Staffin Community Harbour Development

Environmental Impact Assessment Report

Volume 2: Main Assessment

September 2021

Chapter 1: Introduction

Document Control

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1 Introduction

This Environmental Impact Assessment Report (EIAR) has been produced on behalf of the Staffin Community Trust (SCT) to support the construction marine licence application and the planning application for the proposed Staffin Community Harbour (SCH) development.

The objective of the SCH development is to improve the existing slipway operations by providing the community with sheltered berthing and associated infrastructure to support both leisure boat and commercial users. The project aims to address the shortcomings of the existing slipway to support the community for generations to come. Further detail on the project need, consideration of the alternatives, and the construction phases are provided in Chapter 2: Project Description.

An application for a marine licence for the construction works below Mean High Water Springs (MHWS) is requested from Marine Scotland under the Marine (Scotland) Act 2010. This EIAR will be submitted in support of the marine licence application as required by the Marine Works (Environmental Impact Assessment (EIA)) (Scotland) Regulations 2017.

Works above the Mean Low Water Spring (MLWS) are subject to planning consent under the Town and Country Planning (Scotland) Act 1997 (as amended), and hence this EIAR shall also support the application in line with the requirements of the Town and Country (EIA) (Scotland) Regulation 2017.

1.1 Objective

The objective of this EIAR is to:

- Explain the project need and the alternatives considered;
- Provide a description of the proposals, including features of the works incorporated to avoid, prevent or reduce significant adverse effects on the environment;
- Understand the environmental baseline for the proposed development area;
- Identify the potential direct, indirect, and cumulative effects on the environment associated with the development;
- Assess the significance of the potential effects on the environment;
- Identify appropriate measures/mitigation to avoid, prevent or reduce adverse impacts and to maximise benefits; and
- Provide an appropriate level of detail to inform the marine licence and planning decision making process.

1.2 The EIA Team

SCT commissioned Affric Limited to produce the EIAR for the SCH Development. Affric have worked with the following associates to complete the assessment:

- Dalgleish Associates Limited;
- AOC Archaeology Group;
- Ocean Ecology Ltd;
- Tracks Ecology Limited;
- Oxford University Innovation Limited;
- Pell Frischmann Consulting Engineers Ltd;
- Wallace Stone LLP;
- Jock Gordon Design and Planning.

Further information on each company, key individuals’ expertise, and their role in the project, please refer to Appendix A.1.

1.3 EIAR Structure

This EIAR consists of four volumes:

- Volume 1: Non-Technical Summary;
- Volume 2: Main Assessment;
- Volume 3: Appendices; and
- Volume 4: Drawings.

The numbering of the appendices provided in Volume 3 relates to the Volume 2 Chapter numbers, i.e. Appendix A refers to Chapter 1, and Appendix F refers to Chapter 6. As not all chapters have appendices, not all letters are utilised.

1.4 Glossary

Acronym	Definition
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
SCH	Staffin Community Harbour
SCT	Staffin Community Trust

Chapter 2: Project Description

Document Control

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2 Project Description

2.1 Background

The Staffin Community Trust (SCT) ~ Urras an Taobh Sear was established in 1994 by the local community determined to tackle the challenges faced by the rural district, on the Isle of Skye, in the Scottish Highlands. SCT works with, and for the community, which has crofting and Gaelic at its heart.

The original slipway was commissioned in the early 1900s by the Congested District Board. Using a local labour force, a stone-built slipway was created along with a store to allow freight to be unloaded and stored at Òb nan Ron, Garafad. Òb nan Ron is the Gaelic term for Bay of Seals, which is the name of the bay where the slipway is located (Ports and Harbours of the UK, 2021).

In 2000, The slipway underwent upgrades which included the construction of a breakwater. The upgraded Staffin Community Slipway was opened by the HRH The Princess Royal. It is used by the local community to facilitate fishing, fish farming and recreational activities.

As discussed in Chapter 4, Statutory Context and Policy, The West Highlands and Islands Local Development Plan (WestPlan) which identifies one of the placemaking priorities for Staffin being "Support improvements to harbour facilities, including the slipway and breakwater to provide greater depth and protection for harbour users."

SCT secured grant funding to progress the building of a new breakwater, upgrade the existing slipway and install pontoons, create further parking and public water closets (WCs). Access to the Harbour area will always be open to the community, alongside commercial users and visitors.

2.2 Project Need

The Staffin Slipway has a long history of serving the community since its construction in the early 1900s. The Slipway is currently used by members if the local community to launch boats during the summer months. Throughout the year the Slipway is used by a commercial fish farm operator to access their sea sites which are located to the south of Òb nan Ron.

The creation of an attractive multi-user facility will ensure that the growing need for a safe harbour for the local leisure boat users is met, and will also provide necessary infrastructure to support existing commercial users and attract new marine businesses to Staffin.

The layout of the current slipway lacks sufficient berthing and launching boats is dependent on the tides, therefore limiting the functionality of the harbour. Currently boats that are not removed from the water daily are moored in the bay between the slipway and Staffin Island (located approximately 600m north of the existing slipway). A small tender is used to ferry people from the slipway to their boats and back daily. However, when the sea is too rough, the tender cannot leave the slipway area, preventing fisherman and staff of the surrounding fish farms from accessing their boats.

2.2.1 Sheltered Berthing

A major limitation of the existing slipway facilities is the lack of berthing. Currently boats can temporarily berth alongside the slipway, but this is tidally restricted, so primarily utilised for loading and unloading activities. There is also a single tie up berth on the return leg of the breakwater, which is available for temporary use only. Fishing and fish farm vessels have to moor on the southern edge of Staffin Island.

The lack of sheltered berths mean that tenders are used to access vessels at moorings adding time and risk to fishing activities; small boats have to be hauled out when not in use and there are no facilities for visiting vessels to overnight.

Hence, a key feature of the proposed SCH development is to create safe berthing which is protected from rough seas. Berthing for local recreational and commercial uses along with spaces for visiting vessels would increase safety and encourage use of the Harbour, which in turn will bring socio-economic benefits to the local community.

2.2.2 Slipway

The existing slipway is narrow, at 4m in width and 113m in length, and has a shallow gradient (1 in 20), this restricts the tide states that the slipway can be used in and the size of craft that can be launched. Hence a steeper wider slipway is required to provide full accessibility at all states of the tide to a wider range of boats.

2.2.3 Onshore Facilities

There are currently limited onshore storage units for boats, equipment and other maritime orientated items. There are old boat nausts located next to an old boat storage shed.

The current slipway area does not have formal parking and over the peak tourist season (summer months) the area is popular amongst tourists who utilise the informal parking around the slipway to enjoy the area and to access adjacent walking routes. Campervans also overnight in the vicinity of the slipway. Parked vehicles can limit the space available for slipway operations including manoeuvring of vehicles with boat trailers, and at times access to the slipway is blocked entirely.

Appropriate onshore facilities are required to support harbour related activities and to accommodate visitors to the area. Additional space is required to allow parking arrangements to be formalised; vehicle and trailer manoeuvring; storage of boats and equipment; and to provide space for buildings.

The provision of welfare facilities in the form of WCs and showers for use by harbour users and members of the public would be a large asset to the area. To facilitate harbour management a harbour office is required for use by a Harbour Manager. The provision of storage/maintenance buildings for equipment and materials associated with harbour uses would help to encourage commercial users and potentially recreational group use of the facilities.

2.2.4 Utilities

There is currently no electricity on site and water is provided through a single tap which is gravity fed from a spring located approximately 200m south of the storage shed. The utilities will need to be appropriately upgraded to service the proposed facilities, this is likely to include an electricity connection, an upgrade to the water supply and foul drainage provision for the welfare facilities.

For the management of the Harbour there will be a need for phone/internet connectivity (be it hardwired or wireless).

Fuel oil storage would allow for diesel-powered vessels to be refuelled at Staffin. Currently, vessels either collect diesel at the fuel station in Staffin Village in Jerry Cans for refuelling at the Staffin Slipway or vessels travel to Portree to refuel. Portree is approximately 15nautical miles (NM) to the south.

2.3 Considering of Alternatives

The consideration of alternatives has been an iterative process completed as part of the design development. The alternatives considered for the main components are discussed below. Consideration of alternatives took into account the following factors as appropriate:

- Constructability;
- Operability;
- Public safety;
- Physical constraints/ restrictions;
- Environmental effects;
- Wave climate and coastal processes;
- Stakeholders / publics input; and
- Cost.

2.3.1 Do Nothing

The 'Do Nothing' option was ruled out due to the project needs discussed in Section 2.2. These improvements to the existing slipway and breakwater have been identified in the local development plan (WestPlan). The aim of the proposed SCH development is to provide an attractive space, supporting various recreational activities and economic sectors in the area. The proposed SCH development is essential to ensuring new opportunities are presented through job creation in the fishing, fish farming and tourism sectors in the Staffin area and promoting economic growth.

2.3.2 Design Evolution

2.3.2.1 Harbour Development

The initial concept for the design was developed incorporating the requirements laid out in Section 2.2. This layout designed the new breakwater and pontoons approximately 150m to the west of the existing slipway as depicted in Drawing JG4710. In addition, the proposed design included an upgrade to the existing slipway increasing the width to 15m and improving the slope gradient from 1:20 to 1:9.

Originally it was proposed that selected onshore elements be constructed on the cliff side of the existing access road, however, the land is designated as common grazing land. The decision was made to limit the encroachment of the development onto common grazing land, so as to retain that resource. It was therefore decided to extend the existing hardstanding at the top of the slipway to the east through land reclamation on the foreshore and construct all onshore elements there.

During the Pre – application Consultation (PAC) four marine design options were presented to stakeholders. A summary of the design options is provided below.

Option 1: Figure 2.3.1 shows Option 1, the intent would be to remove the end of the existing breakwater and upgrade the existing slipway to be 15m wide with a slope gradient of 1:9. A small ramp down onto the intertidal area would be installed adjacent to the slipway.

A new breakwater would be constructed to the north, orientated in an east-west direction, with the easterly end curving round to the south. The western end of the breakwater would curve south over the intertidal area to join onto a new access road formed above mean high water springs (MHWS) to provide connectivity back to the hard standing area. Pontoons would be located to the south of the new breakwater in a newly created sheltered area. Access to the pontoons would be via a bridge from the breakwater.

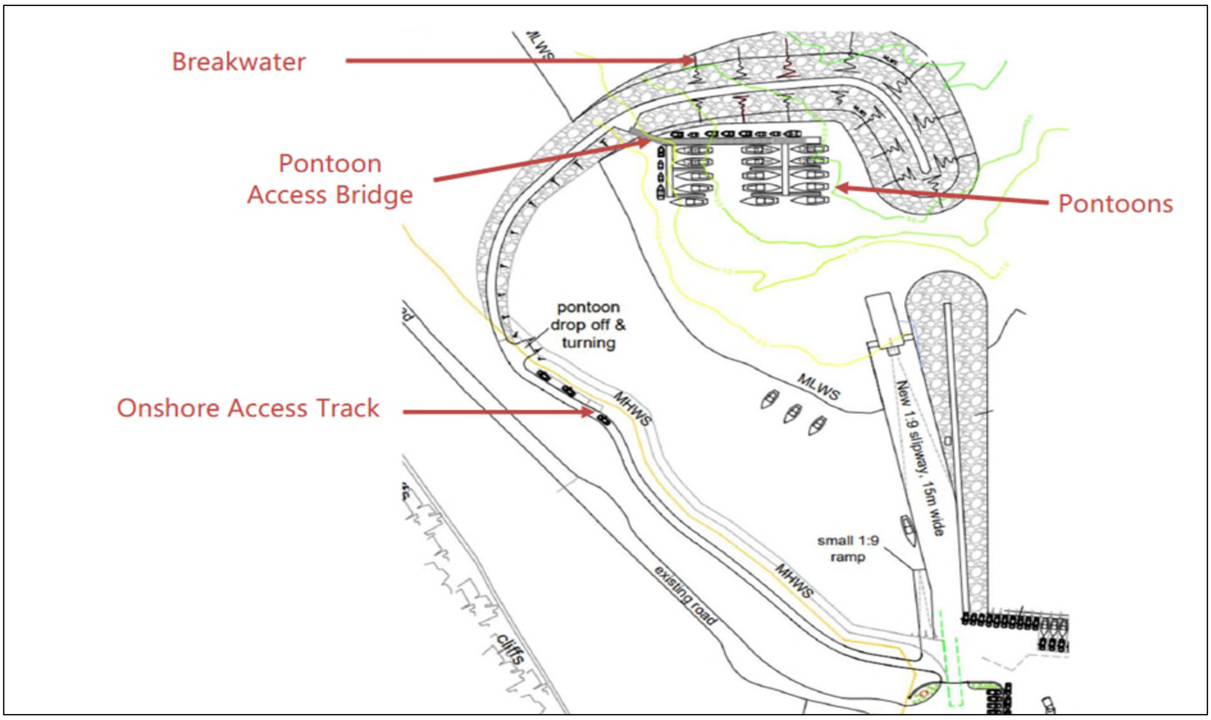

Figure 2.3.1: Option 1

Option 2: As shown in Figure 2.3.2, the access track was moved to areas below MHWS to minimise the impact upon the common grazing land. The changes to the existing breakwater and slipway and inclusion of a small ramp in Option 2 are the same as Option 1 (Figure 2.3.1).

A new breakwater would be constructed to the north, orientated in an east-west direction, with the easterly end curving round to the south, with pontoons located to the south of it as per Option 1. The breakwater would, however, stop at above mean low water spring (MLWS) on the westward end. Access to the pontoons would be from a bridge at the western end of the breakwater, with a raised access track created below the MHWS connecting back to the hard standing area.

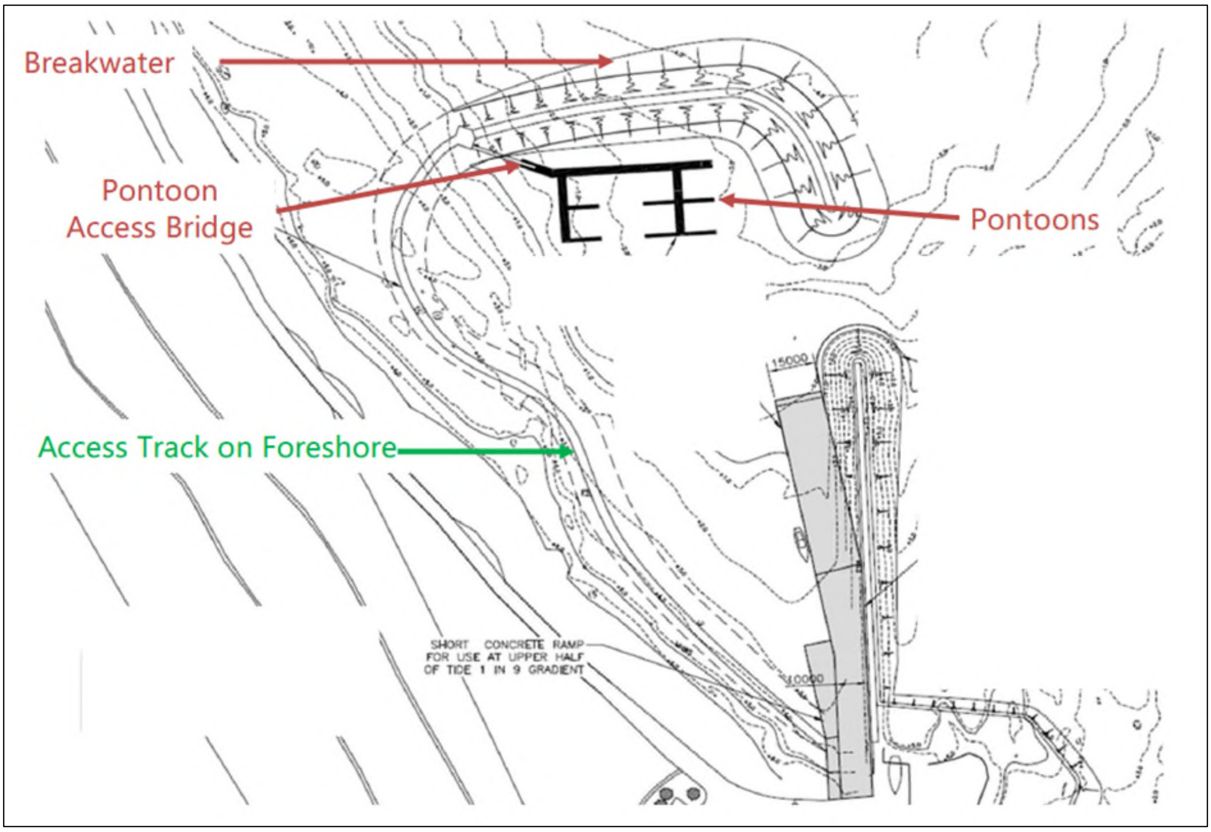

Figure 2.3.2: Option 2

Option 3A and 3B: Due to the designation of the foreshore (between MHWS and MLWS) area between the new breakwater (as shown in Options 1 and 2) and the existing slipway being protected by the Skye Nature Conservation Order (NCO) 2019, a design alternative to minimise the footprint of the proposed SCH development on the foreshore was presented. All elements other than access to the pontoons would be the same as Option 2. Access to the pontoon would be via a series of bridges starting at the existing access road all the way to the pontoon, two potential lines for the bridges to the pontoon were proposed as shown in Figure 2.3.3. Option 3A is the shorter steeper option with bridges on a slope angle of 1:10 (Figure 2.3.4), while Option 3B has a 1:16 slope, has a start point closer to the hard standing but requires an additional bridge and hence is more expensive to construct (Figure 2.3.3).

