potential to provide greater benefit to the vulnerable sub-population, which can help to narrow health inequalities.

A CEMP recommends mitigation measures for the construction phase of the Proposed Development. The CEMP will outline how the effects of construction can be managed by good practice and environmental controls which are routinely and successfully applied on other similar development proposals.

No mitigation measures are proposed for the operational phase of the Iona Breakwater Project.

Following the implementation of suggested mitigation measures, no significant adverse residual effects on population and health (relating to bio-physical and social environment) are anticipated during construction of the Proposed Development. Construction of the Proposed Development will result in beneficial residual effects (relating to education and training, employment and income), although these are not significant.

Operation of the Proposed Development will result in improved and safer access to and from the Isle of Iona, as well as facilitating improved transport of goods and services, including lifeline services and medical supplies. It will also support the uptake of physical activity for the local population, through facilitating safer recreational water sports. Accordingly, operation of the Proposed Development is anticipated to result in significant (moderate beneficial) population and health effects relating to improved transport modes; access and connections; and open space, leisure and play. While improved access to the island will also indirectly benefit the local population through increased opportunities for

education, training, employment and income, this will more greatly benefit vulnerable groups, and therefore these effects are not judged to be significant at a population level.

15 LANDSCAPE & VISUAL

The purpose of the Landscape & Visual Impact Assessment (LVIA) is to identify and assess the effects on landscape character, landscape features, visual receptors, and visual amenity as a result of the works described in the Planning Support Statement and project description contained therein.

The methodology and approach to the assessment contained within this chapter has been derived and carried out in accordance with best practice guidance.

The effects on the landscape resources and visual receptors (people) have been assessed by considering the proposed change in the baseline conditions (the impact of the development) against the type of landscape resource or visual receptor (including the importance and sensitivity of that resource or receptor). These factors are determined through a combination of quantitative (objective) and qualitative (subjective) assessment using professional judgement.

The LVIA considers the potential effects of the project upon:

- Individual landscape features and elements;
- Landscape character; and
- Visual amenity and the people who view the landscape.

The Proposed Development is located within Baile Mòr Conservation Area (including the existing slipway), which contains a number of heritage sites including St Mary's Abbey (Category A listed building) and the Iona Nunnery (scheduled monument). The Pilgrims' Way extends from Iona – Mull – Oban – Tyndrum – St Andrews.

The proposed development is located within the following landscape and seascape character areas:

- Island Mixed Farmland (LCT 49);
- Boulder Moors (LCT 11);
- Deposition Coasts of Islands (CCT12); and
- Sound of Iona Coastal Character Area (CCA).

The proposed development is within the following landscape designations:

- Area of Panoramic Quality;
- Local Landscape Area;
- Baile Mòr Conservation Area

A number of Core Paths lie within close proximity to the Proposed Development and have been identified from the available GIS information associated with the LDP. In addition to the Core Paths identified by the LDP a further walk known as St Columba's Way is a promoted long-distance walk that extends for approx. 200 miles from Iona – Mull – Oban – Tyndrum – St Andrews.

There are several mobile water-based receptors using the water along the coastline of the sound of Iona including ferry users, kayaks, pleasure boats and fishing vessels.

A selection of representative viewpoints has been established via the EIA Scoping Response and feedback from Consultees.

The Proposed Development has the potential to affect the following landscape and visual resources during construction and operation:

- Landscape/Seascape character of the Proposed Development site and the surrounding area;
- Landscapes designated for their special qualities or scenic beauty; and
- The visual amenity of people in the surrounding area.

The Proposed Development is located within the extensive Island Mixed Farmland LCT 49 and Deposition Coasts of Islands CCT 12 for which moderate to major localised and direct long-term effects are considered to be significant for localised coastal fringe areas at the Sound of Iona, reducing to minor to moderate and not significant with increasing distance from the coastal fringe of these LCT and CCT.

The Sound of Iona Coastal Character Area has been described, for which moderate to major localised and direct long-term effects are considered to be significant for localised areas at Iona, reducing to minor to moderate and not significant with increasing distance from the Iona harbour area.

The Proposed Development site is not located within a National Scenic Area. However, it is located within an Area of Panoramic Quality and a Local Landscape Area, with moderate to major localised effects reducing to minor to moderate and not significant effects with increasing distance predicted. The Proposed Development is also located within Baile Mòr Conservation Area with moderate to major effects predicted.

Views from eight viewpoints have been assessed, for both construction and operational phases of the Proposed Development. Localised moderate to major visual effects are predicted to be experienced during the operational phase of the Proposed Development for portions of the overall view available in close proximity to the Proposed Development site. With longer distance, the effects from viewpoints decrease to a level that results in no significant effects.

The assessment has also considered potential impacts on a number of Core Paths within the study area and has found that significant visual effects are predicted to be experienced by receptors on two Core Paths.

The assessment has considered cumulative effects, arising from the addition of the Proposed Development in combination with other proposed and potential developments within proximity. Predicted cumulative effects have been assessed as not significant.

16 CULTURAL HERITAGE

This chapter considers the potential effects of the Proposed Development, during both its construction and operational phases, upon the historic environment. The assessment considers effects on World Heritage Sites, Scheduled Monuments, Listed Buildings, Conservation Areas, Inventory Gardens and Designed Landscapes, Inventory Battlefields, Historic Marine Protected Areas, Protected Military Remains and non-designated archaeological sites and historic assets.

In order to characterise the archaeological potential of the Proposed Development site, data have been gathered for the Proposed Development site and the surrounding 500m. A 500m study area was considered appropriate as records relating to features and finds beyond 500m are unlikely to have any direct bearing upon the current assessment in respect of physical effects and, given the scale of the Proposed Development, it is unlikely to result in change in the setting of assets beyond 500m.

A Cultural Heritage Baseline Assessment has been prepared for the Proposed Development site and was informed by a range of sources to ensure all aspects of environmental heritage of the area are included. The desk-based research was augmented with a site visit which was undertaken in September 2021.

The Proposed Development lies in an area that has seen intensive activity from at least the Early Medieval period and probably earlier. The Early Medieval and Medieval activity has largely related to the importance of the island as a place of pilgrimage and near the Project Site are St Mary's Abbey, a Category A Listed Building and Scheduled Monument, Iona nunnery and MacLeans Cross, both Scheduled Monuments, and the Category A-listed Replica of St John's Cross.

Whilst intervisibility between these and the Proposed Development will be limited, it is considered that the appearance of the Proposed Development will detract from the experience of these assets, in particular their aesthetic and spiritual value. It is considered that the Proposed Development will have adverse effects of moderate significance on these assets. This is significant in the terms of the EIA Regulations.

The Proposed Development site lies at the fringe of the Baile Mòr Conservation Area and will be visible from a number of locations within it. This will have a localised impact upon its character and appearance and the contribution of the Conservation Area's setting. It is considered that the Proposed Development will have an adverse effect of moderate significance on the Conservation Area. This is significant in the terms of the EIA Regulations.

No heritage assets are recorded within the Proposed Development site below the high-water mark and given the results of the examination of bathymetry data and other data sources, it is considered that there is low potential for hitherto unrecorded heritage assets. This potential will be addressed through the implementation of a reporting protocol that will allow for the reporting and recording of any material of archaeological interest encountered.

A previous geophysical survey has identified features associated with an Early Medieval or Medieval cemetery that extend into the temporary construction compound area. These and any associated

features present may be disturbed by construction works. This will be mitigated through a programme of archaeological works that will allow for appropriate recording. This will be secured by a planning condition.

Following implementation of the proposed mitigation in respect of physical construction effects, all potential effects will be of minor significance. This is not significant in terms of the EIA Regulations.

17 WASTE

This chapter assesses the waste management aspect of the Proposed Development. Effects from the forecast waste generation from the construction and operational phases of the Proposed Development have been assessed in the context of the effects on regional waste management treatment and landfill infrastructure capacity, legislation, policy and strategy targets. Mitigation measures are proposed to reduce the impact of waste generated by the proposed development.

Waste is defined as '*"any substance or object which the holder discards or intends or is required to discard"* under the Waste Framework Directive (European Directive 2006/12/EC as amended by Directive 2008/98/EC).

An assessment was made of the potential environmental effects associated with the production, movement, transport, processing, and disposal of arisings from site during the construction and operational phase of the Proposed Development.

The Iona Ferry Terminal consists of a pier and a slipway. The source of current waste arisings is from the operation of the passenger ferry service from Fionnphort. Current wastes arising at the site are a typical mix of recyclable and residual material, accompanied by mixed litter generated from passenger footfall. Iona Port is operated by CalMac Ferries Ltd. who provide recycling facilities at all their port locations for customers to recycle on the go. All waste generated and/or received at Iona Ferry Terminal is currently managed and disposed of by local authorities or licenced waste contractors. The management/ disposal route is at the discretion of the approved contractor.

During the construction phase of the Proposed Development, typical waste materials which may arise from site management practices may include, excess materials and packaging, over-ordering materials, off-cuts, damaged materials and poor storage during the construction phase. Typically, construction waste is 'cleaner' than demolition waste. Packaging waste can make up a significant part of this waste stream. In terms of waste arising from the site welfare facilities and site compound, general office waste such as paper, packaging and canteen waste will be collected in covered skips/large bins for disposal by a licensed waste contractor. Sewage from the temporary site toilets will be emptied under contract for disposal at an appropriate facility.

In terms of the overall impact of the construction phase of the proposed development, there is the potential to have a neutral or slight effect due to the increase in waste being generated and the potential for this waste to be sent to landfill over a short-term duration, however the intention will be to achieve a high rate of diversion from landfill through reuse, recycling and recovery throughout the construction phase.

During the operational phase, the pier will continue to be used by CalMac Ferries Ltd. who operate a passenger ferry service with occasional vehicles being transported between the island of Mull and Iona. Crab/fishing vessel operators, leisure boat operators and private boat owners also use the facilities at the pier. The proposed development may support a slight increase in tourists using the ferry service

and fishing/commercial vessels using the berthing opportunities which may result in a slight increase in litter and waste generation.

Waste management at the port is currently operated to best practice guidance and waste is managed and disposed of by local authorities or licenced waste contractors. It is imperative that CalMac Ferries Ltd. Environmental Strategy and relevant policies and procedures are followed and that any additional wastes that may arise are considered.

In terms of the overall impact of the operational phase on waste management, there is the potential to have a Neutral or Slight effect from a slight increase in waste sent to landfill associated with increased footfall from tourists using the ferry service and fishing and commercial vessels using the berthing facilities.

It is concluded that the significance of the Proposed Development in relation to waste management is not significant.

18 GREENHOUSE GAS ASSESSMENT

This chapter of the EIAR presents the Greenhouse Gas (GHG) Assessment for the Proposed Development. It provides quantitative and qualitative estimates of likely GHG emissions associated with the pre-construction, construction, operation and decommissioning phases of the Proposed Development.

The GHG Assessment is based on a Life Cycle Assessment ("LCA") approach and references the IEMA Environmental Impact Assessment Guide "Assessing Greenhouse Gas Emissions and Evaluating Their Significance" ("IEMA GHG Guidance"). As all GHG emissions are contributing to a global accumulation, the global climate is the ultimate receptor, and the impacts of climate change will impact all aspects of the Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU). Although GHG emissions to the atmosphere are localised, the impacts are transboundary, meaning no matter where the emissions are released, the social, economic and environmental impacts will be felt on a global scale. GHG emissions associated with an infrastructure project (in this case a ferry and associated structures) can originate from the combustion of fossil fuels on-site for operating machinery, the manufacture and transport of materials, and changes in land-use.

Throughout the assessment, the term carbon is referred to. This is used as shorthand for the carbon dioxide equivalent of all GHGs and is quantified as 'tonnes of carbon dioxide equivalent' (tCO_2e).

The baseline scenario examined information from Scottish Greenhouse Gas Statistics 2020 and the Greenhouse Gas Inventory. The findings of the baseline assessment are listed below:

- Greenhouse Gas Statistics 2020
  - Source Emissions – There was 40.0 MtCO2e in 2020, down 51% from 1990 and down 12% from 2019.
  - Emissions for Reporting Against Targets – the GHG account reduced by 58.7% between the baseline period and 2020. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 specifies a target reduction of 56.0% reduction over the same period. Therefore, the interim target for 2020 has been met.
  - Key Trends – Source Emissions – Between 1990 and 2020, there was a 51.0% reduction in estimated emissions, a 41.6 $MtCO_2e$ decrease.
- Greenhouse Gas Inventory
  - In 2020, Domestic transport (excluding International Aviation and Shipping) was the largest source of net emissions, followed by Business, Agriculture, Residential and Energy Supply.
  - Carbon dioxide was the main greenhouse gas emitted or removed in most sectors, with the exceptions of the Agriculture and Waste Management sectors.
  - Methane was the main net gas emitted in the agriculture sector, followed by nitrous oxide and carbon dioxide.

- Almost all emissions in the Waste Management sector were emitted in the form of methane.
- All sectors exhibited a general downwards trend between 1990 and 2020.
- Overall, there has been a 51.0% decrease in net emissions between 1990 and 2020.

In terms of likely significant effects arising due to the Proposed Development, there is likely to be negligible change in emissions during all phases of the project.