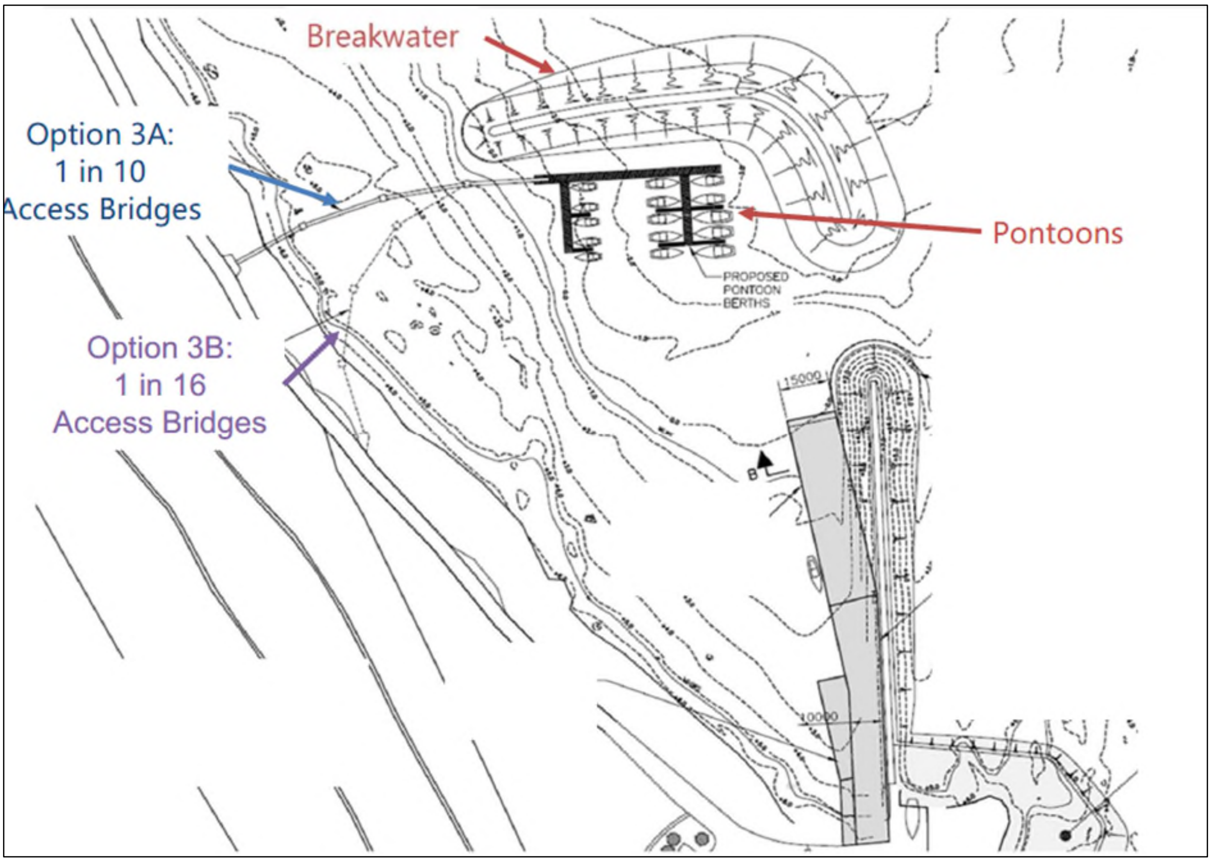

Figure 2.3.3: Options 3A and 3B Layout

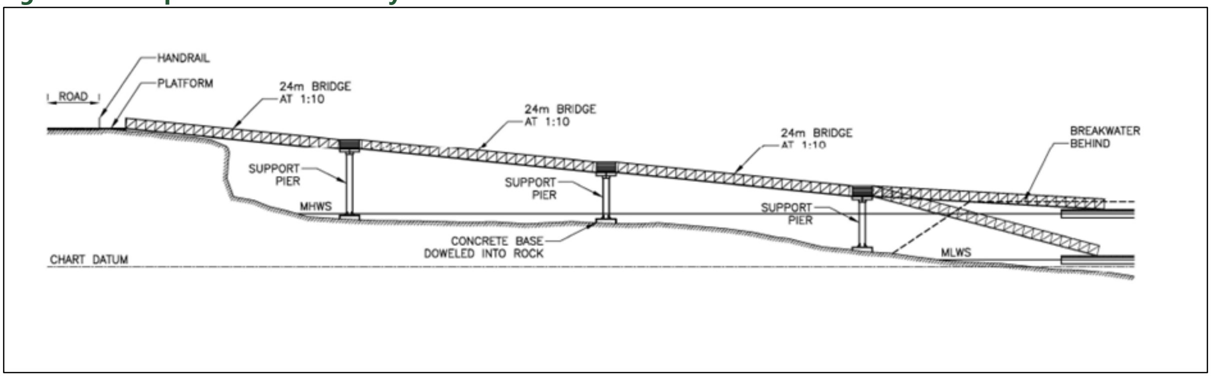

Figure 2.3.4: Option 3A Elevation

Option 4: The design team decided that in order to completely avoid the foreshore to the west of the slipway, which is designated under the Skye NCO, the toe of existing breakwater could be removed to allow the breakwater to extended northwards. The breakwater would then turn to the west to create a sheltered area to accommodate the new pontoons (as shown in Figure 2.3.5).

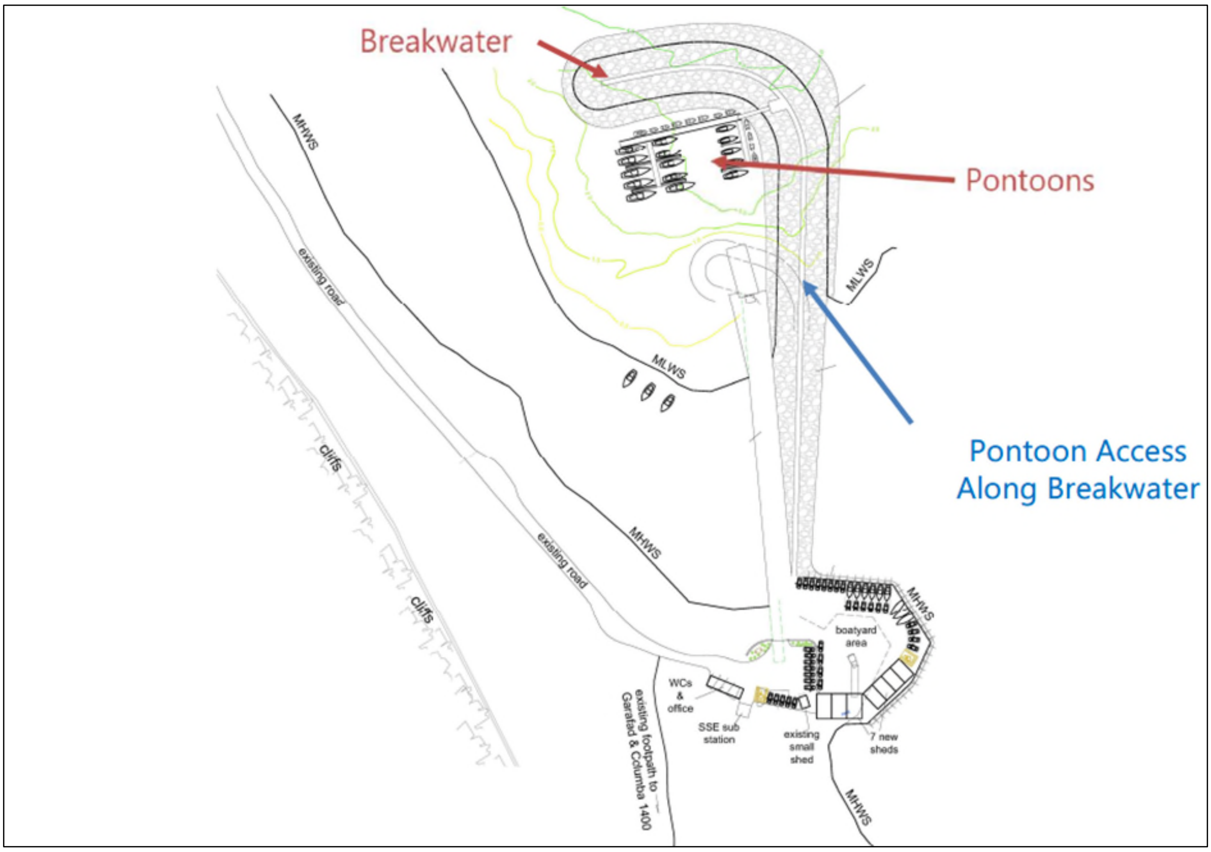

Figure 2.3.5: Option 4

Feedback from participants of the PAC event through questionnaires identified Option 1 and Option 4 as the most popular design choices. On further investigation of Option 4, the wave study showed that having the breakwater on the east of the slipway rather than the west will provide more protection to the Harbour. There was however, one issue with this proposed Option, the design team noted that the water depth at the end of the existing slipway, and the area in which the new breakwater would be extended into, would require a considerable volume of material compared to any other options considered. In turn this increases the number of lorries transporting materials, impacting on transport in the area. Therefore, the decision was made to relocate the breakwater further east into shallower water.

The proposed widening and steepening of the existing slipway and inclusion of a ramp to the west of it also gave rise to challenges partly due to their encroachment into the Skye NCO. The redesign of the breakwater to the east, however provided an opportunity to construct a new slipway from the proposed new breakwater to the east of the current slipway. The current slipway could also be retained adding to the overall offering of the Harbour. The final arrangement is depicted in Drawing JG4845 and discussed in full in Section 2.5.

2.3.2.2 Borrow Pit

The construction of the breakwater and the land reclamation will require stone and aggregate. The closer the source, , the shorter the transport and hence lower the associated transport related environmental and financial cost. The option of reopening Lealt quarry for use as a borrow pit, as opposed to importing material from further afield was therefore investigated. The rock was identified as being suitable for the planned works. The design of the Harbour was utilised to identify the volumes and sizes of rock required and hence the abstraction requirements for the Borrow Pit.

The extraction process will require the blasting of rock to create various sizes of product ranging from crushed aggregate for general fill to 3-5 tonne armour stone blocks. The proposed SCH development is anticipated to require some 52,650 tonnes of rock. Table 2.3.6 sets out an estimate of the required rock quantities. Note that this table shows only the rock needed to be brought to site and does not include the rock in the existing breakwater which will be reused.

Table 2.3.6: Estimated Rock Quantities

Rock Type	Tonnes
Rockfill	31,200
Armour 75-150kg	2,775
Armour 0.3-0.6t	2,250
Armour 1-2t	9,625
Armour 3-5t	6,800
Total	**52,650**

The design of the borrow pit has taken account of:

- the surrounding topography;
- the geological structure;
- engineering requirements to ensure the stability of working faces and the restored landform;
- the strategy with regards to quarry production and product type; and
- minimisation of potential impacts: landscape, visual, hydrology, noise, dust, vibration, traffic and amenity.

2.4 Location

2.4.1 Harbour Development

The proposed SCH development is located at the Staffin Slipway in Òb nan Ron, Garafad, Staffin in the north of Skye and has a grid reference of NG494 681 (Drawing 73.01B). Access to the slipway is via a minor single tracked road off the A855. The road passes the public parking area for An Corran Beach, located approximately 500m north from the existing slipway. The area below the steep rocky cliffs, surrounding the slipway to the northwest, west and south, is common grazing land, before meeting the MHWS and transitioning into the rocky foreshore area. The proposed SCH development falls within the administrative area of the Highland Council. Refer to Drawing 73.04.01 for the proposed SCH development Boundary.

2.4.2 Borrow Pit

Lealt is a previously worked quarry, lying between the A855 road and the east coast of the Trotternish Peninsula, it is to the north of Lealt Gorge, grid reference NG 51879 60595 (Drawing 73.01B). The land falls steeply away to the south of the quarry access, into Lealt Gorge and to the east, and the south-east, to the bay at Inver Tote. Refer to Drawing 73.02.01 and 73.02.02 for the proposed Borrow Pit development area.

2.5 Project Components

Drawing JG4845 provides an overview of the proposed SCH development. Each of the project components are described in Sections 2.5.1 to 2.5.7.

2.5.1 New Breakwater

One of the main aims of the project is to create sheltered berthing. This requires the construction of a breakwater. The entire existing breakwater will need to be dismantled and the material will be used to create a new breakwater to the east of the existing slipway. The new breakwater will be constructed from the newly reclaimed hardstanding area (see Section 2.5.4).

The curved breakwater has a centreline length of approximately 350m. The seaward end is located in water depths of -4m Chart Datum (CD). The curved design provides a sheltered area for the pontoons and slipways discussed in Section 2.5.2 and 2.5.3 respectively. A 5m wide flat section on the top of the breakwater at an elevation of +6.5 CD will be surfaced to provide access to the slipway. The access track will extend just past the slipway to create a turning point before narrowing out to form a footpath to provide pedestrian access to the pontoons. The access track will remain at a height of +6.5CD, however the rock armour will be built up to 0.5m higher than the footpath, which will then form a natural barrier protecting pedestrians and vehicles from falling over the edge of the breakwater. The rock armour will curve around blocking any further access to the rest of the breakwater. Drawing 2297-112 provides a cross section of the breakwater and access track.

Rock armouring has been sized taking account of the wave energy experienced at various locations along the breakwater, as shown in Drawing 2297–111.

2.5.2 Pontoons

To provide berthing, pontoons are proposed. These will be able to accommodate up to 15 boats of up to 12m in length over all (LOA). Provision has been made for a further 15 small boats on the rear side of the berth. The pontoons will be accessible from the parking area over the new breakwater with bridge structure linking the pontoons to the breakwater as shown in Drawing 2297-111. The pontoons will include a water supply, electrical hook-up points and a fuel berth supplied with marine diesel from a storage facility at the hardstanding onshore.

Three decking surface options were proposed namely timber, composite, and GRP Mini Mesh during the PAC. The preferred option was GRP Mini Mesh as it does not get slippery when wet, this will therefore be utilised for the pontoons.

2.5.3 Slipways

A new 10m wide slipway is proposed, as shown in Drawing 2297-112. The slipway will be 70m long overall, 60m of which will be a ramp with a gradient of 1 in 9. The ramp will extend 8m beyond MLWS to allow operations at low tide. Construction will comprise concrete side walls, rock infill, secondary and primary rock armour and a reinforced concrete slab. The new slipway will be constructed on the western side of the new breakwater as shown in Drawing 2297-111. Access to the new slipway will be along the top of the breakwater.

The existing slipway will be left in situ as it will continue to be of use for temporary berthing. On removal of the existing breakwater the east side of the slipway will be modified to allow berthing, thereby doubling the existing capacity of the slipway. An extension to the northern end of the slipway is proposed to allow berthing at low tide.

2.5.4 Hardstanding

To increase the area available for development, an area of 2,022m^2 will be reclaimed from the sea to a height of +6.65m CD. The area to be built up is to the north and east of the existing hardstanding, to the east of the existing slipway. The land reclamation and existing hardstanding will provide approximately 3,200m^2 of area for onshore facilities.

The intent is to have two separate onshore areas, one for general public use and another for harbour users. Excluding non-harbour traffic from the harbour area will help to ensure safe use of the harbour facilities.

The harbour user's area to the east of the hard standing will include: 14 standard carparking spaces, six parking spaces suitable for cars with boat trailers, and one disabled parking space. The parking will be based around a larger vehicle turning area. The storage buildings (see Section 2.5.5) will also be in the segregated area. The intent is to control vehicle access to the harbour user's area utilising a chain and appropriate signage.

The public area to the west of the hard standing will also include space for vehicle turning at the end of the public road. There will be 10 standard parking spaces demarcated and one disabled parking space. The public WCs and Harbour Managers office (see Section 2.5.5) will also be located in the eastern area along with the utilities provision (see Section 2.5.6).

2.5.5 Buildings

The design includes an office for the Harbour Manager and WCs, as shown in Drawing JG4798, which will be available to users of the proposed SCH development and the general public. The office and the WCs will be built with a base height of approximately +7.6m CD. The design includes two toilets and one unisex shower. In addition, provision has been made for one accessible unisex shower and one accessible unisex toilet. A Solar Photovoltaic (PV) array of approximately 27m^2 with an anticipated output of 3 kilowatts peak (kWp) will be installed on the roof of the building on the south elevation.

Onshore storage units for boats, equipment and other maritime related items have been included in the design. The design allows for seven single storey storage units comprising four 8m by 5m and three 10m by 6m units. The storage units will be built with a base height of approximately +7.0m CD. Due to the aesthetic sensitivities of the area, the storage unit design and the buildings design will be visually inspired by local and maritime vernacular as shown in Drawings JG4850 and JG4848.

2.5.6 Utilities

In order to support the proposed buildings discussed in Section 2.2.4, supporting infrastructure such as water, electricity and a foul drainage system will need to be installed on site. A spring is located about 200m south of the proposed SCH development (Grid Reference: 14942 86802), which is currently used to feed water to the tap located behind the existing boatshed. Water to the development will continue to be supplied from the spring with an abstraction rate of up to 2m^3/hour. To allow peak demands to be met water will be stored within a 4m^3 water tank, which will be located to the rear of the existing stone shed.

An underground septic tank will be installed within the parking area for the public for foul effluent treatment and discharge through an outfall pipeline into the marine environment. The outfall pipeline will be a 165m long, 150mm PVC soil pipeline, which will run under the breakwater (refer to Drawing JG4845) for approximately 120m before a sharp right turn through the rock armour and running an additional 45m before reaching the discharge point below MLWS.

Electricity will be provided to the Site through the installation of a substation, connected to the grid by Southern and Scottish Electricity Network (SSEN).

Two double skinned 15,000L fuel storage tanks will be installed. The tanks will be up to 2.5m high and will be located approximately 1.8m from any buildings. Refer to Drawing JG4846 for a detailed layout of the onshore elements. Fuel will be pumped from the storage tanks to the refuelling point on the pontoons. The area in the immediate vicinity of the tanks will be concrete paved and drained via an oil interceptor. The outlet from the interceptor will connect to the outfall pipeline, associated with foul drainage, after the septic tank. The clean water from the interceptor will be discharged through the outfall pipeline below MLWS. Any oil or solids accumulating in the interceptor will be removed by an appropriately licenced waste contractor for treatment and disposal offsite.

2.5.7 Access Road

Access to the proposed SCH development will be via the existing minor single tracked road, which requires some minor repairs and improvements. Drawing JG4920 shows the locations of the existing and proposed passing places along the access road. Table 2.5.7 provides a summary of the proposed improvements. Passing places are numbered starting at the A855 as detailed in Drawing JG4920.

Table 2.5.7: Proposed Passing Place Enhancements

Layby Number	Enhancement
1	Enhancements to passing place involve the cutting into the landowners croft in order to create the space required to widen and lengthen the existing passing place.
2	This is known as the Quirang Lodge Junction. The idea is to extend the road into the central island and widen the road into the verge on the south side.
3	Widening the bend to improve approach to the bend.
4	Widening and lengthening the area of existing hard standing on both sides of the road.
5	Widening the existing passing place on both sides of the road.
6	Lengthening and widening on the west of the existing passing place.
7	Improve forward visibility by removing loose rock on the corner. In addition, a new passing place will be created to the east of the bend.
8	Lengthen and widen the existing passing place.
9	Widen the road adjacent to the existing passing place.
10	Widen the existing passing place.
11	Forming a new passing place in way of the existing parking area.
12	Widening and lengthening the existing passing place
13	Widening and lengthening the existing passing place on both sides of the road.
14	Widening and lengthening the existing passing place.
15	Widening and lengthening the existing passing place.

2.5.8 Borrow Pit

Lealt is an established quarry which is currently not operational. The proposal to re-establish temporary operations minimises land take. Previous workings have left a back-wall, some 6m in height adjacent to the road with a fairly level, slightly domed area of quarry floor, extending eastward towards the coast, there is a second sinking of around 6m to the east of the main floor level.