During the construction phase, receptors may be vulnerable to a range of climate change risks including:

- Inaccessible construction site due to severe weather events restricting working hours and delaying construction;
- Health and safety risks to the workforce during severe weather events;
- Unsuitable conditions for certain construction activities; and,
- Damage to construction materials, plant and equipment, including damage to material storage areas and worksites, for example from stormy weather.

The Proposed Development also has the potential to be impacted upon by a changing climate and, in particular, more frequent severe weather events, in the medium to longer-term during the operational phase. Potential impacts include:

- Material and asset deterioration due to high temperatures;
- Health and safety risks to ferry users;
- Damage to access roads from periods of heavy rainfall; and
- Flood risk on the road network and damage to drainage systems with the potential for increased runoff from adjacent land contributing to surface water flooding.

Embedded mitigation and management plans are proposed to form part of the design to reduce the potential impact of the Proposed Development. These are detailed in the following bullet points:

- Operational Environmental Management Plan (OEMP)
- Adherence to the International Convention for the Prevention of Pollution from Ships (MARPOL)
- Adherence to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the 'BWM Convention').

There is no requirement for additional mitigation over and above the embedded mitigation, management plans and specific measures proposed for the Proposed Development.

With the design and mitigation measures proposed, the Proposed Development is considered to be resilient to projected climate change.

As no significant effects have been identified for the climate assessment, no monitoring of significant effects is proposed.

No significant residual effects have been identified in relation to climate change adaptation or emissions reduction.

Regarding the potential for in-combination effects with other projects, it is assumed that all committed developments will be required to meet relevant standards for emissions reduction and to comply with related planning policy. On this basis, it is considered appropriate to assume that any applications that are consented include 'reasonable' measures to avoid, reduce and /or offset the generation of greenhouse gas emissions and therefore that no significant cumulative effects are anticipated.

Although GHG emissions to the atmosphere are localised, the impacts are transboundary, meaning no matter where the emissions are released, the social, economic and environmental impacts will be felt on a global scale.

Interrelated effects may have a temporal or spatial element and may be short-term, temporary, or longer-term over the life-cycle of the proposed development. There are obvious interrelationships with the water environmental and coastal processes.

19 RISK OF MAJOR ACCIDENTS & DISASTERS

This chapter of the EIAR describes the assessment undertaken of the potential risk of major accidents and disasters presented from the Proposed Development. The chapter aims to set out the methodology for the assessment of major accidents and disasters and the potential risks and likelihood of such events occurring during both the construction and operational phase. In addition to this, potential mitigation measures to reduce the risk of major accidents and disaster have also been explored, as well as the cumulative effects between the Proposed Development and other projects in the area, and residual effects that may still be experienced after mitigation measures have been applied.

A desk study was carried out which identified key receptors which may be impacted by potential hazards. These were grouped into 'Risk Events'. These 'Risk Events' were subjected to a screening process and those that were not screened out were carried forward to understand the likelihood of the event occurring and any mitigation that may be required to manage the risk to an acceptable level.

A baseline scenario was established from the perspective of major accidents and/or disasters. For this baseline assessment, each of the receptors was examined individually to identify the key hazards that may exist in the study area.

A number of grouped Risk Events were identified for both the construction and operational phase of the Iona Breakwater Project. These include:

- Major boat / construction vessel collision / allision (either with existing infrastructure, new infrastructure, other vessels or running aground);
- Accident to the general public on or near the shoreline (e.g., people swimming etc.);
- Man overboard during construction;
- Major pollution or sedimentation event affecting nearby designated sites / areas;
- Major coastal flood event during construction of the Breakwater; and
- Scour of the toe of the breakwater leading to movement and/or damage that could cause a health & safety risk (e.g., vessel allision, risk to maintenance workers).

It is expected that most of the grouped Risk Events will have a major significance were they to occur during the construction or operational phases of the Proposed Development. However, it is expected that most of the grouped Risk Events will have a relatively low likelihood of occurring during construction and operation of the Proposed Development, particularly where mitigation measures are applied.

Mitigation measures that may be applied in order to manage the risk of major accidents and/or disasters to a manageable level have been proposed in the specialist topic chapters

A wide variety of mitigation measures have been identified to reduce the likelihood of Risk Events. These measures are designed to significantly reduce the potential for major accidents and disasters relating to the project. Despite mitigation measures, a (low level) risk of a major accident or disaster occurring will remain. However, it is determined that this risk is not likely to be significant in EIA terms.

There is potential for cumulative effects between the Proposed Development and the proposed Fionnphort Breakwater and Overnight Berthing Project and proposed British Telecom (BT) Cable installation between Iona and Fionnphort. Where these projects occur concurrently, this presents a cumulative risk for major accidents and disasters. However, through adherence to the mitigation measures proposed within the specialist topic chapters, it is determined that the likelihood of an event occurring would be low.

20 SUMMARY OF MITIGATION MEASURES

The EIAR assesses the likely significant impacts arising from the Proposed Development. Where required, mitigation measures are identified and described within individual topic chapters. These are measures which could avoid, prevent, reduce and, where possible, offset likely significant adverse effects upon the environment.

Table 20-1 summarises the mitigation measures and monitoring recommended within the EIAR.

Table 20-1 Summary of proposed mitigation measures per individual topic chapter

Potential Effects	Summary of Proposed Mitigation
CHAPTER 6: Navigation & Safety	
Ferry or tour boat allision (heavy contact) with the Proposed Development Dredger flooding whilst engaged in operations Dredge/construction plant impact with the Proposed Development during construction phase Recreational or fishing vessel allision with the Proposed Development Dredge/construction plant collision with recreational/fishing vessel Tug and tow collision with recreational/fishing vessel Tug and tow collision with ferry/tour boat Accident spill during marine works Heavy lift failure, or failure of lifting gear Small non-powered craft displaced by the Proposed Development: Ferry or tour boat allision with the breakwater: Small non-powered craft displaced by the breakwater	• Marine liaison officer – the marine liaison officer provides a point of contact for the marine works, will provide safety information to vessels navigating in the area and coordinate with local authorities during emergency situations. This is just to provide a central point of contact. • AIS coverage – all dredge/construction vessels, including barges to carry AIS (A or B (see Volume III, Appendix 6.1, Section 2.1 for definitions of AIS signals)). • Notices to mariners – issued by Argyll & Bute Council containing details about the construction works. These should be issued prior to any works (or any related activities such as diving or towage movements). • Availability of pollution response equipment – pollution response equipment should be available and carried by the contractors for use at Iona. The equipment should be appropriate for the type and scale of pollution that may occur. • Weather forecasting – a weather forecasting service should be regularly monitored to indicate any periods of upcoming adverse weather conditions. Appropriate actions should then be taken to mitigate any potential situations that may arise. These actions should be documented in the safety management system, detailing the specific weather conditions that will necessitate action(s). • Operational weather limits – including maximum wave and wind limits for construction activities should be detailed in the contractors 'Risk Assessment Method Statement'. • Promulgation of information – information on the proposed development and upcoming operations with associated vessel movements should be provided to local stakeholders. A website page (potentially on the Council's website) for the project, providing information and a method to contact the project would allow any vessels in the area to obtain information. • Aids to navigation, Provision and maintenance of – aids to navigation should be provided after consultation and approval of the NLB. Marine works to be illuminated at night. The aids to navigation must be maintained to provide the availability of the aids to navigation required by the NLB with any out of service periods reported via the Local Aids to Navigation (LATON) system. • Safety boat – the safety boat should be appropriate for the wind and wave conditions in the area. It should be available on site and manned during construction operations in order to provide quick assistance if any incident was to occur. • Passage planning – CalMac should update their passage plan, both during the works and on completion of the works to recognise the altered route. • Operational planning – capital dredging should be scheduled, as far as possible, to avoid disruption to ferry operations.

Potential Effects	Summary of Proposed Mitigation
	• Review of available powers – Argyll & Bute Council should review their powers in relation to operating the port facility at Iona to determine whether further powers are required to ensure navigational safety. • Update ALRS volume 6 and Sailing Directions – updates to include new structures after completion of the marine works. • Shore side facility maintenance programme – to schedule the maintenance of the site, including the AtoN. • Communications – stakeholders should be informed of the need to move buoyed areas prior to construction and advised of other suitable locations. • Safety - Lighting - it is important that any marine works at night or at times of reduced visibility are sufficiently illuminated in accordance with the Health and Safety Executive (HSE) Approved Code of Practice (ACOP) 'Safety in Docks' (HSE, 2014). The guidance on illumination levels is drawn from the 'Safety and Health in Ports' code of practice published by the International Labour Organization; this states that: "On access routes for people, plant and vehicles and in lorry parks and similar areas, the minimum level of illumination should not be less than 10 lux. In operational areas where people and vehicles or plant work together, the minimum level of illumination should not be less than 50 lux". (ILA, 2016). This level of illumination must be balanced alongside the requirements provided in the British Standard Institute (BSI) publication 'Design of Road Lighting' BS5489.
CHAPTER 7: Terrestrial Biodiversity	
Temporary disturbance/ loss of habitat arising from activities within the terrestrial area of the Temporary Work Area (namely the establishment of a work compound and storage of rock)	• Production of an Otter Species Protection Plan (see Volume III, Appendix 7.2) and adherence to all recommendations made within. • Production of a CEMP. • An Ecological Clerk of Works (ECoW) will be appointed to monitor the works in respect to otter activity. • No additional mitigation measures are required for the operational phase of the Proposed Development. The Environmental Management Plan (EMP) will manage the risks of all operational activities, facilities and cargo handled by the port and will include best practice measures to control pollution following standard guidelines such as the Environment Agency Pollution Prevention Guidelines. This will be considered sufficient to limit any potential impacts relating to pollution events.
Temporary disturbance/loss of habitat due to airborne noise and visual disturbance from construction activities	
Permanent loss of habitat arising from reclamation of seabed during the construction of a new rock armour breakwater to the south of the existing slipway	
Temporary effects on prey species due to underwater noise arising from construction activities (notably dredging and vessel noise), increased suspended sediment concentrations and sediment deposition.	
Long term increase in disturbance to habitat arising from increased levels of marine activity due to improved ferry services	
Long term increase in disturbance of habitat due to airborne noise and visual disturbance associated with the increase in terrestrial activity	

Potential Effects	Summary of Proposed Mitigation
Long term effects on prey species due to noise arising from vessels and potential for pollution events linked with increased levels of marine activity.	
CHAPTER 8: Marine Biodiversity	
Temporary disturbance/ loss of habitat arising from capital and maintenance dredging activity	• Production of a CEMP – Control of pollution during construction will be set out in a CEMP. This will include best practice measures to prevent accidental spillage of chemicals during construction activities. • Production of an EMP – The EMP will manage the risks of all operational activities, facilities and cargo handled by the port and will include best practice measures to control pollution following standard guidelines such as the Environment Agency Pollution Prevention Guidelines. • Production of an Invasive and Non-Native Species (INNS) Management Plan – A document detailing how the risk of potential introduction and spread of INNS should be produced. The plan will outline measures to ensure vessels comply with the International Maritime Organization (IMO) ballast water management guidelines, it will consider the origin of vessels and contain standard housekeeping measures for such vessels as well as measures to be adopted if a high alert species is recorded. • Plant, equipment and material (where required) will follow the 'check, clean, dry method'. • The presence of sensitive features onboard the ship's navigation systems will aid the vessel master in placing either anchor or jack-up legs to avoid these sensitive features. • Production of a Seagrass Compensation and Monitoring Plan – to ensure that seagrass habitat is not permanently lost, compensation will be undertaken to ensure that the habitat is restored. An assessment has already been undertaken in the form of the intertidal and subtidal survey, with the extent of biotopes derived. This data will be used to inform the 'Seagrass Compensation and Monitoring Plan'.
Increased suspended sediment concentrations and sediment deposition	
Resuspension of contaminated sediments	
Temporary disturbance/loss of habitat arising from the displacement/compaction of the seabed by anchors and jack-up barge spud legs	
Permanent habitat loss arising from placement of material on the seabed for the breakwater	
Underwater noise	
Disturbance and collision risk to marine mammals from increased vessel traffic during construction	
Changes in the hydrodynamic regime due to the presence of the breakwater	
CHAPTER 9: Ornithology	
Temporary disturbance/loss of habitat arising from activities within the terrestrial area of the Temporary Work Area (namely the establishment of a work compound and storage of rock)	• The most highly sensitive IOF are non-breeding populations and therefore measures to reduce disturbance around the nearshore area shall be undertaken as far as is practical during the period between September and April. • Methods to attenuate noise will be utilised, notably the use of sound walls and any modification of drilling rigs that would reduce noise levels. • Works undertaken in the vicinity of roosting birds or near occupied nests of sensitive species will be supervised by a suitably qualified and experienced Ecological Clerk of Works (EcoW) to determine if additional measures may be required.
Temporary disturbance/loss of habitat due to airborne noise and visual disturbance from construction activities	
Permanent loss of habitat arising from reclamation of seabed during the construction of a new rock armour breakwater to the south of the existing slipway	