As the large armour stone required constitutes only a small percentage of blast material (typically 3-5%), the proposed borrow pit is anticipated to have to blast in the region of 130-230,000 tonnes of rock to attain the required tonnage of the 3-5 tonnes armour stone product (Table 2.3.2.2). Accordingly, it is anticipated that there will be additional 'over-blast' materials that will not be required for the SCH development which will be retained, in a tidy state, on-site as aggregate stockpiles. Access to the quarry is directly from the A855, to the north of the access, and separate egress, for Lealt Falls car park, from which a path leads to viewpoints for Lealt Falls and the old Diatomite furnace and mill on the shore at Inver Tote. The quarry workings are to the north of the access.

The quarry is screened from the road due to the workings being at a lower level than the road and by an intervening vegetated bund of previously stripped overburden. Views into the working area are possible from the south, although a key-hole entrance limits visibility.

2.5.9 Aids to Navigation

SCH have been in discussion with the Northern Lighthouse Board (NLB) to agree the location of 6 daymarks to aid navigation from Staffin Bay into the proposed SCH. The daymarks will highlight the route between areas of shallow water to reduce risk of grounding. The location of the unlit port (red can) and starboard (green cone) marker buoys is shown on Drawing JG4929. The buoys will be attached by chains to anchor blocks placed on the seabed.

2.6 Project Phases

2.6.1 Construction

2.6.1.1 Access Road

Road improvements are to be completed prior to the commencement of construction of the SCH. As discussed in Section 4.2, Planning Permission, the road improvements are included in the enabling works planning application. Edge repairs require the excavation of the edge road and verge, placing suitable granular fill down and compacting it. Tarmac is then laid onto the compacted area. Patching of the holes involves the laying of tarmac into the hole to fill it. Passing place works will require an excavator / digger to remove portions of the verge surrounding the passing place. Suitable granular fill will be backfilled and compacted, and overlaid with tarmac. Passing place signs will be installed along with signage prohibiting parking.

2.6.1.2 Land Reclamation

The extension of the existing hardstanding will be achieved through land reclamation using rock sourced from the Borrow Pit. A land-based plant will be utilised to place rockfill from the existing hard surfaced area outwards. Once the rockfill has been placed, the rock armour will be built up to cover the rockfill along the seaward edge to protect the reclaimed area from eroding away. The infill will then be compacted, creating a permeable surface to allow stormwater to drain through. Once completed, this area provides the necessary space for materials such as breakwater rock armour to be stockpiled for construction purposes.

2.6.1.3 New Breakwater

In order to construct the new breakwater, the existing breakwater will need to be dismantled and material removed and stockpiled for use as the relevant rock sizes are required in the construction of the new breakwater further east of the existing slipway. The removal will include dismantling the steel berthing structure and breaking out the concrete ledge that runs from the end of the slipway to the berthing structure. All of the dismantling works will be undertaken utilising land based plant.

The new breakwater will be constructed using land - based long reach machinery to construct the breakwater. Inner rockfill (gravel between 5mm and 64mm and cobbles between 64mm – 256mm) will then be deposited directly on the seabed to form the base of the breakwater and provide stability. A layer of secondary rock armour will then be placed over the inner rockfill, followed by two layers of primary rock armour.

Before the surfacing is laid along breakwater, cables for the electricity and pipelines for fuel, water and the outfall will be laid. As discussed in Section 2.5.6, the outfall pipeline will be routed out through the breakwater. The electrical cables and fuel and water pipelines will terminate on the breakwater at connection points adjacent to the pontoon bridge.

A tarmac surface will be laid along the top of the breakwater to create the 5m wide access track to the slipway. The primary rock armouring will extend up higher than the access track to provide a degree of protection. Along the second section of the breakwater (i.e. between the slipway and pontoons), a tarmac footpath will be laid allowing pedestrians to access the pontoons. Drawing 2297-112 provides the cross sections of the breakwater.

2.6.1.4 New Slipway

The new slipway will be constructed to the east of the new breakwater during low tide. The cross section of the Slipway is show as Section D – D of Drawing 2297-112. In order to create the concrete reinforced 500mm thick wall along the northern side of the slipway, the formwork (shuttering) will be erected in sections starting at the breakwater end. Rebar will be placed within the formwork, prior to ready-mixed concrete being poured within the formwork sections when the tide is out.

To allow the sections below MLWS which will not normally dry out, to be completed. A temporary infill bund will be bult around the construction area to create a cofferdam. Water will be pumped out to allow for the remaining formwork and rebar sections to be constructed and concrete to be poured. The material creating the cofferdam will be removed and reused within the slipway construction.

Rockfill will be placed on the seabed to the south of the concrete reinforced wall to create the base for the slipway. Secondary armour (0.15t to 0.3t) will be placed along the southern side of the rock infill, followed by a two layers of primary rock armouring (1.5t to 2.5t). The slipway surfaced will be formed either through the placement of pre-cast reinforced concrete slabs or the placement of rebar over the surface of the rockfill and in-situ pouring of concrete.

Any concrete pour with the potential to be inundated with seawater will have appropriate marine additives in the mix, to eliminate cement wash out (retains the integrity and prevents pollution).

Concrete works on the existing slipway are likely to utilise shuttering and in-situ pours, with cofferdam techniques employed for areas below MLWS.

2.6.1.5 Pontoons

The new pontoons will be brought to site in sections. Each section will be craned into the water from the new slipway and manoeuvred into place utilising a boat and attached to temporary mooring lines. Concrete anchor blocks, located on the breakwater and on the seabed along the perimeter of the pontoons will be installed. The sections of pontoon will be bolted together using rubber bushes. The bridge, connecting the pontoons to the breakwater will be attached to a section of the pontoon prior to be placed within the water. The boat used to tow the pontoon sections will be equipped with a crane arm, which will lift the bridge into place onto the breakwater. Once the pontoons are in place, the fuel and electrical services will be fitted.

2.6.1.6 Buildings

In order to construct the WCs and Harbour Manager's office the foundation will be excavated, and then in-situ concrete poured to form the foundation. The walls will be constructed by laying concrete blocks with a sinusoidal metal profiled roof cladding. Vertical board on board cladding will be used at the front of the building with cement dash on the sides and back of the building. PV Panels will then be fastened onto the sinusoidal metal roof cladding.

Concrete foundations will be laid for the onshore storage units. Steel profile frames will be erected, and clad in sinusoidal metal profile attached for the walls and roof.

2.6.1.7 Utilities

In order to get water from the spring to the proposed SCH development, the existing old plastic pipe, which is in poor condition will be replaced. The vegetation layer will be removed intact as possible (turfed) and set to the side. The soil will then be excavated and stockpiled alongside the trench. Approximately 184m of 32mm medium density polyethylene (MDPE) blue plastic pipe will laid from the proposed SCH development to the spring. Once the new pipeline has been laid, the trench will be back filled using the stockpiled material, and turfs placed back. A stock proof spring catchment chamber will be constructed over the spring. A pump will be installed in one of the new storage sheds, along with a 4,000l water storage tank.

A substation will be installed on site to provide power to the proposed SCH development. As discussed in Section 4.2 of Chapter 4: Statutory Context and Policy, this is included within the enabling works planning application and will be constructed as part of the enabling works. The substation will be installed as a modular unit on a concrete plinth, which will require in-situ concrete pouring. New high voltage cables will need to be installed by SSEN, connecting the substation to the grid.

A section of the existing hardstanding will need to be excavated to install the 5,000l septic tank underground. In addition, excavations within the existing hard surfacing will be required to install the pipeline which will connect the WCs with the septic tank and the septic tank to the outfall pipeline, installed under the breakwater. The material excavated will be stockpiled and used for back filling. In areas with existing concrete surfacing, the surface will be reinstated with concrete in-situ once backfilling is complete.

As discussed in Section 2.5.6, the outfall pipeline will be laid on top of the rock infill within the breakwater before making a sharp right turn through the rock armour. The pipeline will be routed through the lower point in the seabed rock for approximately 45m in an eastly direction to just below MLWS. The pipeline will be laid and encased within concrete. Rocks will be placed on top to cover the encased pipeline.

The fuel storage tanks will be delivered to site, installed and secured on a concrete slab, in accordance with the manufacturer's instructions.

2.6.1.8 Borrow Pit

Preliminary Works

Initial site development works would relate the securing of the site boundaries, the installation of welfare facilities for site personnel and soils tripping and mound formation operations. Drawing 73.02.02, Existing Topography Plan shows the existing borrow pit development.

The existing site is enclosed by boundary fencing to the west and south-west. The gorge immediately to the east of the quarry creates a natural barrier. Prior to the commencement of the development, the northern, southern and south-eastern boundaries of the site will be secured with stockproof fencing. All fencing shall be maintained, as appropriate, throughout the duration of operations until the reinstatement of the site is complete. Appropriate warning signage will be erected in order to maintain public safety.

Most of the existing borrow pit is bare ground with soils and overburden forming screening mounds on the western and northern boundaries.

The proposed development areas to the north and east extend to around 0.3ha and soils are very thin (generally less than 300m) and there is no definable split between topsoil and subsoil which would require these to be stripped separately. All soils shall be retained on site and utilised for screening and restoration.

Soil stripping over the full area shall be undertaken at the commencement of operations. Prior to the commencement of soil stripping a blind catch ditch shall be formed along the northern boundary. Prior to soil stripping, silt traps shall be installed along the minor water feature on the eastern site boundary. Soils stripped from the excavation area shall be stored within the northern part of the site.

Soil stripping shall only be carried out when soils are reasonably dry. Work routines for stripping operations shall be designed to minimise vehicle movements on unstripped land, and at all times the mechanical handling and compaction of the topsoil shall be minimised. No vehicle, other than those involved in the stripping operations, shall be permitted on unstripped land.

Soil mounds shall not be traversed by heavy vehicles or plant other than in the course of formation or removal for respreading. The sides and top surfaces of all mounds shall be evenly graded and shaped to prevent water ponding on their surfaces.

Extraction Activities

The proposed development will be undertaken in three phases (Drawings 73.02.03, 73.02.04, 73.02.05 and 73.02.07).

Phase 1 - minor development of the western and northern quarry faces; this creates a safe final face and enlarges the quarry floor area which will be the subject of development in Phases 2 and 3 (Drawing 73.02.03). Initial works will be required to relocate the existing soil/overburden mounds which are located to the west and north of the existing quarry. The clearance of these mound will also allow access for the drilling rig. The face height will vary from around 6m in the south to up to 11m in the north.

Following drilling and blasting, the larger rock in the blast pile, suitable for use as rock armour, will be extracted by an excavator and moved to the armour stone stockpile on the southern site boundary until required at the slipway site. Once the above segregation has taken place there may be material that requires to be broken as it would be too large for processing. This size reduction would be undertaken by an excavator mounted hydraulic breaker. The remaining mineral in the blast pile would be moved by the loading shovel to the rock processing and storage area which will be located within the screened southern part of the existing quarry at around 85m AOD. Once a sufficient volume of material had been accumulated mobile plant would be brought to site to prepare crushed aggregates. This would comprise a crusher and, possibly, a screen.

Phase 2 - the development of an access haul ramp at a gradient of 1 in 10 from the southern part of the borrow pit northwards towards the existing sinking on the western edge of the borrow pit at around 81-82m AOD (Drawing 73.02.04). From this point the borrow pit will be developed north and west with a floor level of 77m AOD. A small bund will be created along the eastern boundary to ensure that there is no run-off from the quarry into the watercourse to the east. As the quarry is developed to the north and west, an 8m bench will be established along with appropriate edge protection. The final quarry faces will vary from 8m in the west to 12m in the north and 4-7m in the east.

Following drilling and blasting, rock sorting and processing would continue as in Phase 1.

Phase 3 - develops the excavation to the south with the floor rising gently from 77m to 78m AOD to avoid ponding at the excavation face (Drawing 73.02.05). The final quarry faces will be around 7m in height. As with Phase 2, an 8m bench will be established along with appropriate edge protection.

As noted in Section 2.5.8, the total tonnage that requires to be blasted will depend on the yield of armour stone, which is anticipated to be in the region of 3-5%. Phase 3 design allows for the lower yield of 3% which should therefore make provision for all armour stone required. However, if a 5% yield is achieved, the total tonnage requiring to be blasted would be significantly reduced. In this respect the final quarry development is by necessity indicative, and the residual void could fall somewhere between Phase 2 and Phase 3 design.

As Phase 3 is developed southwards, the processing and storage area will be relocated from the 85m AOD level into the northern part of the quarry sinking on the 77m AOD level. As operations progress, any 'over-blast' materials that are not required for the slipway project will be retained on the quarry floor, in a tidy state, as aggregate stockpiles.

Closure

The site is owned by the Scottish Government and comprises the existing borrow, with quarry faces and bare ground and grassed screening mounds on the western and northern boundaries. On consultation, the Scottish Government has indicated that the site may be suitable for future development, subject to planning permission, and that the preferred reinstatement would leave the quarry in a relatively clear and tidy state. It is also noted that the retained over-blast would be a suitable source of aggregates for future local developments.

In light of the potential for future use of Lealt Quarry, reinstatement of the site will ensure safe and stable slopes with a graded floor level (Drawing 73.02.06). This will include suitable edge protection bunding, warning signage and peripheral fencing. The Landowner shall be responsible for ensuring safety of members of the public following completion of works.

Any blasted and/or processed materials, which are not required for the harbour project, shall be retained in a tidy state, as stockpiles, within the excavation void.

Having regard to the potential for future use, re-vegetation will largely be restricted to the periphery of the quarry. The grassed peripheral screening mounds shall largely be retained in-situ. Limited soils shall be spread on the quarry bench which will be seeded with grass and scrub. Prohibitive planting (gorse) will be undertaken to restrict access onto the quarry bench. A small channel will be broken through the north-eastern edge of the quarry wall to provide a drainage outlet to the adjacent watercourse; this being a re-creation of the current situation.

Following physical restoration, the planted areas shall be subject to an aftercare scheme.

2.6.2 Operations

While the proposed SCH development does not comprise a new development, the improved infrastructure, better onshore amenities and safer road and parking will provide an attractive space for both boat users and the general public. The safer berthing and improved launching facilities will support commercial sectors such as fishing, fish farming and tourism.

The public wanting to make use of the footpath surrounding the Harbour will have safer access to the Harbour, better parking and access to WCs. Visiting boats will have a safe haven during bad weather or just to refuel and utilise the Harbour amenities. Local boat users will be able to leave boats within the Harbour all year round rather than launching and hauling boats out when needed.

From a commercial point, the fish farm operators will have valuable infrastructure to launch and berth boats, store equipment and park commercial vehicles. Larger landing crafts will be able to operate from the slipway, rather than Portree. Fish farm workers and fishermen will no longer have to make the hazardous crossing in small tenders to swinging moorings on the opposite side of the bay.

The improved onshore amenities, parking and roads, provides an opportunity for marine tourism operators to move into the space (i.e. kayak rentals, boat cruises and marine mammal watching cruises), attracting tourists into the Staffin area.

2.6.2.1 Maintenance

Although maintenance dredging is not expected during the operational phase of the proposed SCH development, other works relating to maintenance are required including:

- Pontoons: removing marine growth, repairing floats and replacing fenders etc.;
- Clearing the outfall grille;
- Emptying the oil interceptor;
- Emptying of the sludge from the septic tank;
- Removing marine growth from the slipways;
- General building maintenance; and
- Replacing mooring rises every 10 years.

2.6.3 Decommissioning

Due to nature of the Proposed Project, there are no future plans for the discontinued use of the Site. However, should it become necessary to decommission the SCH in the future, materials (i.e. rock and infill) could be removed from the seabed and the onshore buildings demolished, depending on what the plan is for the site. The majority of the materials utilised within the proposed SCH development could be reused for other developments (specifically rock and infill) or recycled (metal cladding on the buildings).

2.7 References

Ports and Harbours of the UK. 2021. Retrieved from http://www.ports.org.uk/port.asp?id=459. Accessed 23 February 2021.

2.8 Glossary

Acronym	Definition
CD	Chart Datum
ha	Hectares
km	Kilometres
kWp	Kilowatts peak
L	Litres
m	Metres
MDPE	Medium density polyethylene
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
mm	Millimetres
NCO	Nature Conservation Order
PAC	Pre – application Consultation
PV	Photovoltaic
SCH	Staffin Community Harbour
SCT	Staffin Community Trust
SSEN	Southern and Scottish Electricity Network
WCs	Water Closet
WestPlan	The West Highlands and Islands Local Development Plan

Chapter 3: Methodology

Document Control

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Contents

3 Methodology

3.1 Overview of Approach and Methodology

One of the main purposes of the Environmental Impact Assessment (EIA) process is to influence and improve design through iteration. Environmental impacts have been considered throughout the project, from the development option stage to the project's design stages, as discussed in Chapter 2. Where possible, environmental considerations have been incorporated into the design. The siting and design of the improvement works have been heavily influenced by aspects identified through the EIA process, including stakeholder opinion, possible visual and archaeological impacts, and the seabed conditions in the area.

An environmental specialist was involved throughout the design process, and, where necessary, appropriate topic experts were consulted to inform the design. Therefore, the project design has avoided and minimised impacts wherever possible, and, as such, there are embedded 'primary mitigation measures' to avoid or reduce negative effects. These are incorporated within the assessment of effects.

Additionally, it is assumed that standard construction practices, such as those outlined in Guidance for Pollution Prevention documents (GPP) (tertiary mitigation), have been applied in the assessment process and that these are captured within the Schedule of Mitigation (Chapter 19).

This section sets out the process undertaken to provide a methodical and robust assessment of environmental impacts, which is used across all the chapters of the Environmental Impact Assessment Report (EIAR) and aligns with the legislative requirements.

3.2 Scoping

A formal scoping opinion was not sought from the regulators due to the project timelines. However, a Scoping report was drafted and is provided as Appendix C.1, in Volume 3 of this EIAR as it provides the understand as to why topics have been scoped out and are not considered in detail within the EIAR. It should be recognised that there were discussions with stakeholders with regard to the scope of assessment completed for specific topic areas for example traffic and access.

Table 3.2.1 provides a summary of the output of the scoping report. Items scoped out (grey) have not been assessed through the EIAR process, and those in orange have been subjected to a full assessment as laid out in Section 3.4. Mitigation measures are included within the Schedule of Mitigation (SoM) for those identified in green.

Table 3.2.1: Proposed Scoping for the EIA assessment

Topic	Construction and Site Preparation		Operation
	Harbour Development	Borrow Pit	
Air Quality			
Climate Change			
Archaeology & Cultural Heritage			
Benthic Ecology			
Fish Ecology			
Marine Mammals			
Terrestrial Ecology			
Landscape, Seascape and Visual			
In–air Noise and Vibration			
Soils, Geology and Palaeontology			
Hydrology, Hydrogeology, Water Quality and Coastal Processes			
Population, Human Health and Socio-economics			
Resource Usage and Waste			
Traffic and Access			
Navigation			
Major Accidents and Disasters			

Key

	No Effect/Not Applicable – Scoped Out
	Negligible Effect – Scoped Out
	Potential Effect – Scoped In

3.3 Baseline Assessments

Baseline assessments have been completed for each of the EIA topic areas considered as part of this assessment. The following sources of information have been utilised in the compilation of baseline data:

- Desk-based studies: making use of publicly available reports and data;
- Stakeholder dialogue: to identify additional data sources and information; and
- Site surveys and monitoring: when appropriate.

Full details of data sources used and survey and monitoring methods employed for each topic are provided within the topic-specific sections.

The baseline information is utilised to understand the value of each environmental receptor and its sensitivity to the potential impacts associated with the upgrade works. This is then used to assess the significance of the effect each impact is predicted to have.

3.4 Assessment Methodology

The assessment criteria applied to this EIA are detailed within this section. For each of the environmental topics assessed, the appropriate professional guidelines for EIA's are applied and followed as necessary, and any relevant guidance documents and best practice techniques. As a result, where the standard assessment criteria and terminology set out below are not applied for a specific environmental topic, this will be identified within the relevant environmental chapter of the EIAR, along with specific information on the preferred assessment criteria.

The environmental assessment is conducted in two stages. The first stage characterises the nature of the impacts (positive or negative), and the second determines the level of significance of the effects. An effect results from the consequences of a change (or impact) acting on a resource / receptor. The precise nature of the effect will depend on the interaction between the degree of impact (e.g. extent, duration, magnitude, permanence etc.) and the sensitivity, value, or the number of the resources / receptor in each case.

The assessment identifies the origins of environmental impacts, positive (beneficial) and negative (adverse), from the project and predicts their effects on resources or receptors. A resource is any environmental component affected by an impact (e.g. items of environmental capital such as habitats, aquifers, landscape, views and community facilities). A receptor is any environmental or other defined feature (e.g. human beings) that is sensitive to or has the potential to be affected by an impact.

The assessments of whether the effects of the proposals on the particular resources or receptors were made by suitably qualified and experienced practitioners. Where possible, quantitative analyses were undertaken to support the impact assessments. Where the subject did not lend itself to quantitative analysis, qualitative analysis based on the relevant literature and similar studies were utilised to provide a robust assessment. This was determined for each environmental topic, depending on the nature of the receptor.

Each potential impact was assessed in terms of its receptor's sensitivity or value (e.g. nature conservation value, landscape value or amenity value), followed by an assessment of the magnitude of the impact. Thus, it was determined whether or not significant effects result. For each significant effect identified, appropriate secondary mitigation measures are prescribed. The residual effects are determined for each significant effect; taking into account all proposed mitigation.

3.4.1 Sensitivity / Value of Receptors/Resource

Sensitivity or values were assigned to individual receptors or resources, using a set of criteria and terminology defined within each technical chapter. This often categorised in accordance with EIA guidance documents as appropriate for each environmental topic.

Where categories were used to describe the value or sensitivity of a resource or receptor, these are defined within the 'Assessment Methodology' section of the individual chapters. Typically, receptor sensitivity or value will be classed as negligible, low, medium or high.

3.4.2 Impact Severity

In considering the impact severity, a range of factors are taken into account as applicable to the subject matter. The factors used are based on the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines of ecological assessment (CIEEM, 2018) and apply to most topic areas. They include the:

- Positive or Negative;
- Extent: spatial or geographical area affected;
- Magnitude (Scale): size, amount, intensity, volume;
- Duration: typically short-term, medium-term, long-term and permeant or temporary;
- Frequency and timing: how often and when (time of day or seasonality); and
- Reversibility: can the effect be reversed, or is it irreversible.

An impact can be positive or negative, and it is clearly stated within the assessment whether the impacts are positive or negative.

The magnitude of the impact considers the extent, scale, frequency and timing as applicable for the subject area. The magnitude of impact terminology and criteria will be defined within each environmental chapter. In most cases, it includes an overall magnitude term of negligible; minor, small or low; moderate or medium; and major, high or large. In some instances, a fifth category of very large is utilised to align with topic specific guidance.

The duration of the impact is noted as permanent or temporary. Temporary impacts can be further sub-divided, if necessary, in accordance with the following definitions: although use of this terminology is highly dependent on other factors within the environmental topic being assessed (e.g. lifecycle of flora and fauna species):

- Short-term: less than one year in duration;
- Medium-term: between one to three years in duration; and
- Long-term: more than three years in duration.

Whether or not an impact is reversible is also noted.

The initial assessment of impacts takes account of primary and tertiary mitigation (refer to Section 3.4.5). Potential significant adverse effects are then reassessed to understand the residual effects taking into account all of the mitigation proposed.

3.4.3 Indirect and Cumulative Impacts, and Impact Interactions

As well as direct impacts (resulting from the project itself), impacts can also be indirect or cumulative. There can also be interactions between multiple impacts resulting from one or more projects. Where this terminology is used within any assessment, the definitions for these (as taken from 'Guidelines for the assessment of indirect and cumulative impacts as well as impact interactions' (European Commission, 1990)) are outlined below:

- Indirect: impacts on the environment, which are not a direct result of the project, often produced away from or as a result of a complex pathway. Sometimes referred to as second or third level impacts or secondary impacts;
- Cumulative: impacts that result from incremental changes caused by other past, present or reasonably foreseeable future actions together with the project; and
- Impact interactions: the interactions between impacts, whether between the impacts of just one project or between the impacts of other projects in the area.

3.4.4 Determination of Significant Effects

For each impact identified, a determination of whether or not it will result in a significant effect was made, taking into account both the sensitivity / value of the resource / receptor and the magnitude of impact. Table 3.4.1 provides an example of how these two elements can be combined to give an overall significance category. Topic specific variations to significance determination are provided in the topic chapters.

Table 3.4.1: Categorising Significance of Effects.

	Sensitivity/Value of Resource/Receptor			
Magnitude of Impact	**High**	**Medium**	**Low**	**Negligible**
Major/Large/High	Major	Moderate	Minor	Negligible
Moderate/Medium	Moderate	Moderate	Minor	Negligible
Minor/Small/Low	Minor	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Key

	Significant Effect
	Non-Significant Effect

The categories provide a threshold to determine whether or not significant effects may result from the proposed development. A typical categorisation is shown in Table 3.4.2. Effects can be both beneficial or adverse.

Table 3.4.2: Categorisation and Definition of Effects

Category	Definition
Negligible	No detectable change to the environment resulting in no significant effect.
Minor	A detectable but non-material change to the environment resulting in no significant effect.
Moderate	A material, but non-fundamental change to the environment, resulting in a possible significant effect.
Major	A fundamental change to the environment, resulting in a significant effect.

For this particular EIAR, a significant effect will be defined as moderate in level or higher (Table 3.4.1 and Table 3.4.2) and considered to be a 'likely significant effect' in terms of EIA. The duration and reversibility of the effect will also be noted, as discussed in Section 3.4.2.

For adverse significant effects, secondary mitigation will be proposed where practicable to prevent, reduce, or offset the significant adverse effect. Effects determined as minor or lower will be considered to have no significant effect. Where an impact could be reduced by the application of recognised best practice, this will be identified irrespective of its significance. This will assist in reducing all effects, whether they are significant in EIA terms or not.

3.4.5 Approach to Mitigation

The Institute of Environmental Management and Assessment (IEMA) define three categories of mitigation in their EIA guidance for Shaping Quality Development (IEMA, 2015). These categories are used throughout this EIAR and are outlined below:

- Primary (Inherent) Mitigation: Modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project and does not require additional action to be taken.
    - E.g. Identifying a key habitat or archaeological feature that should remain unaffected by the development's layout and operation.
- Secondary (Foreseeable) Mitigation: Actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent or through inclusion in the EIAR.
    - E.g. Adoption of a Marine Mammal Protection Plan to limit the effects of disturbance through piling noise.
- Tertiary (Inexorable) Mitigation: Actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements or actions that are considered to be standard practices used to manage commonly occurring environmental effects.
    - E.g. Considerate contractors' practices that manage activities that have potential nuisance effects.

As per the above IEMA categories, all the primary and tertiary mitigation embedded in the design and proposed construction techniques are set out in the Project Description (Chapter 2), with topic specific elements discussed in the individual topic chapters. The primary and tertiary mitigation measures will be used when assessing the significance of effects since both these forms of mitigation are certain to be delivered. Thus, any effects that might arise without the primary and tertiary mitigation do not need to be identified as potential effects, as there is no potential for them to occur.

Secondary mitigation measures will be proposed where practicable for any potential significant adverse effects that are identified. Mitigation measures will then be developed, as required, taking into account current guidance, precedents from similar projects, effectiveness and feasibility of solutions, and incremental costs.

It may only be possible to reduce the severity of potential adverse effects through secondary mitigation, as some cannot be eliminated entirely. Residual effects are those that remain after mitigation has taken place. These are assessed in the same way as detailed in Section 3.4.4.

A Schedule of Mitigation has been produced; and will be utilised in the development of the Construction Environmental Management Document (CEMD) in line with The Highland Council (The Highland Council, 2010) and IEMA's guide to Delivering Quality Development (IEMA, 2016). The CEMD will be developed prior to the commencement of construction activities. The CEMD is a 'live' document and will be updated as required to take account of additional detail from the design and specific information once the Construction Contractor is appointed. Any material changes to the Schedule of Mitigation or CEMD content will be discussed and agreed upon with Marine Scotland, Highland Council and the relevant statutory consultees prior to implementation.

3.5 Consultation

As discussed in Chapter 4: Statutory Context and Policy, the project was required to carry out Pre-application Consultation (PAC). A PAC Report has been produced for submission with the Marine Licence application.

3.6 Cumulative Effects

A review of planned developments has been carried out to identify which should be considered within the EIAR from a cumulative effects perspective. Of those that required consideration, a further review was completed to understand which topic-specific chapters need to consider.

3.6.1 Onshore Developments

The Highland Council's ePlanning website (Highland Council, 2021) was accessed on the 23rd of June 2021 to identify and review any projects in the planning process that could give rise to cumulative or in combination effects. They have been examined to determine if any applications would give rise to a new receptor that may need to be considered within impact assessments.

In total, 12 planning applications were made within a 1.5km radius of the harbour development in the previous 28-month period (February 2019 to June 2021). Interpretation panels constituted three of the applications; these have already been installed and, as such, will be considered as baseline.

Six of the applications are for new houses around Clachan, all of which have been granted consent. A small camping pod has also been permitted in the hamlet. Due to the scale of these developments, they are unlikely to give rise to cumulative effects even if constructed simultaneously. The houses are in an area of existing residential properties, and as such, they are not deemed to give rise to a new receptor. However, it is noted that they are increasing the size of the hamlet of Clachan.

Planning permission has been granted for an agricultural building in Stenscholl. This is not likely to give rise to cumulative effects due to its scale, nor is it a new receptor.

The final planning consent near the slipway is for the conversion of an agricultural shed to a farm shop and catering facility. This is located to the east of the minor road leading from the A855 to the slipway, just to the North of the junction with the A855. As both projects will be utilising the junction with the A855, and the farm shop is likely to give rise to additional vehicle movements, it will be considered in the Traffic Impact Assessment.

In total, 12 planning applications were made within a 1.5km radius of the borrow pit in the previous 28-month period (February 2019 to June 2021). Interpretation panels again constituted three of the applications and will be considered as the baseline due to already being installed.

Two of the applications are for new houses around Lonfearn (approximately 1km to the North of the borrow pit), and another is for a set of three small holiday pods within Lonfearn. These have all been granted consent and will share a new access road coming off the A855. Two applications for holiday let units sharing a plot of land have also been granted planning permission in the existing settlement of Grealine (approximately 1km to the North, North West of the borrow pit). Planning permission for a new house in the existing settlement of Lower Tote (approximately 1km to the south of the borrow pit) was also granted.

These new houses and holiday pods are unlikely to give rise to cumulative effects even if constructed at the same time due to their small scale. They are all located close to existing residential property and are no closer to the borrow pit than the existing properties. They are not new receptors for consideration in EIA terms; rather, they increase the size and potential sensitivity of the existing settlements as receptors.

A Prior Notification application for the construction of a new agricultural shed in Lower Tote was submitted, but it was decided by the authority that prior notification was unnecessary. The search in June 2021 identified that this has since been followed up with an application for retrospective permission for quarrying and permission for further quarrying, to level the area needed for the development. A further 4400 cubic metres of material is required to be extracted from the site, and the proposal is currently under consideration. The access road to this site joins the A855 approximately 700m south of the proposed borrow pit of the proposed SCH development.

Having regard to the separation distance from the borrow pit, and the small scale and short duration of the two developments, the potential for any cumulative impact in terms of noise, dust, traffic, hydrology or ecology is unlikely. As the two sites are intervisible, the potential for cumulative landscape and visual effects is considered (Chapter 13).

The final planning consent is for a marine fish farm located 500m offshore around 1km north of the borrow pit. No negative cumulative impacts are expected to arise as a result of this development's offshore location. Indeed, this development will benefit from the increased ease of access provided by the Staffin Community Harbour (SCH) development project.

3.6.2 Offshore Development

Current marine renewable energy projects, construction, cable and National Renewable Infrastructure Plan projects are listed on the Scottish Government website and were accessed on the 23rd of June 2021 (Marine Scotland, 2021). Each project type has been considered in turn to identify projects which could have cumulative or in-combination effects. The potential impacts of this slipway redevelopment project are predicted to have a relatively limited geographic extent. Thus, only projects within an approximately 70km radius of the development were considered. This area encompasses projects in The Minch, the Little Minch and the Sea of the Hebrides and broadly covers Skye, the Western Isles, and the coastal mainland from Ullapool to Mallaig. In total, ten projects were identified and are considered in more detail in **Error! Reference source not found.** to establish whether or not there is a possibility of cumulative effect.

3.6.3 Topic Consideration

Each of the projects identified in Section 3.6.1 and 3.6.2 as having the potential for cumulative effects have been considered in more detail to identify the environmental topic areas for which there are potential cumulative effects (Table 3.6.1). Only where there is a potential cumulative effect have the projects been taken forward for consideration in the topic-specific chapter. Those effects being brought forward for cumulative assessment are shown in light blue in Table 3.7.3.

Table 3.6.1: Marine Projects for Cumulative Consideration

Project type	Status	Proposal	Approx. distance from Staffin	In/Out	Reason for inclusion/exclusion
Maintenance of existing works	Application	Bridge Maintenance Works, A87 Kyle of Lochalsh	~ 50km straight line ~ 50km by sea	OUT	An EIA was not required for this project, and so any environmental impacts will be non-significant, localised and very unlikely to result in cumulative effects.
Cable	Application	Cable Replacement – Isle of Skye to Harris	~ 20km straight line to the nearest point ~ 35km by sea	OUT	There is potential that construction could overlap with the SCH development. However, the impacts associated with cable lays are very localised, and so it is unlikely any cumulative effects will arise between the projects.
Construction of new works	Application	Deep Water Port, Glumaig Bay, Stornoway	~ 65km straight line ~ 65km by sea	IN	It is likely the construction works may overlap, and thus there is potential that both developments could impact mobile receptors (particularly marine mammals). The potential cumulative effects will therefore be taken into consideration in the relevant chapters.
Construction of new works	Application	Ferry Terminal Development – Tarbert, Isle of Harris	~ 45km straight line ~ 50km by sea	OUT	Construction works at Tarbert harbour will be completed by autumn 2021. This will not overlap with those at Staffin, and so cumulative construction effects between the two projects will be very unlikely. The ferry terminal extension will facilitate a larger vessel but will not change the ferry timetable, and as such, it doesn't change the current baseline in terms of vessel movements.
Construction, alteration or improvement of any works	Pre-application	Kishorn Port Land Reclamation for Laydown Area	~ 40km straight line ~ 60km by sea	OUT	The project does not require an EIAR, and the main marine effects identified in the screening opinion (Affric Ltd., 2020) were negligible after mitigation. Together with the presence of land between the two developments, this means there are unlikely to be any cumulative effects.
Construction, alteration or improvement of any works	Post-consent	Kyleakin Feed Mill Construction	~ 45km straight line ~ 50km by sea	OUT	The construction for this project has already been completed and, as such, will be considered as the baseline.

Project type	Status	Proposal	Approx. distance from Staffin	In/Out	Reason for inclusion/exclusion
Construction, alteration or improvement of any works	Application	Lochmaddy Ferry Terminal Development	~ 55km straight line ~ 70km by sea	IN	Construction has been delayed, so this stage will likely overlap with the Staffin slipway. The project is located on the east coast of North Uist. Thus, it could potentially impact the same mobile marine mammal receptors; hence there is a potential for cumulative effects.
Construction, alteration or improvement of any works	Licence	Newton Marina Development	~ 65km straight line ~ 65km by sea	OUT	The development has completed its construction phase and is now operational. As such, it is considered to be the baseline.
Construction of new works	Application	Uig Ferry Terminal Development, Uig, Isle of Skye	~ 10km straight line ~ 35km by sea	IN	There is potential for the construction works at this relatively close project to overlap. Its construction programme involves piling operations, which have the potential to impact mobile marine mammal receptors. Due to the same receptors potentially being impacted by construction at the Staffin slipway, this project will be further assessed for cumulative impacts.
Cable	Application	Western Isles to Mainland Scotland HVDC Interconnector	~ 50km straight line ~ 50km by sea	OUT	Whilst there is potential for the construction works to overlap with those for the Staffin slipway, the relatively localised nature of impacts expected from both developments means no cumulative effects should arise.