Potential Effects	Summary of Proposed Mitigation
Temporary effects on prey species due to underwater noise arising from construction activities (notably dredging and vessel noise), increased suspended sediment concentrations and sediment deposition.	• Near-shore vessel-based activities should aim to reduce disturbance to foraging seabirds and waterfowl, particularly if works coincide with the winter period when divers, grebes and sea duck may be present.
Long term increase in disturbance to habitat arising from increased levels of marine activity due to improved ferry services	
Long term increase in disturbance of habitat due to airborne noise and visual disturbance associated with the increase in terrestrial activity	
Long term effects on prey species due to noise arising from vessels and potential for pollution events linked with potential increased levels of marine activity.	
CHAPTER 10: Terrestrial Noise & Vibration	
Worst case construction noise predictions exceed the 65 dB BS 5228 noise limit at a number of construction noise receptors during day-time hours.	• Mitigation in the form of timely and effective stakeholder consultation should be undertaken. This would ensure that residents are kept informed of on-going and future operations. For example, local residents would be informed by letter drop of proposed works, particularly where these are due to occur outside standard working hours. The letter would include details of proposed cause, start dates and duration of works to be carried out. • In order to minimise the likelihood of complaints, Argyll & Bute Council and affected residents should be kept informed of the works to be carried out and of any proposals for work outside normal hours. All complaints will be recorded by the appointed contractor. The appointed contractor will investigate the circumstances and ensure the necessary corrective measures are taken. • Night-time construction noise impact indicates that there is the potential for significant impact without mitigations. Screening at source of potentially affected receptors would ensure that the BS 5228 noise limit is achieved reducing impact to temporary minor adverse. • Construction mitigation measures will be put in place to ensure construction noise levels are attenuated and reduced where necessary. • Best practice measures will be employed to ensure that construction phase noise levels are reduced to the lowest possible levels. • BS5228:2009+A1:2014 – Noise and vibration control on construction and open sites outlines a range of measures that can be used to reduce the impact of construction phase noise on the nearest noise sensitive receptors. These measures will be applied by the contractor where
Worst case construction noise predictions exceed the 45 dB BS 5228 noise limit at a number of construction noise receptors during night-time hours.	
Unmitigated construction noise daytime predictions in excess of 65 dB would be deemed to have a temporary moderate impact at four receptors of medium sensitivity, and temporary moderate / major impact at one receptor of high sensitivity	
Worst case construction noise predictions exceed the 45 dB night-time BS 5228 noise limit for all construction noise receptors during night-time hours. Unmitigated construction noise night-time predictions in excess of 45 dB would be deemed to be temporary moderate / major adverse impact at all medium and high sensitivity receptors	

Potential Effects	Summary of Proposed Mitigation
	appropriate during the construction phase of the Proposed Development. Construction best practice measures which will be implemented included below: ○ Ensuring that mechanical plant and equipment used for the purpose of the works are fitted with effective exhaust silencers and are maintained in good working order ○ Careful selection of quiet plant and machinery to undertake the required work where available ○ Machines in intermittent use will be shut down in the intervening periods between work ○ Ancillary plant such as generators, compressors and pumps will be placed behind existing physical barriers, and the direction of noise emissions from plant including exhausts or engines will be placed away from sensitive locations, in order to cause minimum noise disturbance. Where possible, in potentially sensitive areas, temporary construction barriers or enclosures will be utilised around noisy plant and equipment ○ Handling of all materials will take place in a manner which minimises noise emissions ○ Audible warning systems will be switched to the minimum setting required by the Health & Safety Executive • Although recognised that the choice of dredgers is likely to be determined by the engineering requirements and the suitability of available equipment, dredging activities should be planned where possible to reduce the overall source noise level during the works – e.g., limiting night-time works directly adjacent to noise-sensitive properties etc. • Any dredger used for the works will be expected to be fitted with effective engine exhaust silencers, and there will be a requirement placed on the chosen dredger operator to ensure that all engine silencers are effective and reducing engine exhaust noise levels to the lowest reasonably practicable level. • Screening shall be provided nearest to those properties most likely to experience high noise levels from dredging, particularly during more sensitive night-time periods.
CHAPTER 11: Water Quality	
There is the potential for increased suspended sediment during the construction works of the breakwater and the dredging process	• SEPAs standing advice for “Construction Activities – Pollution Prevention” should be used. • Mitigation measures required to reduce the potential impacts from noise have been identified and included and the impacts of dredging and suspended solids on general marine life. These measures follow the Joint Nature Conservation Committee recommendations and guidance for minimising risk to marine wildlife (JNCC, 2010). • No losses of concrete (cement) to the waters will be permitted during the works.
Any sediment plumes generated during disposal are expected to be limited but may result in a temporary increase in turbidity	
The presence of physical alterations within a waterbody has the potential to impact on the hydromorphology of the waterbody	

Potential Effects	Summary of Proposed Mitigation
Dredging activities associated with the Proposed Development are likely to produce noise which is likely to disturb species in the area resulting in temporary, localised impact. There is potential for accidental oil/ fuel spillages on site due to increased vessel presence and associated fuel storage	• Fuel, oil and chemical storage must be sited on an impervious base within a bund and secured. The base and bund walls must be impermeable to the material stored and of adequate capacity. GPP2 shall be implemented to ensure safe storage of oils and chemicals. • The safe operation of refuelling activities shall be in accordance with PPG 7 "Safe Storage – The safe operation of refuelling facilities" (Environment Agency, 2011b). • With regard to potential oil spills during construction, an emergency spill kit and oil spill containment equipment will be located at strategic locations adjacent to the works. • An Oil Spill Contingency Plan which must be adhered to by all staff including those employed to carry out works. Its primary purpose is to set in motion the necessary actions to stop or minimise the discharge and to mitigate its effects. Effective planning will ensure that the necessary actions are taken in a structured, logical and timely manner. • Given that there will be berthing of oil, gas and renewables supply vessels and associated refuelling, a full retention oil separator is recommended to mitigate for the potential impacts of fuel/ oil spillage or leakage. This is recommended to be maintained in accordance with the manufacturer's instructions by experienced personnel. • SEPA's Standing Advice for Construction activities – pollution prevention has been consulted and will be adhered to. • The contractors Environmental Clerk of Works will be required to monitor mitigation measures and auditing of the contractor's environmental controls will be undertaken by the client's representative. • A 'Seagrass Compensation and Monitoring Plan' has been proposed to counter the direct habitat loss predicted to occur as a result of the Proposed Development. This will ensure that the loss of existing seagrass habitat is compensated ensuring no net loss of habitat.
CHAPTER 12: Flood Risk	
The existing slipway and pier are currently at risk of coastal flooding, and this will still be the case with the Proposed Development Minor local changes to the currents are expected around the breakwater such as an increase in the current velocity around the structure	• Contractor to sign up to SEPA's Floodline flood warning service in order to get notified when the area is at risk of flooding. • Use the Scottish Flood Forecast by the Scottish Flood Forecasting Service (SFFS), which provides 3-day flood forecasts and is updated daily. • Tidal warning will be the key mitigation measure for the operation of the site. The Floodline Warning Service and the Scottish Flood Forecast as described above can be used.
CHAPTER 13: Coastal Processes	
Scour around the toe of the breakwater Sediment build-up to the northern side of the breakwater (infilling the dredged pocket)	• Scour protection is proposed as part of the operational phase of the Proposed Development to mitigate the impact of scour around the toe of the breakwater during periods of maximum flood velocity which would be expected during a 1 in 1 year 240° storm event during the flood tide.