Table 3.6.1: Environmental Topic's with Potential Cumulative Effects

Topic	Farm Shop, Garafad, Staffin	Deep Water Port, Glumaig Bay, Stornoway	Lochmaddy Ferry Terminal Development	Uig Ferry Terminal Development, Uig, Isle of Skye	Agricultural Shed in Lower Tote
Air Quality and Climate Change	While these developments are in close proximity and the construction phases may overlap, no cumulative dust impacts due to minimal dust impacts associated with both developments.	The potential overlap in the construction phase, the distance of these projects to the proposed Staffin Community Harbour development is too great to have cumulative impacts on dust. Climate change is a global issue; hence cumulative effects will occur with all other sources of greenhouse gases; therefore, it is not appropriate to consider specific projects in cumulative terms.			
Archaeology and Cultural Heritage	No archaeological impacts are likely from this project; hence, no cumulative effects.	Although there are archaeological effects associated with the Stornoway Deep Water Port, they are all on localised features. The Staffin development will not affect them; hence no cumulative effects are predicted.	No significant archaeological effects were predicted for the Lochmaddy project; hence significant cumulative effects are highly unlikely.	Archaeological assets in Uig and Staffin are associated with local issues; hence no cumulative effects are predicted.	
Benthic Ecology	Benthic impacts are not associated with the development of a farm shop.	The main effects on benthic ecology associated with these projects are dredging, dredge disposal, and habitat loss. Impacts on benthic ecology associated with Staffin will be primarily loss of habitat, which is a localised effect. No significant cumulative effects are predicted.			This is not a Marine project and is therefore benthic would not be considered as part of the application.
Fish Ecology	Not applicable to this type of development, hence no cumulative impact on fish ecology.	Although there is a significant distance between these two projects, potential impacts on fish species (e.g. basking sharks) during the	Although there is a significant distance between these two projects, potential impacts on fish species (e.g. basking sharks) during the	Potential impacts on fish species (e.g. basking sharks) during the construction phase due to	This is not a Marine project and is therefore fish would not be considered as

Topic	Farm Shop, Garafad, Staffin	Deep Water Port, Glumaig Bay, Stornoway	Lochmaddy Ferry Terminal Development	Uig Ferry Terminal Development, Uig, Isle of Skye	Agricultural Shed in Lower Tote
		construction phase needs to be considered due to their mobile nature.	construction phase needs to be considered due to their mobile nature.	the proximity of the two developments.	part of the application.
Marine Mammals	Not applicable to this type of development- no cumulative impact on marine mammals ecology	Although there is a significant distance between these two projects, potential impacts on marine mammals during the construction phase needs to be considered.	Although there is a significant distance between these two projects, potential impacts on marine mammals during the construction phase needs to be considered.	Potential impacts on marine mammals during the construction phase due to the proximity of the two developments, which are within the Inner Hebrides and the Minches Special Areas of Conservation (Designated for Harbour porpoise).	This is not a Marine project and is therefore marine mammals would not be considered as part of the application.
Terrestrial Ecology	The conversion of an existing building is highly unlikely to have an effect on terrestrial ecology; hence, no cumulative effect.	None of these projects are connected by land hence no cumulative effects on terrestrial species.		No significant effects on species with a range that could include both sites, e.g. ornithology or otters, were identified within the Uig EIA. Therefore, no cumulative effects.	None of these projects are connected by land hence no cumulative effects on terrestrial species.
Landscape, Seascape and Visual	The conversion of an existing building will not change the baseline landscape, and visual context; neither are the two projects likely to have any intervisibility.	Due to the location of these two projects on different islands, there are no cumulative landscape or visual impacts.		Due to the location of these two projects on opposite sides of the island with hills between them, there will be no cumulative landscape or visual impacts.	As the two sites are intervisible, the potential for cumulative landscape and visual effects needs to be considered.
In- air Noise and Vibration	No significant noise sources are likely to arise from the conversion of an	Due to the distance between the sites, no cumulative noise and vibration impacts are anticipated.			Having regard to the separation distance from the Borrow pit,

Topic	Farm Shop, Garafad, Staffin	Deep Water Port, Glumaig Bay, Stornoway	Lochmaddy Ferry Terminal Development	Uig Ferry Terminal Development, Uig, Isle of Skye	Agricultural Shed in Lower Tote
	existing building. Hence cumulative noise effects are unlikely.				and the small scale and short duration of the two developments, the potential for any cumulative impact in terms of noise is unlikely.
Soils, Geology and Palaeontology	Effects on soil, geology and palaeontology are all very localised hence no cumulative impacts due to the distance between projects.				
Water Quality and Coastal Processes	Not applicable to this type of development, hence no cumulative impact on water quality and coastal processes.	Due to the distance between these projects, no cumulative impacts on water quality and coastal processes are anticipated.			This is not a Marine project and is therefore coastal processes would not be considered as part of the application. Due to the distance between these projects, no cumulative impacts on water quality are anticipated.
Population, Human health and Socio-Economics	It is recognised that people utilising the Harbour may also frequent the Farm Shop, which may be beneficial in socio-economic terms. The cumulative effect is	Due to the distance and location of these two projects, no cumulative impacts are anticipated.	It is recognised that visitors to Staffin may also visit Uig and travel to Lochmaddy and the western isles. This may bring economic benefit to all areas. However, the proposals are unlikely to significantly increase this; hence no significant cumulative effects are predicted.		Due to the distance and location of these two projects, no cumulative impacts are anticipated.

Topic	Farm Shop, Garafad, Staffin	Deep Water Port, Glumaig Bay, Stornoway	Lochmaddy Ferry Terminal Development	Uig Ferry Terminal Development, Uig, Isle of Skye	Agricultural Shed in Lower Tote
	not likely to be significant.				
Traffic, Access and Navigation	There are potential cumulative impacts on traffic and access as they both utilise the minor access road off the A855.	Due to the distance and location of these two projects, no cumulative traffic, access and navigation impacts are anticipated.	No significant traffic effects were identified for the Lochmaddy project on Skye; hence no cumulative effects are predicted.	Although there is potential for the construction phases of these two projects to overlap, materials transport for the Staffin Community Harbour will utilise the A855 between Lealt and the slipway primarily. Uig is on the A87, and hence, the majority of construction traffic will not be on the same roads. There are no cumulative traffic and access impacts.	Having regard to the separation distance from the Borrow pit, and the small scale and short duration of the two developments, the potential for any cumulative impact in terms of traffic is unlikely,

Key

	No further assessment required.
	To be taken forward for cumulative assessment.

3.7 References

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3.8 Glossary

Acronym	Definition
CEMD	Construction Environmental Management Document
CIEEM	Chartered Institute of Ecology and Environmental Management
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GPP	Guidance for Pollution Prevention
IEMA	Institute of Environmental Management and Assessment
km	kilometres
m	metres
PAC	Pre – Application Consultation
PAN	Proposal of Application Notice
SCH	Staffin Community Harbour

Chapter 4: Statutory Context & Policy

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Contents

4 Statutory Context & Policy

This chapter provides a summary of the statutory requirements for the construction of the proposed Staffin Community Harbour (SCH) development, as well as highlighting the policies that may apply to the determination of the Marine Licence and Planning Consent Applications. In addition, statutory requirements specific to a given topic area are discussed in the relevant topic chapters.

4.1 Marine Licence

Under the Marine (Scotland) Act 2010 a number of activities listed in Part 4, Section 21 of the Act require a Marine Licence issued by the Marine Scotland Licensing Operations Team (MS-LOT). This includes any activity where the project intends to do any of the following below the Mean High-Water Springs (MHWS):

- Deposit or remove substances or objects in the sea either on or under the seabed;
- Construct/alter/improve any works in or over the sea or on or under the seabed;
- Remove substances or objects from the seabed; or
- Dredging activity.

The removal of the existing breakwater, construction of a new breakwater and slipway, the installation of the pontoons, extension of the existing hardstanding through land reclamation and installation of utilities all have elements seaward of the MHWS and hence, will require a Marine Licence.

4.1.1 Marine Licence Exemptions

Under The Marine Licensing (Exempted Activities) (Scottish Inshore Region) Order 2011, a number of activities are listed as exempt from a marine licence. Under this order an "activity" means licensable marine activity. An activity is exempt should it satisfy any condition specified in the Order which relates back to activities under the Marine (Scotland) Act 2010.

With regards to moorings and aids to navigation, Section 27(1) of Part 3: "Exempt activities and conditions" of the Order, specifies that:

> *any deposit or works activity carried out by:*
>
> - *a harbour authority;*
> - *a lighthouse authority; or*
> - *any other person in accordance with the approval or consent of any such authority,*
>
> *is exempt from a marine license should it be required for the purpose of providing a pile mooring, swinging mooring or aid to navigation.*

Given that the SCH development have had their navigation plans approved by the Northern Lighthouse Board, any deposits and work activities relating to aids to navigation are understood to be subject to an exempt from marine licensing.

4.2 Planning Permission

Under the Town and Country Planning (Scotland) Act 1997, any type of development, i.e. carrying out of building, engineering, mining or other operation in, on, over or under land, or the making of any material change in the use of any building or other land above the Mean Low Water Springs (MLWS) will require planning consent.

Portions of the proposed breakwater and slipway, extended hardstanding, car parking area, buildings, storage units, oil storage and Borrow Pit operations are proposed above the MLWS and hence will require planning consent.

A planning application (Reference number 21/04276/FUL) has been submitted to the Highland Council for enabling works comprising road improvements to the access road and construction of a substation enclosure. These works have however, been considered throughout the EIAR to provide a holistic assessment of the proposed SCH development.

4.3 Environmental Impact Assessment

Due to the size and scale of the Proposed Project, the development falls under Schedule 2 paragraph 1(e) and 10(m) of the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Town and Country Planning (Environmental Impact Assessment) (Scotland) 2017. Having considered the location and characteristics of the Proposed Project, the applicant has decided that an Environmental Impact Assessment Report (EIAR) is to be submitted in support of the Marine Licence and Planning Consent Applications. Drawing 73.04.01 provides the Project Development Boundary of the proposed SCH development.

4.4 Pre – Application Consultation

The Marine Licensing (Pre-application Consultation (PAC)) (Scotland) Regulations 2013, prescribe the marine licensable activities that are subject to PAC and in combination with the Marine (Scotland) Act 2010, set out the nature of the pre-application process. The Proposed Project falls within Regulation 4(d) as a construction activity within the marine area exceeds 1000m^2 therefore requiring the project to go through the PAC process. Consultation has been carried out to meet the requirements of the Marine Licensing (PAC) (Scotland) Regulations 2013 and a report produced for submission with the Marine Licence application.

Due to the scale of the proposed development (less than 2 hectares), it is not deemed a 'Major Development' in terms of Regulation 2(1) of the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009. The project therefore is not required to go through the PAC process compliant with the terrestrial process laid out in the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008.

4.5 Policy Context

4.5.1 National Marine Plan

As the project is partly below the MHWS and within 12 nautical miles (nm) of the Scottish Coastline, it falls within the remit of the Marine (Scotland) Act 2010. The 2015 Scottish National Marine Plan (NMP) covering inshore waters is a requirement of the Act. The NMP lays out the Scottish Minister's policies for the sustainable development of Scotland's seas and provides General Planning Principles (GENs), some of which apply to the construction and operations of the proposed SCH development. Many GENs are specific to environmental topics; these are identified in Table 4.5.1, along with the considerations made during the design of the proposed SCH development in order to meet the requirements.

The NMP lays out sector specific objectives and policies, for Shipping, Ports, Harbours and Ferries, as well as Recreation and Tourism and Aquaculture. Table 4.5.2, Table 4.5.3 and Table 4.5.4 details the objectives and relevant policies and how the proposed SCH development contributes towards these.

Table 4.5.1: Applicable Scottish National Marine Plan GENs

General Planning Principles	Requirements	Staffin Community Harbour Considerations	Chapter
GEN 2: Economic benefits	Sustainable development and use which provides economic benefit to Scottish communities is encouraged when consistent with the objectives and policies of this Plan.	The aim of the proposed SCH development t is too to provide an attractive space, supporting various economic sectors in the area. The proposed SCH development is essential to ensuring new opportunities are presented through job creation in the fishing, fish farming and tourism sectors in the Staffin area and promoting economic growth.	18
GEN 3: Social benefits	Sustainable development and use which provides social benefits is encouraged when consistent with the objectives and policies of this Plan.	The aim of the proposed SCH development is to provide infrastructure for the local community to give facilities suitable for recreation and commercial uses for locals and visitors.	18
GEN 4: Co-existence	Proposals which enable coexistence with other development sectors and activities within the Scottish marine area are encouraged in planning and decision-making processes, when consistent with policies and objectives of the Plan.	The proposed SCH development is considered a multi – user facility as it is being developed for use by the commercial fisherman, fish farms, tourism sector and the leisure boats owned by the local community.	18
GEN 5: Climate Change	Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change.	The proposed SCH design has been informed and considered a number of factors such as minimising carbon emissions when selecting rock sources and ensuring the design takes account of future sea levels.	2 & 17
GEN 6: Historic Environment	Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance.	No protected archaeological assets were identified as being significantly affected by the proposed works. A protocol for archaeological discoveries in case anything is found during the works will be developed prior to the commencement of construction activities. The design has specifically avoided areas of known paleoethological value.	6 & 12
GEN: 7 Landscape/seascape:	Marine planners and decision makers should ensure that development and use of the marine environment take seascape, landscape and visual impacts into account.	The proposed SCH development is located within the Trotternish National Scenic Area. A full assessment of	13

General Planning Principles	Requirements	Staffin Community Harbour Considerations	Chapter
		landscape and visual impacts has been completed and have informed the design.	
GEN 8: Coastal process and flooding:	Developments and activities in the marine environment should be resilient to coastal change and flooding, and not have unacceptable adverse impact on coastal processes or contribute to coastal flooding.	The design of proposed SCH development took into account the coastal processes and wave climate within Òb nan ron. Additionally, the potential for flooding is detailed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes. The Impact Assessment concluded that the proposed development will not result in unacceptable adverse effects on coastal processes and flooding.	17
GEN 9: Natural Heritage	Development and use of the marine environment must: (a) Comply with legal requirements for protected areas and protected species. (b) Not result in significant impact on the national status of Priority Marine Features. (c) Protect and, where appropriate, enhance the health of the marine area.	Ecological features of interest have been considered within this EIAR. Legal requirements have been taken into consideration throughout. Mitigation measures are outlined in each of the Biodiversity Chapters 7-11.	7-11
GEN 10: Invasive Non-Native Species	Opportunities to reduce the introduction of invasive non-native species to a minimum or proactively improve the practice of existing activity should be taken when decisions are being made.	The possible sources of invasive non-native species associated with the project have been identified and appropriate mitigation identified to minimise the chance of their introduction. The potential for introduction of non – native species was found to be negligible (non-significant).	17
GEN 11: Marine Litter	Developers, users and those accessing the marine environment must take measures to address marine litter where appropriate. Reduction of litter must be taken into account by decision makers.	Potential sources of litter and measures to prevent it entering the marine environment have been identified in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes.	17
GEN 12: Water Quality and Resource	Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives apply.	A water framework assessment has been completed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, taking into account the findings of Ecology Chapters 7-11.	17

General Planning Principles	Requirements	Staffin Community Harbour Considerations	Chapter
GEN 13: Noise	Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.	No significant noise sources associated with the development in the marine environment, as discussed in Chapter 3: Methodology, noise associated with the Harbour were scoped out.	3
GEN 14: Air Quality	Development and use of the marine environment should not result in the deterioration of air quality and should not breach any statutory air quality limits.	No significant effects on air quality at the proposed SCH development are predicted and as such air quality was scoped out of the EIAR as discussed in Chapter 3: Methodology.	3
GEN 15: Planning Alignment A	Marine and terrestrial plans should align to support marine and land-based components required by development and seek to facilitate appropriate access to the shore and sea.	The proposed SCH development constitutes both marine and onshore elements. The nature of the development facilitates access to the shore and sea through the slipway and the pontoon access. The various projects elements are discussed within Chapter 2: Project Description.	2
GEN 17: Fairness	All marine interests will be treated with fairness and in a transparent manner when decisions are being made in the marine environment.	Staffin Community Trust and their consultants have had open and honest dialogue with stakeholders in the development of the Marine Licence process submission and will publish the submission to ensure transparency.	PAC Report
GEN 18: Engagement	Early and effective engagement should be undertaken with the general public and all interested stakeholders to facilitate planning and consenting processes.	Pre-Application Consultation has been completed and a report provided to support the Marine Licence application.	PAC Report
GEN 19: Sound Evidence	Decision making in the marine environment will be based on sound scientific and socio–economic evidence.	Information provided in this EIAR is based on current available scientific evidence, to inform the decision-making process.	All
GEN 21: Cumulative Impacts	Cumulative impacts affecting the ecosystem of the marine plan area should be addressed in decision making and plan implementation.	Cumulative impacts are considered as part of the assessment as detailed in Chapter 3: Methodology, and the relevant topic-specific chapters.	3

Table 4.5.2: Applicable Scottish National Marine Plan Shipping, Ports, Harbours and Ferries Objectives Comparison

Objective/Policy	Requirements	Staffin Community Harbour Considerations	Chapters
Objective 1	Safeguarded access to ports and harbours and navigational safety.	As part of the EIAR, navigation has been assessed to ensure safe access to the harbour once it is operational (Chapter 16: Navigation).	16
Objective 2	Sustainable growth and development of ports and harbours as a competitive sector, maximising their potential to facilitate cargo movement, passenger movement and support other sectors.	The aim of the proposed SCH development includes supporting the commercial fishing and fish farming sectors in the Staffin area and surrounds.	17
Objective 5	Best available technology to mitigate and adapt to climate change, where possible, supporting efficiencies in fleet management and ensuring port infrastructure and shipping services are able to adapt to the consequences of climate change. Consideration of the provision of facilities for shoreside power in new developments to allow for this to be provided when markets require it, if it becomes cost effective to do so.	The proposed SCH development will have shoreside power, as discussed in Chapter 2: Project Description.	2
TRANSPORT 5	Port and harbour operators should take into account future climate change and extreme water level projections, and where appropriate take the necessary steps to ensure their ports and harbours remain viable and resilient to a changing climate. Climate and sea level projections should also be considered in the design of any new ports and harbours, or of improvements to existing facilities.	The design of the proposed SCH development has considered and been informed by a number factors such as minimising carbon emissions when selecting rock sources and ensuring the design takes into account future sea level rises.	2 & 17

Table 4.5.3: Applicable Scottish National Marine Plan Recreation and Tourism Objectives Comparison

Objective/Policy	Requirements	Staffin Community Harbour Considerations	Chapters
Objective 1	Position Scotland as a world class sustainable coastal and marine tourism and recreation destination through the sustainable development of coastal and marine recreation activities and industries in Scotland.	The proposed SCH development offers an attractive space to promote both recreational and tourism activities within the Staffin area.	18
Objective 2	Protection and enhancement of the unique, natural resources which attract visitors and which are relied upon for recreational activities.	The proposed SCH development is located within an area acclaimed for its vertebrate fossils and picturesque scenery. Both a palaeontological impact assessment	12 & 13

Objective/Policy	Requirements	Staffin Community Harbour Considerations	Chapters
		(Chapter 12: Soils, Geology and Palaeontology) as well a landscape, seascape and visual impact assessment (Chapter 13: Seascape, Landscape and Visual) have been undertaken to inform the design of the proposed SCH development.	
Objective 3	Promote diversification of the recreation and tourism sector to increase the value of assets in rural towns and exploit opportunities from future climate change.	Part of the purpose of the proposed SCH development is to provide infrastructure and facilities to promote tourism and recreational activities within Staffin, north of Skye.	18
Objective 4	Continued and improved access to marine and coastal resources for tourism activities and recreational use.	The purpose of the proposed SCH development is to provide access to tourism operators, tourists and the local community for recreational uses. The nature of a harbour allows users to access the marine and coastal resources.	18
Objective 5	Sustainable improvement and/or development of existing or new facilities, encouraging the sharing of facilities and supporting infrastructure and the use of low carbon energy solutions.	The proposed SCH development is a multi – user facility which, once operational, will be utilised by the commercial fishing and fish farm operators, tourism operators and the community.	18
Objective 8:	Improved education and understanding of the marine environment for recreational users, including how to enjoy the resource responsibly in accordance with the Marine Wildlife Watching Code and the Scottish Outdoor Access Code.	Once the proposed SCH development commences operations, posters and / or information boards will be erected to provide information on the marine environment including how to enjoy the resource responsibly. This will be included in the Schedule of Mitigation (Chapter 19).	18 & 19
REC & TOURISM 1	Opportunities to promote sustainable development of marine recreation and tourism should be supported.	The proposed SCH development is a multi – user facility which, once operational, will be utilised by the commercial fishing and fish farm operators, tourism operators and the community.	18
REC & TOURISM 2	The following key factors should be taken into account when deciding on uses of the marine environment and the potential impact on recreation and tourism:	Chapter 18: Population and Socio- Economics provides a detailed socio – economic assessment of the impacts and benefits associated with the proposed SCH development.	18

Objective/Policy	Requirements	Staffin Community Harbour Considerations	Chapters
	• The extent to which the proposal is likely to adversely affect the qualities important to recreational users, including the extent to which proposals may interfere with the physical infrastructure that underpins a recreational activity; • The extent to which any proposal interferes with access to and along the shore, to the water, use of the resource for recreation or tourism purposes and existing navigational routes or navigational safety; • Where significant impacts are likely, whether reasonable alternatives can be identified for the proposed activity or development; • Where significant impacts are likely and there are no reasonable alternatives, whether mitigation, through recognised and effective measures, can be achieved at no significant cost to the marine recreation or tourism sector interests.		
REC & TOURISM 4	Marine and terrestrial planners, marine decision makers and developers should give consideration to the facility requirements of marine recreation and tourism activities, including a focus on support for participation and development in sport. Co-operation and sharing infrastructure and/or facilities, where appropriate, with complementary sectors should be supported as should provision of low carbon transport options.	The proposed SCH development is a multi – user facility which, once operational, will be utilised by the commercial fishing and fish farm operators, tourism operators and the community.	18
REC & TOURISM 5	Marine planners and decision makers should support enhancement to the aesthetic qualities, coastal character and wildlife experience of Scotland's marine and coastal areas, to the mutual benefit of the natural environment, human quality of life and the recreation and tourism sectors.	As part of the EIAR processes a landscape and visual impact assessment has been undertaken in Chapter 13: Landscape, Seascape and Visual.	13
REC & TOURISM 6	Codes of practice for invasive non-native species and Marine Wildlife Watching should be complied with.	Chapter 17: Hydrology. Hydrogeology, Water Quality and Coastal Processes and Chapter 10: Marine	10, 17 & 19

Objective/Policy	Requirements	Staffin Community Harbour Considerations	Chapters
		Mammals provide a detailed assessment and subsequent mitigation measures that have been incorporated into the Schedule of Mitigation (Chapter 19).	

Table 4.5.4: Applicable Scottish National Marine Plan Aquiculture Objectives Comparison

Objective/Policy	Requirements	Staffin Community Harbour Considerations	Chapters
Objective 4	Quality employment and sustainable economic activity in remote and rural areas, as well as more widely in Scotland.	The proposed SCH development will be a multi – user facility, with one of the users being the commercial fish farming operations. Not only will the proposed SCH development support the existing fish farming operations, but it will also attract new ventures into the area.	18
Objective 6	Maximise benefits to Scotland and to local communities from the Scottish aquaculture value chain.	The proposed SCH development will be a multi – user facility, with one of the users being the commercial fish farming operations. Not only will the proposed SCH development support the existing fish farming operations, but it will also attract new ventures into the area.	18
AQUACULTURE 14	The Scottish Government, aquaculture companies and Local Authorities should work together to maximise benefit to communities from aquaculture development.	The proposed SCH development will be a multi – user facility, with one of the users being the commercial fish farming operations. Not only will the SCH development support the existing fish farming operations, but it will also attract new ventures into the area, creating jobs and promoting economic growth in the rural area of Staffin and surrounds.	18

4.6 Planning Policy

It is appropriate that the planning policy context is set out in relation to both marine and terrestrial landscapes, as the proposed SCH development construction works are necessary both on land and in the marine environment.

The development plan system in Scotland, which provides the framework for considering planning applications, is made up of four main documents:

- The National Planning Framework (NPF);
- Scottish Planning Policy (SPP);
- Strategic Development Plans (SDPs) produced for the Scotland's four largest cities; and
- Local Development Plans (LDPs) produced for each council area.

The Scottish Government provides advice and technical planning information in the form of Planning Advice Notes (PANs), to support the implementation of the policy.

4.6.1 The National Planning Framework

The NPF is a requirement of the Planning (Scotland) Act 2006 and sets out the strategy for long-term development within Scotland. The third NPF (NPF3), was published in 2014 and sets out the strategy for development for the next 20 to 30 years (Scottish Government, 2014a).

Section 4.29 of the NPF3 states "*the environment of our coastal areas, on land and at sea, is an outstanding, internationally important resource. These natural assets support quality of life and underpin important economic sectors like tourism, outdoor recreation and food and drink*."

It specifically recognises in Section 4.32. that "*outdoor recreation is important throughout the coastal and marine area, with the West Highlands being a particular asset. Sailing is worth around £100 million to the Scottish economy and is a growing sector. The west coast and the Hebridean islands are a main focus for development, but there is also potential in the north and on the east coast*."

Whilst acknowledging the need for construction minerals to support the construction and energy sectors, NPF3 also highlights the need for appropriate restoration.

NPF3 does not identify any national developments in the Staffin area.

All SPP was consolidated into one overall policy document in February 2010. The SPP is also subject to regular updates, and a revised version was published in 2014 (Scottish Goverment, 2014b). With regard to 'Promoting Rural Development, the SPP identified policy principles that the planning system should support patterns of development which:

- *"In all rural and island areas promote a pattern of development that is appropriate to the character of the particular rural area and the challenges it faces;*
- *Encourage rural development that supports prosperous and sustainable communities and businesses whilst protecting and enhancing environmental quality; and*
- *Support an integrated approach to coastal planning."*

The construction of the proposed SCH development will be within an area already utilised for launching boats and other harbour activities. The proposed SCH development aims to support the need for sheltered berthing and associated infrastructure not only for use by commercial fishing and fish farm sectors but for use by tourism sector too.

SPP Paragraph 234: "*Minerals make an important contribution to the economy, providing materials for construction, energy supply and other uses, and supporting employment. NPF3 notes that minerals will be required as construction materials to support our ambition for diversification of the energy mix. Planning should safeguard mineral resources and facilitate their responsible use. Our spatial strategy underlines the need to address restoration of past minerals extraction sites in and around the Central Belt.*"

The proposal makes provision for the extraction of aggregates, to serve a specific local project, by extending an existing borrow pit, thereby removing the requirement for longer distance Heavy Goods Vehicle (HGV) movements. Accordingly, the proposal represents the 'responsible use' of an identified mineral resource.

SPP Paragraph 235: "*The planning system should:*

- *safeguard workable resources and ensure that an adequate and steady supply is available to meet the needs of the construction, energy and other sectors;*
- *minimise the impacts of extraction on local communities, the environment and the built and natural heritage; and*
- *secure the sustainable restoration of sites to beneficial after use after working has ceased.*"

The proposal safeguards a workable resource which is strategically located in relation to the SCH development. This EIA Report assesses all relevant potential impacts and demonstrates that any impacts from the proposed borrow pit development, on the local community and on the environment, are minimised and within acceptable parameters. The proposal makes provision for appropriate site reinstatement.

SPP Paragraph 242: "*Operators should provide sufficient information to enable a full assessment to be made of the likely effects of development together with appropriate control, mitigation and monitoring measures. This should include the provision of an adequate buffer zone between sites and settlements, taking account of the specific circumstances of individual proposals, including size, duration, location, method of working, topography, the characteristics of the various environmental effects likely to arise and the mitigation that can be provided.*"

The EIA Report assesses any likely potential environmental impacts of the development proposals and, where appropriate, suggests mitigating measures. The proposal makes provision for an appropriate buffer zone; the closest third-party residential property is some 460m from the proposed borrow pit. Reinstatement proposals have been provided. The site design and the provision of an appropriate assessment of impacts accord with the requirements of Paragraph 242.

SPP Paragraph 243: "*Borrow pits should only be permitted if there are significant environmental or economic benefits compared to obtaining material from local quarries; they are time-limited; tied to a particular project and appropriate reclamation measures are in place.*"

Given the additional transportation impacts associated with alternative sites, there are clear environmental and amenity benefits to be derived from the use of the proposed borrow pit.

The SCH development is a community project with a limited budget; the use of the proposed borrow pit has clear economic benefits. Planning permission for the proposed borrow pit will be time-limited, tied to the needs of the SCH development.

SPP Paragraph 247: "*… planning authorities should, through planning conditions and legal agreements, continue to ensure that a high standard of restoration and aftercare is managed effectively and that such work is undertaken at the earliest opportunity. A range of financial guarantee options is currently available and planning authorities should consider the most effective solution on a site-by-site basis. All solutions should provide assurance and clarity over the amount and period of the guarantee and in particular, where it is a bond, the risks covered (including operator failure) and the triggers for calling in a bond, including payment terms. In the aggregates sector, an operator may be able to demonstrate adequate provision under an industry-funded guarantee scheme.*"

The borrow pit site is owned by the Scottish Government, a preference has been expressed that the site be left in a clean and tidy state suitable to the implementation of the Government's future aspirations for the land. Accordingly, the proposal makes provision for restoration of peripheral areas with the retention of the main quarry floor and hardstanding areas. As the site is currently bare ground, the proposed reinstatement would not represent a significant change from the current situation. In this respect, the provision of a restoration guarantee is not considered to be necessary.

SPP Paragraph 248: "*Planning authorities should ensure that rigorous procedures are in place to monitor consents, including restoration arrangements, at appropriate intervals, and ensure that appropriate action is taken when necessary. The review of mineral permissions every 15 years should be used to apply up-to-date operating and environmental standards although requests from operators to postpone reviews should be considered favourably if existing conditions are already achieving acceptable standards. Conditions should not impose undue restrictions on consents at quarries for building or roofing stone to reflect the likely intermittent or low rate of working at such sites.*"

In applying for planning permission, it is acknowledged that, if The Highland Council is minded to grant planning permission, appropriate planning conditions will be applied to ensure that the development is appropriately controlled.

The proposed borrow pit does not conflict with the aims of the SPP guidelines.

Relevant PANs for the SCH development which were used to support the EIA include:

- PAN 1/2011: Planning and Noise and associated Technical Advice Note Assessment of Noise (Scottish Government, 2011a);
- PAN 2/2011: Planning and Archaeology (Scottish Government, 2011b)
- PAN 50: Controlling the Environmental Effects of Surface Mineral Workings (Scottish Government, 1996a);
- PAN 50: Controlling the Environmental Effects of Surface Mineral Workings (Annex A) (Scottish Government, 1996b);
- PAN 50: Controlling the Environmental Effects of Surface Mineral Workings (Annex B, 1998);
- PAN 50: Controlling the Environmental Effects of Surface Mineral Workings (Annex C, 1998);

- PAN 50: Controlling the Environmental Effects of Surface Mineral Workings (Annex D, 2000);
- PAN 51: Planning and Environmental Protection;
- PAN 60: Planning for Natural Heritage (Scottish Government, 2008);
- PAN 64: Reclamation of Surface Mineral Workings;
- PAN 69 Flood Risk (Scottish Government, 2015);
- PAN 75: Planning for Transport (Scottish Government, 2005); and
- PAN 79: Water and Drainage (Scottish Government, 2006).

4.6.2 Regional

The Highland-wide Local Development Plan 2012 sets out the overarching spatial development plan for the whole of the Highland Council area. The vision set out in section 7.2, states that by 2030 the West Highlands and Islands area will:

- "*Be a place of outstanding natural and cultural heritage – heritage assets including that landscape and wildlife will have been safeguarded and enhanced. The high quality of life and economic opportunities associated with these assets will be helping to increase and maintain population levels.*
- *Have re-established and promoted it's unique identity – as a centre for Gaelic culture and language and as having a high quality tourism product providing high quality facilities, service and exceptional cuisine based on high quality local produce. The area will be recognised and promoted as an all year round building on the current and ongoing branding associated with the Outdoor Capital of the UK, an internationally renowned "outdoor" destination and event/trail outdoor activity with a wide range of activities including skiing, mountain biking, sailing, climbing etc. based draw for tourists attracted by the area's outstanding natural and cultural heritage*."

20.19 of the Plan discusses Coastal Development, it states:

"*Development proposals for the coast or for installations in nearshore waters should, in both their location and their design, show consideration to the range of existing interests ensuring best use of resources taking account of existing and planned marine activities and development. Proposals should not have an unacceptable impact on the natural, built or cultural heritage and amenity value of the area*."

The aim of the proposed SCH development is to improve the existing infrastructure to provide a multi-user facility which has been designed to avoid any unacceptable impact on natural, built or cultural heritage and is therefore in line with the Highland-wide Local Development Plan.

In addition to the development plan system in Scotland, the Highlands & Islands region has its own strategic development plan which supports the National Strategic Plan and the Scottish Government's Economic Action Plan. The Highlands & Islands Enterprise (HIE) 2019-2022 Strategy identifies how industries in the region will contribute significantly to Scotland's economic development through opportunities presented by the unique natural capital of the region, which can sustainably deliver significant economic and social impacts. These contributions are anticipated by creating and maintaining valuable economic opportunities to industries such as the energy sector, tourism and wider marine economy (Highlands and Islands Enterprise, 2019).

As discussed in the Project Need Section of Chapter 2: Project Description and in Section 4.5.2.1 of this chapter, the proposed development will support tourism and commercial fish farms in Staffin by providing infrastructure and structures for recreational and commercial boat users. As such, the project directly aligns with the Tourism and Marine Economy strategies highlighted in the HIE 2019-2022 Strategy.

4.6.2.1 Local

Staffin falls within area of the West Highlands and Islands Local Development Plan (WestPlan), adapted in September 2019. The plan lays out the visions and outcomes for the Plan Area namely Growing Communities, Employment, Connectivity and Transport and Environmental Heritage (The Highland Council, 2019). The proposed development has been aligned with the WestPlan where appropriate to ensure that it meets the objectives laid out for the West Highlands and Islands. Table 4.6.1 details how this has been achieved.

Chapter 3.6 of the WestPlan sets out the priorities of the placemaking Priorities for Staffin. The Priorities include:

- Protect the traditional crofting landscape and special qualities of the village and Trotternish National Scenic Area (NSA), through securing high standards of siting and design;
- Protect and promote the natural and built heritage of the area, including its archaeological remains;
- Support improvements to harbour facilities, including the slipway and breakwater to provide greater depth and protection for harbour users.

The Project is directly aligned to the placement priorities for the Staffin Settlement.

Table 4.6.1: Applicable Outcomes from the WestPlan

Outcome	Policy No.	Policy	Staffin Community Harbour Considerations	Chapter
Growing Communities	P2: Delivering Development	Development of the locations and uses specified in the main settlements sections of this Plan will be supported subject to provision of the necessary infrastructure, services and facilities required to support new development as indicated in this Plan or identified in accordance with the Development Plan as more detailed proposals are brought forward.	Staffin is considered a main settlement and the proposed project aims to aid facilities and infrastructure to support new developments within the Staffin area. Social impacts and benefits associated with the proposed SCH development are discussed in Chapter 18: Population and Socio – Economics.	18
	P3: Growing Settlements	Development proposals that are contained within, round off or consolidate the Growing Settlements (listed) will be assessed against the extent to which they:		
		Take account of the issues and placemaking priorities identified for the individual Growing Settlements;	The proposed SCH development is located in Staffin. The project is identified as a placemaking priority for the Staffin area, as described in Chapter 3.6 of the WestPlan.	18
		Avoid a net loss of amenity or recreational areas significant to the local community; and	The proposed SCH development aims to enhance recreational areas for the Staffin area. Social impacts and benefits are discussed in Chapter 18: Population and Socio – Economics.	18
		Would not result in adverse impact on any other locally important natural or cultural heritage feature, important public viewpoint/vista or open space.	As part of the EIAR process, both an Archaeological and Cultural Heritage assessment and Landscape, Seascape and Visual assessment have been undertaken.	6 & 13
Environment and Heritage	N/A	Flood risk better assessed, avoided, reduced and mitigated via flood risk being a primary criterion in site selection.	The design of the proposed SCH development takes into account flood risk, specifically the 1:100 flood line, which has informed the proposed design. The flood risk is discussed in Chapter 17: Water Quality and Coastal Processes.	17

Outcome	Policy No.	Policy	Staffin Community Harbour Considerations	Chapter
	Special Landscape Areas	Special Landscape Areas (SLAs) are landscapes that are seen as being of regionally significant landscape and visual quality. The boundaries of these areas are set out in the Assessment of Highland Special Landscape Areas (June 2011) and supported by planning policy in the Highland-wide Local Development Plan.	The proposed SCH development falls within the Trotternish NSA as well as the Trotternish and Tianavaig SLA. A Landscape and Visual Impact Assessment has been undertaken to inform the design, detailed in Chapter 13: Landscape, Seascape and Visual.	13

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4.8 Glossary

Acronym	Definition
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPS	European Protected Species
GENs	General Planning Principles
HGV	Heavy Goods Vehicle
HIE	Highlands & Islands Enterprise
MHWS	Mean High Water Spring
MLWS	Mean Low Water Spring
MS-LOT	Marine Scotland Licensing Operations Team
nm	Nautical miles
NMP	National Marine Plan
NPF3	National Planning Framework 3
NSA	National Scenic Areas
PAC	Pre-application Consultation
PAN	Planning Advice Notes
SCH	Staffin Community Harbour
SDP	Strategic Development Plans
SLA	Special Landscape Areas
SPP	Scottish Planning Policy
WestPlan	West Highlands and Islands Local Development Plan

Chapter 5: Air Quality

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Contents

5 Air Quality

5.1 Introduction

In this chapter the potential effects of the proposed operations of the Borrow Pit on air quality, namely fugitive dust emissions, are discussed and assessed.

The term dust (BS 6069 Part 2) is used to describe particles between 1µm and 75µm in diameter - that is between one millionth of a metre (1 micron) and 75 millionths of a metre. They originate through the action of crushing and abrasive forces on materials. Depending upon the chemical composition, dust can be chemically active e.g. limestone, or effectively inert e.g. sand. The colour varies through brown to white.

The process by which dust becomes airborne is referred to as 'dust emission'. It occurs through saltation of particles across a surface or suspension of particles and their entrainment in airflow. Wind has the potential to lift dust particles from surfaces depending upon the speed of the wind, the condition of the surface and size of the particle. Tipping of materials leaves particles exposed to wind blow as they fall through the air.

Planning Advice Notes (PAN) 50 Annex B advises that large dust particles (greater than 30µm) make up the greatest proportion of dust emitted from mineral workings and will largely be deposited within 100m of sources. Intermediate sized particles (10-30µm) are likely to travel up to 250-500m. Smaller particles (less than 10µm), which make up a small proportion of dust emitted from most workings, can travel up to 1km from sources.

The release of dust to the atmosphere and its resultant spread is very weather dependent and as a result the amount of dust deposition can vary greatly over a short period of time. This variation is quite normal in urban and rural environments though it is perhaps more relevant in rural environments, due to seasonal ground conditions and agricultural activities.