Potential Effects	Summary of Proposed Mitigation
	• Maintenance dredging would be required after construction is completed. The frequency of maintenance dredging would be established as part of the construction contract following the construction of the breakwater.
CHAPTER 14: Population & Human Health	
Construction noise is predicted to be within limits set to be protective of health and the environment in most cases. However, when considering a worst-case scenario, Chapter 10 identifies that there is potential for construction noise to exceed limits (both daytime and night-time) at a small number of individual receptors that are located closest to the construction activities, with the receptors most likely to be impacted being non-residential.	• Mitigations measures related to noise impacts are included in Chapter 10. • A CEMP will be produced as part of application process. The CEMP will outline how the effects of construction can be managed by good practice and environmental controls which are routinely and successfully applied on other similar development proposals. • The CEMP should also set out a clear plan for managing access to the Sound of Iona during construction. This would include designating safe alternative transport routes and appropriately communicating these to local populations (including through the use of Gaelic materials). • The CEMP should also set out a plan for engagement with the local population. This could include information on timings updates, affects to any services/deliveries/access and a complaints procedure. Engagement should be culturally appropriate, including provision of non-technical information and communication in Gaelic. • Opportunities to include the local population in construction of the Proposed Development can be beneficial for health. Actions to ensure positive outcomes include providing opportunities for training and upskilling as well as prioritisation of hiring for local populations.
Disruption or disturbance to recreation could affect the vulnerable sub-population (dependents with children or people with existing poor physical or mental health)	
There is the potential for construction to affect sea users including sea kayakers and sail boats which are used for leisure boating and recreation in the Sound of Iona. This effect would possibly occur during dredging or when there is other disruption in the construction area. This change would mostly affect residents in the local community	
CHAPTER 15: Landscape & Visual	
No specific landscape mitigation measures have been proposed as part of the Proposed Development. The design of the Proposed Development has “built-in” mitigation through steps such as optimising the new breakwater height to maintain as low a height as possible and the use of natural rock to form the breakwater. The minimal lighting required for safety has been provided.	
CHAPTER 16: Cultural Heritage	
Stripping of topsoil for the compound may result in the disturbance of features associated with An Eala, in particular a revetting wall and possible ditch.	• A reporting protocol has been developed to allow for the reporting and thereby appropriate recovery and recording of any cultural material encountered during the construction phase below the high-water mark. • Potential construction impacts above the high-water mark can be avoided by relocating the compound or be mitigated through a programme of archaeological works.
The change in setting of heritage assets including Iona Nunnery, MacLean’s Cross, St Mary’s Abbey and Replica of St John’s Cross	
Change of appearance / character of Iona Conservation Area	

Potential Effects	Summary of Proposed Mitigation
	• A programme of archaeological work would offset the physical loss or disturbance of features affected by allowing for them to be recorded appropriately, with reporting to an appropriate level. • Works must be undertaken in line with a Written Scheme of Investigation (WSI) agreed with WoSAS and approved by the Local Planning Authority.
CHAPTER 17: Waste	
There is the potential for quantities of materials to be deposited in landfill sites	• Argyll & Bute Council and their appointed contractor will ensure that all waste materials leaving the site will be transported via road by a registered and licensed carrier and arrive at a licensed / permitted site. Waste will only be disposed or recovered through licenced operators and in accordance with national waste legislation. • Site Waste Management Plan (SWMP). • (CEMP. • Construction Phase Monitoring.
The use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in environmental impacts/ pollution	
Excess materials and packaging, over-ordering materials, off-cuts, damaged materials and poor storage during the construction phase	
The proposed development would support a slight increase in tourism using the ferry service and fishing/commercial vessels using the berthing opportunities which would result in a slight increase in litter and waste generation	
CHAPTER 18: Greenhouse Gas Assessment	
Potential impacts during the construction phase could include: • Inaccessible construction site due to severe weather events (flooding, snow and ice, storms) restricting working hours and delaying construction; • Health and safety risks to the workforce during severe weather events; • Unsuitable conditions (due to very hot weather or very wet weather, for example) for certain construction activities; and • Damage to construction materials, plant and equipment, including damage, material storage areas and worksites, for example from stormy weather.	• Operational Environmental Management Plan (OEMP) - An OEMP will be developed to guide ongoing operations and maintenance activities during the life-cycle of the Project. The OEMP will also set out the procedures for managing and delivering the specific environmental commitments as per each technical chapter for each receptor over the operational period. • Adherence with the International Convention for the Prevention of Pollution from Ships (MARPOL) - All vessels will adhere to MARPOL requirements. Accordance with this will help to ensure that the potential for release of pollutants is minimised during operations. • Adherence with the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the 'BWM Convention').

Potential Effects	Summary of Proposed Mitigation
Potential impacts on the Proposed Development during the operational phase include: • Material and asset deterioration due to high temperatures; • Health and safety risks to ferry users; • Damage to access roads from periods of heavy rainfall; and • Flood risk (surface, groundwater, fluvial and snow/ice melt) on the road network and damage to drainage systems with the potential for increased runoff from adjacent land contributing to surface water flooding.	
CHAPTER 19: Risk of Major Accidents & Disasters	
Major boat/construction vessel collision/allision (either with existing infrastructure, new infrastructure, other vessels or running aground)	• Lighting at the end of the Breakwater – to avoid contact between vessels and the breakwater during the operation phase. • Scour protection – to reduce scour around the toe of the breakwater and avoid damage and movement of rock armour. • Type and sources of construction materials – constructing the breakwater from clean quarried local rock should help reduce the risk of pollution during construction phase and reduce transport distances. • Utilities infrastructure – avoidance of sewer, telecommunications, gas and electricity infrastructure during construction is key as well as incorporating any existing infrastructure into the project design to avoid any unnecessary risks. • Safety fencing – to keep the general public away from construction areas or areas of potential danger. • Safety Boat – to help avoid collisions between vessels and contact with the shoreline or infrastructure during the construction phase • Navigational Aids – to help avoid collisions between vessels and contact with the shoreline or infrastructure during both the construction and operation phase. • Safety lighting – to help avoid collisions between vessels and contact with the shoreline or infrastructure during both the construction and operation phase. • AIS coverage – to help avoid collisions between vessels during the construction phase. • Weather forecasts and operational weather limits – to avoid hazardous conditions during construction. • Updating ALRS and signalling directions – to help avoid collisions between vessels and contact with the shoreline or infrastructure during both the construction and operation phase. • Pollution response equipment – to help quickly respond to a major pollution event during the construction phase.
Accident to the general public on or near the shoreline	
Man overboard during construction	
Major pollution or sedimentation event affecting nearby designated sites	
Scour of the toe of the breakwater leading to movement and/or damage that could cause a health & safety risk	

Potential Effects	Summary of Proposed Mitigation
	• SEPA's Floodline Warning Service – to be aware and plan for coastal flood events during the construction phase. This service also includes information on tidal extremes and may also be useful during the operation phase. • Ecological Clerk of Works (ECoW) – appointed to monitor the works in respect to biodiversity and species in the area. • Correct and secure storage of fuels, oils and chemicals – must be sited on an impervious base within a bund and secured. The base and bund walls must be impermeable to the material stored and of adequate capacity. • Marine Liaison Officer – to provide a point of contact for the marine works providing safety information to vessels in the area during the construction phase. • Notices to mariners – to provide details of construction activities. • Passage and operational planning – to provide details of altered routes during the construction and operation phase and scheduling construction activities to reduce disruption. • Communicating with stakeholders – to inform locals of movement of buoyed areas during the construction phase. • Navigation safety management process – to help manage vessel movements during the construction phase. • CEMP. • Operational Environmental Management Plan (OEMP). • Environmental Management Plan (EMP). • Ensure waste arisings from the construction phase (especially with sediment disposal) are dealt with in a sustainable and legislatively compliant manner. • Oil Spill Contingency Plan – to set in motion the necessary actions to stop or minimise the discharge and to mitigate its effects. • The safe operation of refuelling activities shall be in accordance with PPG 7 "Safe Storage". • Adherence to the International Convention for the Prevention of Pollution from Ships (MARPOL) – to help to ensure that the potential for release of pollutants is minimised during operations. • Site Waste Management Plan (SWMP). • Construction Phase Monitoring.

21 CUMULATIVE EFFECTS AND ENVIRONMENTAL INTERACTIONS

Assessment of cumulative effects addresses long-term changes that may result from the construction and operation of the Proposed Development in combination with other developments in the area.

Cumulative assessment is undertaken to ensure that the combined effects of the Proposed Development and other influences are assessed together, and not as individual aspects of the environmental assessment.

Cumulative effects are defined as changes to the environment that are caused by an action in combination with other actions, arising from:

- the interaction between existing and/or approved Projects in the same area; as required by Schedule 4, Section 5 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017; and
- the interaction between the various impacts within a single Project.

Using the local authority planning and Marine Scotland websites, two proposed projects were identified in the vicinity of the Proposed Development. These are:

- The Fionnphort Breakwater and Overnight Berthing Project; and
- British Telecom (BT) Cable installation – Iona to Fionnphort

For the Fionnphort Breakwater and Overnight Berthing Project, it is anticipated that the duration of the construction phase will be 52 weeks. This proposed project is in the final stages of design and so there is potential that this proposed project may be constructed in parallel with the construction phase of the Proposed Development at Iona. An EIA and HRA will be undertaken as part of the marine licencing application, nonetheless it is likely that there would be potential for in-combination effects.

For the BT cable installation, there is potential that the construction phase of the Proposed Development may coincide with the construction cabling works during the first half of 2023. This has potential for in-combination effects.

Therefore, it was established that the proposed Fionnphort Breakwater and Overnight Berthing Facility and cable installation between Iona and Fionnphort were the key projects potentially having cumulative effects given their distances from the Proposed Development and the temporal overlap of construction phases.

Chapter 20 (Section 20.3.1) provides a description of potential interactions between the Proposed Development and the other listed projects in the area which are deemed likely to have cumulative effects.

As identified in Chapter 20, the proposed project to be undertaken at Fionnphort, is likely to have the potential for cumulative effects with regards to ‘Permanent habitat loss arising from the placement of material on the seabed for the breakwater’ during the construction phase on benthic receptors.

At Iona, permanent long-term habitat loss will occur directly under the new breakwater structure. The overall footprint of the breakwater is approximately 10,037 m^2, with approximately 149,812 tonnes of rock armour to

be laid. The works will be carried out once but will remain in situ for up to 120 years for the design life and will be non-reversible.

At Fionnphort, permanent long-term habitat loss will occur directly under the new breakwater structure. The overall footprint of the breakwater is approximately 4,200 m^2 (this is based on the Fionnphort Scoping Report dated July 2021 and therefore may be subject to slight variation). The works will be carried out once but will remain in situ for up to 120 years for the design life and will be non-reversible.

The potentially combined permanent loss of habitat due to the breakwaters would be 7,000 m^2.

As such, a 'Seagrass Compensation and Monitoring Plan' has been proposed. Direct habitat loss is predicted to occur as a result of the Proposed Development; therefore, to ensure that seagrass habitat is not permanently lost, compensation will be undertaken to ensure that the habitat is restored. An assessment has already been undertaken in the form of the intertidal and subtidal survey, with the extent of biotopes derived. This data will be used to inform the 'Seagrass Compensation and Monitoring Plan'.

As there is likely to be a significant effect on seagrass, an agreement will be sought between the Iona Proposed Development and the Fionnphort project on the compensation/ mitigation strategy for seagrass. This approach should be agreed upon with Marine Scotland, its advisors, and in consultation with seagrass restoration projects, with reference to documents such as Seagrass restoration in Scotland - handbook and guidance (Kent *et al*., 2021) and the Seagrass Restoration Handbook (Gamble *et al.*, 2021).

Chapter 20 (Section 20.3.2) provides a description of the potential interactions within the Proposed Development, between specialist topic chapters. A summary of the assessment is provided below.

Navigation & Safety

During the construction phase of the Proposed Development there is potential for interaction between Navigation & Safety and Marine Biodiversity, Population and Human Health and the Risk of Major Accidents and Disasters. These interactions and effects are fully assessed within Chapter 6, Section 6.4.1 and Chapter 19, Section 19.4.

Marine Biodiversity

During the construction phase of the Proposed Development there is potential for interaction between Marine Biodiversity and Navigation & Safety, Water Quality, Coastal Processes and the Risk of Major Accidents and Disasters. These interactions and effects are fully assessed within Chapter 8, Section 8.7.2 and Chapter 19, Section 19.4.

Terrestrial Noise & Vibration

During the construction phase of the Proposed Development there is potential for interaction between Terrestrial Noise & Vibration and Population & Human Health. These interactions and effects are fully assessed within Chapter 10, Section 10.4.2.