The Mineral Industry Research Organisation (MIRO) report 'Good practice guide: control and measurement of nuisance dust and PM_{10} from the extractive industries' February 2011 advises that existing levels of deposited dust will typically be of the order of $38mgm^{-2}day^{-1}$ (milligrams per square metre per day) annual median, for a general deposit in open country. Values are likely to vary daily, particularly during dry weather but also because of local influences such as agricultural activities, main roads or industrial operations. The report also provides median (50^{th} percentile) levels of $56mgm^{-2}day^{-1}$ for residential areas and town outskirts, and $90mgm^{-2}day^{-1}$ for commercial town centres. The Lealt Borrow Pit is located in a rural/costal environment where long term average dust deposition rates of $38mgm^{-2}day^{-1}$ may be expected.

5.2 Regulations, Guidance and Sources of Information

5.2.1 European and International Legislation

The Directive 2008/50/EC on ambient air quality and cleaner air, aims to reduce harmful effects on health and the environment by defining and establishing ambient air quality objectives. It lays down measures for assessment, information collation and sharing, maintaining, and improving air quality, and promotes member state cooperation to assist with its aim. Directive 2008/50/EC sets out specific monitoring requirements and targets for a range of chemicals and particulate matter (PM_{10} and $PM_{2.5}$) which can be included in the general term 'dust'. It is recognised that the UK is no longer part of Europe however the directive has been transcribed into Scottish law and hence the main principles are still relevant.

5.2.2 National Legislation, Policy and Guidance

The Air Quality Standards (Scotland) Regulations 2010 enacts Directive 2008/50/EC into Scottish Law. It identifies the circumstances under which Air Quality Plans must be drawn up for zones, in order to achieve the appropriate limits and target values.

In relation to PM_{10} concentration levels, The Air Quality (Scotland) (Amendment) Regulations 2002 set objective values of $18\mu g/m^3$ as an annual mean as well as a 24-hour mean of $50\mu g/m^3$ not to be exceeded more than 7 times a year, both to be established by 31st December 2010.

The Air Quality Standards (Scotland) Regulations 2010 sets an annual PM_{10} mean of $40\mu g/m^3$ as well as a 24-hour mean of $50\mu g/m^3$ not to be exceeded more than 35 times a year.

The Air Quality (Scotland) Amendment Regulations 2016 sets an annual $PM_{2.5}$ mean of $10\mu g/m^3$ to be achieved by 31st December 2020.

Scottish Planning Policy (SPP) requires that sufficient information be provided to enable a full assessment to be made of the likely effects of development together with appropriate control, mitigation and monitoring measures.

PAN 50, Annex B, includes a summary of dust control measures which should be observed by operators. These measures shall be implemented as standard practice during the operation of the Borrow Pit through a Site Dust Management Plan, which is set out in Section 5.8. The Site Dust Management Plan gives consideration to:

- Site layout;
- Method of working and dust control measures to be adopted;
- Site management systems; and
- Monitoring and response procedures.

5.2.3 Other Guidance

The report "Guidance on the Assessment of Mineral Dust Impacts for Planning, May 2016" was published by the Institute of Air Quality Management (IAQM). This document provides advice on robust and consistent good practice approaches that can be used to assess operational phase dust impacts. The predicted scale of dust effects may be classified as either 'significant', or 'not significant'. Where effects are predicted to be 'significant', further mitigation is likely to be required before the proposals are considered to be acceptable under planning policy. The guidance uses a simple distance-based screening process to identify those minerals sites where the dust impacts are unlikely to be significant and therefore require no further assessment.

Section 3 of the document advises that it is possible to screen out the need for a detailed assessment based on the distance from a mineral site to potentially sensitive receptors. The document states: "The experience of the Working Group together with published studies and anecdotal evidence on the change in both airborne concentrations and the rate of deposition with distance, suggests that dust impacts will occur mainly within 400m of the operation, even at the dustiest of sites". For dis-amenity dust the report recommends that the distance-based criteria set out in IAQM Figure 2 (Figure 5.2.1) should be used to determine the requirement for a detailed dust assessment.

The document provides guidance on assessing the dust impacts and effects of minerals developments. The Source-Pathway-Receptor (S-P-R) concept presents the hypothetical relationship between the source (S) of the pollutant, the pathway (P) by which exposure might occur, and the receptor (R) that could be adversely affected. The dust impact at relevant receptors should be predicted using this concept. This approach is applicable to both the dis-amenity and the ecological effects of deposited dust. Appendix 3 of the IAQM document provides a Dust Dis-amenity Assessment Procedure which is followed in this report.

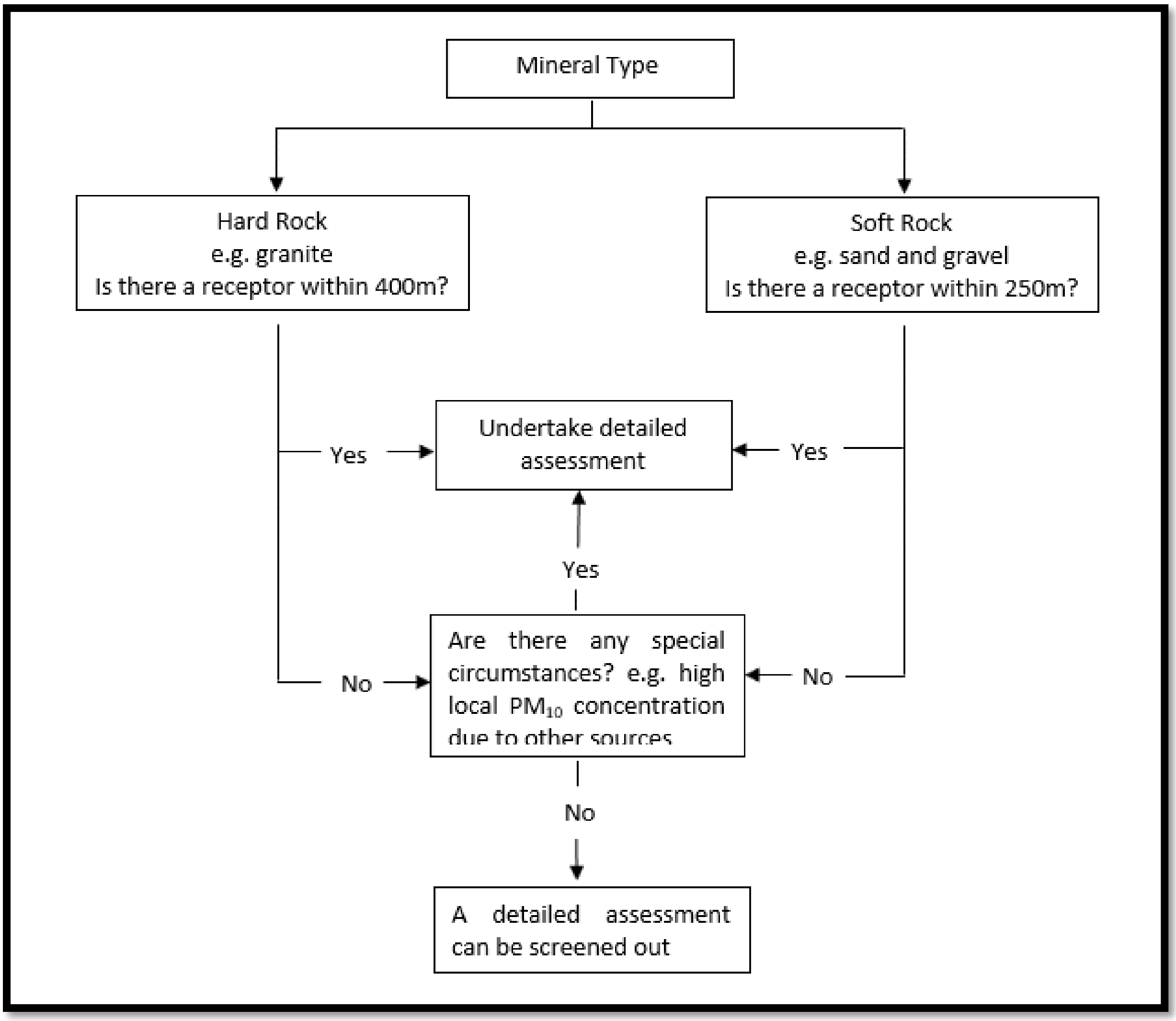

Figure 5.2.1: Screening Flowchart (IAQM, Figure 2)

5.3 Assessment Methodology

The assessment sets out the following information:

- An evaluation of existing conditions;
- An evaluation of potential dust sources and mitigating measures; and
- The identification of potential dust sensitive receptors and an assessment of the potential dust emissions associated with the proposed operations at these locations.

5.3.1 Dust Effects

The assessment of potential dust nuisance was undertaken by Dalgleish Associates Ltd using the guidance set out in PAN 50 (PAN 50 1996) and PAN 50 Annex B: The Control of Dust at Surface Mineral Workings 1998.

The IAQM document provides a Dust Dis-amenity Assessment Procedure is also followed in this report.

The effect on neighboring properties of dust arising from the area of the quarrying operation, normally during periods of dry weather, is measured principally in terms of potential to cause a significant nuisance. Annoyance and the loss of amenity can result as dust falls out, usually as a visible thin layer, causing the discoloration of buildings, interference with the enjoyment of outdoor leisure, increased washing of windows, problems with drying washing outdoors, and increased cleaning of surfaces. Most dust is deposited close to its source, as the larger, heavier particles are not carried very far by the wind.

In the European Community (EC) and the UK there are no definitive standards for dust deposition. In the absence of statutory standards for the control of nuisance dust PAN 50 Annex B notes that guideline values in the range 200 – 350 mg/m^2/day have been variously used for mineral sites.

PAN 50 Annex B advises that large dust particles, which make up the greatest proportion of dust emitted from mineral workings, will largely deposit within 100m of sources. For much of the quarry excavation any dust generated would therefore fall within the confines of the quarry and the surrounding grassland/heath/bog.

5.3.2 Factors Affecting Potential Impacts

The occurrence of dust nuisance depends on the generation of airborne particles and the potential of the airborne particles to cause a nuisance. The generation of airborne dust is affected by a number of factors and depends on:

- Meteorological conditions;
- The size of the dust particle;
- The nature of the ground;
- The dust source; and
- The measures employed in the control of dust.

The potential for dust to become a nuisance to the local community is a function of several factors:

- The proximity of dust sensitive properties/premises and the level of sensitivity; Table 5.3.1 categorises facilities and sensitivity (source PAN 50 Annex B and IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning, May 2016);

- Meteorological conditions;
- Local topography and vegetation pattern of intervening ground; and
- The duration and frequency of the activity.

5.3.3 Receptor Sensitivity

The sensitivity of various receptors to air pollution is determined by a number of factors including:

- Duration spent within the area, i.e. transient or constant presence;
- Sensitivity of receptor i.e. the elderly, children, or certain plant species; and
- Distance from the dust source.

Table 5.3.1: Dust Sensitive Facilities/Locations

Sensitivities of People to Dust Soiling Effects		
High Sensitivity	**Medium Sensitivity**	**Low Sensitivity**
Residential dwellings; Hospitals and clinics; Retirement homes; Hi-tech industries; Painting and furnishing; Food processing; Medium and long term car parks; Car showrooms.	Schools; Residential areas; Food retailers; Greenhouses and nurseries; Horticultural land; Offices; Parks; Places of work.	Farmland; Footpaths; Light and heavy industry; Outdoor storage; Short-term car parks; Roads.
Sensitivities of Human Receptors to the Health Effects of PM_{10}		
High Sensitivity	**Medium Sensitivity**	**Low Sensitivity**
Locations where public are exposed for 8 hours or more in a day; Residential dwellings; Hospitals and clinics; Retirement homes; Hi-tech industries; Painting and furnishing.	Locations where people are occupationally exposed over a full working day e.g. Offices, warehouses, industrial units.	Locations where human exposure is transient e.g. public footpaths, playing fields, parks and shopping streets.
Sensitivities of Receptors to Ecological Effects		
High Sensitivity	**Medium Sensitivity**	**Low Sensitivity**
Locations with an International designation; Locations where there is a community of Red Data List species; Special Areas of Conservation.	Locations of particularly important plant species where dust sensitivity is uncertain or unknown; Sites of Special Scientific Interest.	Local designations where features may be affected by dust deposition; Local Nature Reserves with dust sensitive features.

5.3.4 Dust Impact Assessment

It should be noted that the assessment of dust differs from the methodology laid out in Chapter 3, in that the assessment takes account of all mitigation. As such potential dust impacts are considered to help identify the mitigation required, but are not assessed prior to mitigation being identified.

5.3.4.1 Estimation of Residual Source Emissions

The definitions of the residual source emissions for various dust emitting operations anticipated to occur during the operation of the Borrow Pit are aligned to the IAQM Mineral Guidance (IAQM, 2016) and are outlined in Table 5.3.2.

Table 5.3.2: Residual Source Emissions Classification

Site Preparation/Restoration	
Large	A working area of >10ha, bunds >8m in height, >100,00m^3 material movement, >10 heavy plant operating situationally, bunds un-seeded, fine-grained and friable material.
Medium	A working area of >2.5ha but <10ha, bunds >4m but <8m in height, >5 heavy plant operating simultaneously but <10 plant, moved material contains moderate moisture contents.
Small	A working area of <2.5ha, bunds <4m in height, <5 heavy plant simultaneously operating all bunds seeded and moved material contains high moisture contents.
Mineral Extraction	
Large	Working area >100ha, drilling and blasting frequently used, dusty mineral of small particle size or low moisture content, 1,000,000 tonnes removed per annum.
Medium	Working area >20ha but <100ha, mineral material with moderate moisture content, >200,000 but <1,000,000 tonnes removed per annum.
Small	Working area <20ha, hydraulic excavator frequently used, coarse material or high moisture content, <200,000 tonnes removed per annum.
Stockpiles/Exposed Surfaces	
Large	Stockpile with a total exposed area >10ha in an area exposed to high wind speeds located <50m from the site boundary, daily transfer of material with high dust potential (low moisture contents), stockpile duration >12 months, quarry production >1,000,000 tonnes per annum.
Medium	Stockpile duration of >1 month but <12 months with a total area of >2.5ha but <10ha in an area of moderate wind speeds, transfer of material of moderate dust potential (moderate moisture contents), quarry production >200,000 but <1,000,000 tonnes per annum.
Small	Stockpile duration of <1 month with a total area <2.5ha in an area of low wind speeds, located >100m from the site boundary, weekly transfers of material of low dust potential (high moisture contents), quarry production <200,000 tonnes per annum.
Mineral Handling	
Large	>10 loading plant within 50m of the site boundary, transferring material with high dust potential (low moisture contents) over dry and poorly surfaced ground.
Medium	>5 but <10 loading plant within 100 to 50 m of the site boundary, transferring material with moderate dust potential (moderate moisture contents) over dry but partially surfaced ground.
Small	<5 loading plant within 100m of the site boundary and within the quarry void or clean hardstanding, transferring material of low dust potential (high moisture contents) over well-surfaced ground.
On-Site Transportation	
Large	>250 movements in a day on unpaved surfaces of potentially dusty material (low moisture contents).
Medium	>100 movements per day but <250, transportation over a mixture of surfaced and unsurfaced routes with potentially dusty material with moderate moisture contents.

Small	Covered conveyors used for the majority of the on-site transportation of material <100 movements per day over compacted aggregate, <500m in length and a maximum speed of 15 mph.
Mineral Processing	
Large	Mobile crusher and screener on-site, processing >1,000,000 tonnes per annum of material of high dust potential (e.g. hard rock or low moisture contents).
Medium	Fixed screening plant with designed dust control, processing >200,000 but <1,000,000 tonnes per annum of material with moderate dust potential (moderate moisture contents).
Small	Fixed screening plant with effective design in dust control, processing <200,00 tonnes per annum of material with low dust potential (high moisture contents e.g. wet sand and gravel).
Off-Site Transportation	
Large	Total Heavy Goods Vehicles (HGV) movements of >200 per day on unsurfaced site access road <20m in length with no HGV cleaning facility.
Medium	Total HGV movement of >25 but <200 per day over a mixture of unsurfaced and surfaced site access road.
Small	<25 HGV movements per day over surfaced site access road >50m in length with effective HGV cleaning facilitates and procedures.

5.3.4.2 Estimation of Pathway Effectiveness

The site-specific factors considered to determine the Effectiveness of the Pathway are the distance and direction of receptors relative to the prevailing wind directions. The frequency of moderate to high wind speeds, with the ability of carrying airborne dust towards receptors, is assigned categories in Table 5.3.3.

Table 5.3.3: Categorisation of Frequency of Potentially Dusty Winds

Frequency Category	Criteria
Infrequent	Frequency of winds (>5m/s) from the direction of the dust source on all days are less than 5%
Moderately Frequent	The frequency of winds (>5m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	The frequency of winds (>5m/s) from the direction of the dust source on dry days are between 12% and 20%
Very Frequent	The frequency of winds (>5m/s) from the direction of the dust source on dry days are greater than 20%

Specific wind data has not been accessed; therefore the conservative assumption has been made that the frequency of potentially dusty winds is very frequent in all cases. The distance to each receptor is categorised as per Table 5.3.4.

Table 5.3.4: Categorisation of Receptor Distance from Source

Category	Criteria
Distant	Receptor is between 200m and 400m from the dust source
Intermediate	Receptor is between 100m and 200m from the dust source
Close	Receptor is less than 100m from the dust source

The pathway effectiveness was classified using the Frequency of Potentially Dusty Winds (Table 5.3.3) and the Receptor Distance from Source (Table 5.3.4), as shown in Table 5.3.5.

Table 5.3.5: Pathway Effectiveness

		Frequency of Potentially Dusty Wind			
		Infrequent	**Moderately Frequent**	**Frequent**	**Very Frequent**
Receptor Distance Category	**Close**	Ineffective	Moderately Effective	Highly Effective	Highly Effective
	Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
	Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

5.3.4.3 Estimation of Dust Risk Impact

The Residual Source Emissions (Table 5.3.2) and the Pathway Effectiveness (Table 5.3.5) are combined to predict the Dust Impact Risk as shown in Table 5.3.6.

Table 5.3.6: Estimation of Dust Risk Impact

		Residual Source Emissions		
		Small	**Medium**	**Large**
Pathway Effectiveness	**Highly Effective Pathway**	Low Risk	Medium Risk	High Risk
	Moderately Effective Pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

5.3.4.4 Magnitude of Dust Effects

The likely dis-amenity effect at each receptor is determined from the Dust Impact Risk (see Table 5.3.6) and the Receptor Sensitivity (see Table 5.3.1) in Table 5.3.7.

Table 5.3.7: Descriptors of Magnitude of Dust Effects

	Receptor Sensitivity		
	Low	**Medium**	**High**
High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

In line with Chapter 3; Methodology, effects of moderate and above are classed as significant in Environmental Impact Assessment (EIA) terms.