Water Quality

During the construction phase of the Proposed Development there is potential for interaction between Water Quality and Coastal Processes, Marine Biodiversity and the Risk of Major Accidents and Disasters. These interactions and effects are fully assessed within Chapter 11, Section 11.3.1 and Chapter 19, Section 19.4.

Flood Risk

During the construction phase of the Proposed Development there is potential for interaction between Flood Risk and the Risk of Major Accidents and Disasters. This interaction is fully assessed within Chapter 19, Section 19.4.

Coastal Processes

During the construction phase of the Proposed Development there is potential for interaction between Coastal Processes and Marine Biodiversity and Water Quality. These interactions and effects are fully assessed within Chapter 13, Section 13.4.1.

Population & Human Health

During the construction phase of the Proposed Development there is potential for interaction between Population & Human Health and Navigation & Safety and Terrestrial Noise and Vibration. These interactions and effects are fully assessed within Chapter 14, Section 14.4.1.

Landscape & Visual

The Proposed Development has the potential for interaction between Landscape & Visual effects and Cultural Heritage. These interactions and effects are fully assessed within Chapter 15, Section 15.5.

Cultural Heritage

The Proposed Development has the potential for interaction between Cultural Heritage and Landscape & Visual effects. These interactions and effects are fully assessed within Chapter 16, Section 16.5.

Risk of Major Accidents & Disasters

During the construction phase of the Proposed Development there is potential for interaction between the Risk of Major Accidents & Disasters and Navigation & Safety, Marine Biodiversity, Water Quality and Flood Risk. These interactions and effects are fully assessed within Chapter 19, Section 19.4.

22 SUMMARY & CONCLUSIONS

The assessment presented within the EIAR, has identified and documented impacts arising from the Proposed Development. These impacts have been assessed as to whether or not they are likely to result in significant effects. Where significant effects have been predicted, measures to avoid or mitigate these effects have been included so that, where possible, they are no longer significant.

The overall objective of the Proposed Development is to provide improved access facilities for the Iona ferry which operates across the Sound of Iona, between the two villages of Fionnphort and Iona. The Iona ferry, operated by CalMac, operates daily all year round. After traversing the Sound, the ferry holds its position at Iona using the weight of the ramp and the friction between the ramp and the slipway deck, however the slipway at Iona is currently very vulnerable to waves, particularly from the south, resulting in the ramp of the ferry rising and falling from the deck of the slipway. The instability of the ferry, as a result of swells, presents a risk to both ferry operators, passengers embarking and disembarking, vehicles and other slipway users.

During storm events or periods of intense wave action, the health and safety risk associated with the current berthing practice means that the ferry is not able to operate. Ferry users are therefore not able to access Iona, or in fact, may become trapped at Iona until the ferry is able to operate again. This presents issues such as lack of accommodation (visitor accommodation on Iona is limited to two hotels, a number of B&Bs, self-catering units, and a campsite), with tourists having to sleep in their vehicles[5], and subsequent reputational issues, with tourists unlikely to revisit after having a poor experience. In addition, there is no shelter or indoor waiting area for ferry passengers in times of unfavourable weather conditions. This often presents difficulties where the weather is either wet or windy.

The current berthing practice also has a negative impact on service provision to residents of Iona. These problems have had a direct impact on the lives of the people who live there. A day without a ferry operating, results in essential services to the island being affected – medical, educational, refuse collection, business delivery etc.

In addition to ferry operation, the Island and the Sound bring people visiting on holiday, including discernible increases in the total numbers of leisure yachts, which sail around Mull and Iona in the summer season berthing within the Sound as a safe overnight mooring. This is an opportunity for these visitors to eat locally as well as stock up on supplies.

The Proposed Development aims to address these issues by making the connection between the Isle of Mull and Iona safer, more efficient, and more attractive to both ferry customers and leisure sailors. The Proposed Development is intended to make the ferry crossings more reliable and safer. It is not intended to increase the frequency of the ferry crossings and thereby no change in vessel traffic is expected as a result of the works.

[5] BBC News Article 2021 - https://www.bbc.co.uk/news/articles/ce9n25zeyx1o

With adherence to a CEMP and with implementation of the mitigation laid out in the EIAR, most negative effects from the Proposed Development will generally not be significant. However, some significant negative effects may potentially be experienced by a number of receptors.

Given the remote nature of Iona, the landscape and visual setting will potentially be significantly affected by the Proposed Development. Moderate to major localised and direct long-term effects have been identified for a number of landscape and visual receptors. These are generally localised to coastal fringe areas and in close proximity to the breakwater and reduce to minor to moderate, and not significant, with increased distance from the Proposed Development.

In addition, although there will be no direct physical effects on cultural heritage, significant effects have been identified on the character and appearance, and the aesthetic and spiritual value of several heritage receptors. The island is considered as a place of pilgrimage and it is considered that the appearance of the Proposed Development at the point of arrival on the island will detract from the experience of the pilgrimage assets, in particular, their aesthetic and spiritual value. The Proposed Development site also lies at the fringe of the Baile Mòr Conservation Area and will be visible from several locations within it. This will have a significant but localised impact upon its character and appearance and the contribution of the Conservation Area's setting.

It is not possible to mitigate against these visual effects and changes in aesthetic value. A range of alternative designs have been previously assessed, as discussed within this EIAR, however to date, no alternative design has been identified, which provides the required level of protection, without compensating on other health and safety aspects (i.e., reduced visibility of overtopping waves), whilst also being as small in crest height and width as practicable.

As well as the above effects on visual and aesthetic settings, the Proposed Development has been assessed with respect to effects on marine environmental receptors. The assessment determined that 'Permanent habitat loss for the benthic habitat '*Zostera marina/angustifolia* beds on lower shore or infralittoral clean or muddy sand A5.5331' (seagrass), arising from the placement of material on the seabed for the breakwater was deemed of moderate significant effect. Seagrass is also a biological element contributing to the water body status, under the WFD. To address the moderate significant effect of the temporary and permanent habitat loss, a 'Seagrass Compensation and Monitoring Plan' has been proposed to reduce the impact of the Proposed Development on seagrass receptors.

However, it should also be noted that minor positive effects associated with benthic ecology and fish and shellfish are anticipated due to the breakwater creating a hard habitat for colonisation and refuge. With the exception of the loss in footprint of seagrass currently present, the remaining biological elements are deemed to be of low vulnerability, high recoverability and local to international importance. Therefore, the assessment determined the significance of effect on the biological elements, other than seagrass (angiosperms) as minor (positive) and not significant in EIA terms.

Following implementation of the mitigation and/or compensation measures proposed, all other environmental effects have been deemed as not significant.