5.3.5 Particulates

The nuisance effects of dust are usually measured with reference to dust deposition or soiling, whereas the effects on health focus on the effects of inhalation and respiration of fine airborne dust particles, especially the smaller size fractions e.g. PM10 (small particles, 10 microns and less in diameter).

PAN 50 Annex B advises that smaller particles, 10 microns and less in diameter, may travel up to 1km from sources. However, it is also noted that these smaller particles make up only a small proportion of dust emitted from most workings.

5.3.5.1 PM_{10} Assessment

Research looking into the effects of opencast coal mining on health has been undertaken by the Department of Epidemiology and Public Health at the University of Newcastle and was published as a Department of Health document in December 1999. The study has been endorsed by the Committee on the Medical Effects of Air Pollutants. The research concluded that increases in particles close to opencast sites was not due to the release of coal particles but was more likely caused by earth moving and excavation activities which were noted as being common to all mineral workings.

Since the Newcastle research determined that the geometrical mean PM_{10} level was 17ug/m3 in opencast communities and 14.9μg/m^3 in control communities the report suggested that an additional loading of 2μg/m^3 be attributed to opencast site operations. The potential for dust generation from opencast mines tends to be significantly greater than that from quarrying, due to the increased scale of operations and the continuous disturbance of rock strata, compared with the lesser scale and frequency of disturbance involved in quarrying. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2003 suggests that quarrying and construction work are thought to account for less than 1μg/m^3 of PM_{10} levels.

Previous guidance, Scottish Planning Policy 4 (SPP4): Planning for Minerals advised that: "Concerns over the likely effects of dust emissions should be assessed against the existing body of scientific, medical and epidemiological evidence. These effects have been explored in detail in the University of Newcastle-upon-Tyne study, Do Particulates from Opencast Coal Mining Impair Children's Respiratory Health? (1999). The Newcastle Study contains a framework to guide the assessment of the implications of proposals on the objective for PM_{10} particulates. The research suggests that this assessment framework will also be relevant to mineral working generally and should be adopted when drawing up and considering proposals for new sites, or extensions or modifications to existing sites, if there is a residential property or other sensitive establishment within 1km of any site activity with the potential to generate dust e.g. haul roads, crushers and stockpiles".

The Newcastle Report advises that: "In considering the need for additional assessment to be undertaken at the environmental impact assessment stage of an application for opencast coal sites it is important to view the site in context and identify the likely impacts at the scoping stage. It would be inappropriate to indiscriminately apply tests that may not serve any planning, environmental, health or amenity purpose".

The framework provides a guide to the assessment of sites for PM_{10}. The framework takes a step-by-step approach looking at each factor in turn asking simple questions. If the site is not likely to have a significant impact, then 'best practice' measures are recommended. The recent report "Guidance on the Assessment of Mineral Dust Impacts for Planning, May 2016" published by the Institute of Air Quality Management (IAQM) adopts this assessment framework.

If a site is remote from communities (in excess of 1km) then there should be no need to carry out any more assessment or control measures other than 'best practice' measures.

If the site has a community or particularly sensitive premises/users within 1km or if a site is likely to contribute to local sources of PM_{10} which would result in the National Air Quality Standard being exceeded, then it is reasonable for an assessment to be considered.

In such circumstances the potential impact of the site can be assessed against two potential sources of information:

- Site/community monitored PM_{10} data; or
- Automatic Urban and Rural Network (AURN) data.

Site/community monitoring should be evaluated on the basis of the representative period monitored and comparison with the nearest AURN data.

If the AURN data indicates that the additional load attributable to site operations of 2µg/m^3 would bring the area above the National Air Quality Standard, then this would indicate that there may be a need for monitoring and control mechanisms to be put in place to reduce the potential to create PM_{10} dust from the site on those days when the standard is exceeded.

If the AURN data does not indicate that the additional load attributable to site operations of 2µg/m^3 would bring the area above the National Air Quality Standard, then this would not breach the current National Air Quality Standard and therefore would not justify any additional monitoring and controls over and above 'best practice' measures.

Whilst the proposed site is not within 1km of a community, in recognition of the residential properties in the general vicinity around the site, consideration has been given as to whether additional loading would bring the area above the National Air Quality Standard. The Air Quality (Scotland) Amendment Regulations 2002 set an air quality objective for PM_{10}. The target is a 24-hour mean of 50µg/m^3, not to be exceeded more than 7 times a year, and an annual mean of 18µg/m^3 to be met by end of 2010.

Reference has been made to the DEFRA website, which provides background mapping data for local authorities for LAQM purposes to understand existing baseline conditions. The potential emissions for the Borrow Pit based on publish data have been identified, these levels have been added to the baseline conditions for comparison against the air quality objectives.

5.3.5.2 $PM_{2.5}$ Assessment

The Air Quality (Scotland) Amendment Regulations 2016 sets an annual $PM_{2.5}$ mean of 10µg/m^3 to be achieved by 31st December 2020.

5.4 Baseline

5.4.1 Site Context

Lealt is a previously worked quarry lying between the A855 road and the Lealt Gorge on the coast of the Trotternish Peninsula at National Grid Reference NG 51880 60620 (Drawing 73.02.01, Site Location Plan refers). The existing Borrow Pit is shown on Drawing 73.02.02 Existing Topography Plan. Previous workings have left a back-wall, some 6-8m in height adjacent to the road with a fairly level, slightly domed area of quarry floor at around 85-88m above ordnance datum (AOD), extending eastward towards the coast, there is a second sinking of around 6m to the east of the main floor level at around 81-82m AOD. Access to the quarry is directly from the A855, a little to the south-west of the quarry workings and to the north-east of the twin accesses to the Lealt Gorge car park from which a path leads to viewpoints for the Lealt Stream Waterfall and the old Diatomite furnace and mill down on the shore at Inver Tote.

The closest residential properties to the proposed Borrow Pit are Lealt Falls House and No.2 Tote, some 460m to the south-west, the Hamlet of Lealt, some 970m to the west and No.10 Culnacnock, some 650m to the north. Blasting has the potential to result in levels of vibration.

5.4.2 Climate and Meteorology

Weather conditions are important in the consideration of the potential for dust generation from any ground disturbing activity. The prevailing meteorological conditions of any site will be dependent upon several factors including its location and local topography.

The influence of the Atlantic Ocean and the Gulf Stream create a mild oceanic climate. Temperatures are generally cool, averaging 6.5 °C (43.7 °F) in January and 15.4 °C (59.7 °F) in July at Duntulm in Trotternish. Snow seldom lies at sea level and frosts are less frequent than on the mainland. Winds are a limiting factor for vegetation. South-westerlies are the most common and speeds of 128 km/h (80 mph) have been recorded. High winds are especially likely on the exposed coasts of Trotternish and Waternish. Climatological information for the site is based on data from the Meteorological Office (Met. Office) supplemented by information from the Flood Estimation Handbook produced by the Centre for Ecology and Hydrology (Web Service, 2021).

The site area is located within the Western Scotland regional climate area. Western Scotland experiences a maritime climate, due to its geographical location at the eastern edge of the Atlantic Ocean in a predominantly south-westerly air stream. It is classed as fairly warm and moist, with typically between 1800 and 2400mm of rainfall per year.

For the Lealt River catchment, long term averages indicate that the Standard Annual Average Rainfall (SAAR6190) for the period 1961 to 1990 is 2,249mm per annum and the Standard Annual Average Rainfall (SAAR4170) for the period 1941 to 1970 was 2,069mm for the catchment area.

The Standard Percentage Runoff (SPR), a measure of the amount of rainfall within the catchment that is converted into surface water runoff, can be estimated from the local soil data. For the catchment that the site lies within, the SPRHOST is 54%, indicating infiltration, evapotranspiration and through-flow are important for the site. The proportion of the time that the catchment is wet (PROPWET) is estimated to be 75%; this indicates the amount of time that the soil moisture deficit is equal to or less than 6mm.

The periods during which the risk of dust generation is likely to be the highest are when potential evaporation exceeds rainfall and drying conditions result. At Lealt this is likely to occur from April to September. These drier months must be considered times of greatest potential for dust arising due to moisture deficits in surface materials, either in particulate matter within the quarry or unbound surface areas within the processing and stockpiling areas.

Wind is a significant meteorological factor in that the wind direction determines the transport of fugitive dust and wind speed affects the pick-up of fugitive dust and the distance it is carried from source. On Skye there is a dominance of southerly and south-westerly winds with only a small proportion of winds coming from the north-west to south-east.

5.4.3 Local Air Quality

5.4.3.1 The Highland Council Air Quality Annual Progress Report 2019

The Environment Act 1995 requires local authorities to review and evaluate the current and likely future quality of air in their areas against those objectives in the Air Quality Strategy (AQS) which have been prescribed in the regulations for the purpose of the local air quality monitoring regime. Where a local authority considers that one or more of the AQS objectives are unlikely to be met within the relevant time period, the authority must declare an Air Quality Management Area (AQMA), covering the area where the problem has been identified. It must then draw up an action plan setting out the measures it intends to take to achieve the air quality objectives in the area.

The July 2019 Air Quality Annual Progress Report (APR) for The Highland Council provides an overview of air quality in The Highland Council area. Whilst the report refers to quarrying operations as being a potential source of fugitive dust, no issues were raised with respect to existing or proposed sites. The report concludes that the air quality in The Highland Council area is general good, noting that the only air quality issues within the area relate to Nitrogen dioxide pollution in Inverness City Centre.

5.4.3.2 DEFRA Data

The DEFRA website, data for the 1km grid square that contains the Borrow Pit at Lealt gives a projected PM_{10} concentration in 2021 of 4.78µg/m^3 and a projected $PM_{2.5}$ concentration for the area for 2021 of 2.89µg/m^3.

5.4.4 The Proposed Development

The proposal relates to the utilisation of Lealt Quarry as a Borrow Pit to allow the quarrying of hard rock for use in the proposed Staffin Community Harbour (SCH) development. The extraction process will require the blasting of rock to create various sizes of product ranging from crushed aggregate for general fill to 3-5 tonne armour stone blocks. The proposed SCH development is anticipated to require in some 52,650 tonnes of rock.

Whilst it is anticipated that the main blasting and processing works could be completed within a period of 2-3 months; this would be dependent on materials being transported regularly off-site as there is insufficient space within the Borrow Pit development area to accommodate all of the processed and over-blast materials. Accordingly, as there is only a limited availability of stockpiling areas within the SCH development area, operations in relation to the loading and dispatch of crushed rock and armour stone are likely to be spread out over a longer period, the duration of which shall be dictated by the rate at which aggregates are required on the development site as the SCH project progresses.

On this basis, it is anticipated that the quarry operations may be intermittently on-going for a period of around one year during which time it is likely that blasting followed by processing would be undertaken intermittently, for periods of 2-3 weeks at a time, as the Borrow Pit is developed.

The site will be developed in 3 phases; Section 2.6.1.8 of Chapter 2 describes the development in detail. Drawing 73.02.02 shows the existing topography, Drawings 73.02.03 to 73.02.06 show the development phasing.

5.4.5 Receptors

5.4.5.1 Lealt Falls House and No.2 Tote

Lealt Falls House and No.2 Tote are located some 460m to the south-west of the Borrow Pit and are representative of the closest residential properties (Drawing 73.05.01 refers). From the Borrow Pit at around 85-90m AOD, the land drops into the Lealt Gorge and the bay at Inver Tote and then rapidly climbs back to around 80m AOD at the properties. The intervening topography is predominantly rough grazing land. These properties are not in the direct line of the prevailing wind. As per Table 5.3.1 residential receptors have a high sensitivity. The distance is greater than that defined as distant per Table 5.3.3 but has pessimistically been assumed as distant for the purpose of assessment. Site specific wind data has not been sourced and the conservative assumption has been made that the frequency of potentially dusty winds is very frequent in all cases. The pathway effectiveness based on Table 5.3.5 is therefore **moderately effective** from sources associated with Borrow Pit.

5.4.5.2 No.10 Culnacnock

The residential property of Culnacnock is located to the east of the A855 some 650m to the north of the Borrow Pit. The intervening topography is rough grazing land rising from around 95m AOD at the Borrow Pit to around 100m AOD before dropping to around 90m AOD at the property. The property is in the direct line of the prevailing wind. As per Table 5.3.1 residential receptors have a **high** sensitivity. The distance is greater than that defined as distant per Table 5.3.3 but has pessimistically been assumed as distance for the purpose of assessment. Site specific wind data has not been sourced and the conservative assumption has been made that the frequency of potentially dusty winds is very frequent in all cases. The pathway effectiveness based on Table 5.3.5 is therefore **moderately effective** from sources associated with Borrow Pit.

5.4.5.3 No.2 Lealt

No.2 Lealt is located some 970m to the west of the Borrow Pit and is the closest residential property in the hamlet of Lealt. The intervening topography is predominantly rough grazing land dipping from around 85m AOD at the Borrow Pit to around 80m AOD before climbing to around 100m AOD at the property. This property is not in the direct line of the prevailing wind. As per Table 5.3.1 residential receptors have a **high** sensitivity. The distance is greater than that defined as distant per Table 5.3.3 but has pessimistically been assumed as distance for the purpose of assessment. Site specific wind data has not been sourced and the conservative assumption has been made that the frequency of potentially dusty winds is very frequent in all cases. The pathway effectiveness based on Table 5.3.5 is therefore **moderately effective** from sources associated with Borrow Pit.

5.4.5.4 Lealt Car Park and Picnic Area

Recreational facilities in the area comprise the Lealt Car Park and Picnic Area, which is located immediately to the east of the application boundary. From the car park paths lead off to viewpoints for the Lealt Stream Waterfall and the old Diatomite furnace and mill down on the shore at Inver Tote. The picnic area is located some 75m from the Borrow Pit. The picnic area is not in the direct line of the prevailing wind. As per Table 5.3.1 footpaths and short term car parks have a **low** sensitivity. The area is close hence pathway effectiveness based on Table 5.3.5 is **highly effective** from sources associated with Borrow Pit.

Recreational receptors have also been considered.

5.4.5.5 Ecology

There is potential for the wind to pick up and disperse fine particles. Dust deposition on to surfaces can potentially affect plant life, though this occurs only at high dust loadings. The consequences include:

- Reduced photosynthesis resulting from reduced light penetration through the leaves leading to reduced growth rates and plant vigour;
- Increased incidence of plant pests and diseases; and
- Reduced effectiveness of pesticide sprays due to reduced penetration.

There are no ecologically designated sites in the immediate vicinity of the Burrow Pit. As detailed in Chapter 10: Terrestrial Ecology, the Phase 1 habitat survey has identified remnant woodland located on the steep ground adjacent to the Lealt River.

The trees and the associated bryophyte flora could be sensitive to dust. Having regard to the very small scale of Borrow Pit, the short timescale of its operations, particularly the limited amount of processing required, and the lack of ecological designation, no ecological receptors are taken forward for specific assessment. It is however, recognized that mitigation designed to minimise dust issues will mitigate impacts on ecological receptors also.

5.5 Potential Impacts

5.5.1 Dust

The proposed rock extraction operations at the Lealt Borrow Pit have the potential to produce dust from a variety of sources and activities associated with:

- Soil/drift stripping and storage;
- Drilling and blasting of rock faces;
- Rock crushing and screening;
- Site vehicle movements;
- Temporary rock storage;
- Transportation of rock off site; and
- Restoration.

These are discussed in turn below, as the assessment of dust is completed for residual effects taking into account mitigation, the significance of impacts is not assessed in this section rather it is considered in Section 5.8.

5.5.1.1 Soil Stripping and Storage

Soil stripping and storage must be carried out during drier conditions to prevent damage to the soil structure, and therefore there is some potential for dust generation from disturbance of the soil.

The soil's inherent moisture content will help mitigate dust generation. The proposed stripping and mound formation operations shall be a relatively short-lived activity of some 1-2 weeks in duration at the commencement of operations. To minimise the potential for dust uplift, soil mounds shall be seeded to grass at the earliest opportunity.

Having consideration of the very short duration of operations, likely meteorological conditions, the separation distance to receptors and the intervening topography it is considered that the potential for a dust impact from soil handling operations is no greater than that associated with agricultural activities and is likely to be negligible.

5.5.1.2 Drilling and Blasting

The drilling of blast holes has a high potential for dust generation and dust emission. Dust will arise as the rock face is blasted.

In practice little dust is produced from drilling as dust collection is mandatory under COSHH. This operation is strictly controlled under statutory legislation. Dust will arise as the rock face is blasted, but this is a short-term event comprising larger particulate matter.

Having consideration of the mitigation required by statutory controls, the small size of each individual blast, likely meteorological conditions, the separation distance to receptors and the intervening topography, it is considered that the potential for a dust impact from drilling and blasting operations is negligible.

5.5.1.3 Rock Crushing and Screening

Following drilling and blasting, the rock in the blastpile will be sorted into varying sizes of armour stone (from 75kg up to 5 tonnes); these being removed and stockpiled on site until required at the SCH development site. Once the above segregation has taken place the smaller sized aggregate will be stockpiled. Once a sufficient volume of material has been accumulated, mobile plant shall be brought to site to prepare crushed aggregates. This would comprise a crusher and, possibly, a screen. Crushing and screening has the potential to create dust with the attendant risk of uplift.

As with drilling operations, rock crushing and screening is regulated under statutory controls (SEPA PPC permit) which ensure that appropriate mitigation measures are employed to minimise dust emission. Where required, conveyors are covered to prevent windblow and crushers are fitted with water sprays for dust suppression. The requirement for crushed rock is fairly low (just over 31,000 tonnes) so crushing is likely to be restricted to a few weeks in total. The location of the crushing and screening plant within the quarry void ensures that operations benefit from an element of natural screening which reduces windblow. Having regard to the like short duration of crushing and screening operations, with mitigation, the potential for dust emission is considered to be low/negligible.

5.5.1.4 Site Vehicle Movements

The mechanical action of wheels on unbound road surfaces reduces particle sizes by crushing, thereby increasing the likelihood of dust emissions. Vehicle wheels can throw up dust from the road surface and the effect can be increased by vehicles travelling at speed. Without mitigation there is a high potential for dust emissions from this source.

In general, dust attributable to vehicle movements can be controlled by the imposition of site speed restrictions and water spraying from a mobile bowser as necessary. With mitigation, the potential for dust emission is considered to be low.

5.5.1.5 Temporary Rock Storage

There is the potential for windblow from the dry surface layers on stockpiles which, without mitigation, can give rise to low to moderate levels of dust emission.

5.5.1.6 Transportation of Rock Off Site

The transportation of rock off site can cause dust emission from dirt on roads, dirt on vehicles or dust from transported materials.

The stockpiles of the larger armour stone are unlikely to be significant sources of fugitive dust. The stockpiles of crushed aggregate will be located within the quarry void and benefit from natural screening. Temporary stockpiles shall be accessible for water spraying and shall be sprayed, as required, to prevent dust becoming airborne. With mitigation, the potential for dust emission is considered to be low/negligible.

5.5.1.7 Reinstatement

Generally, site restoration involves the replacement of soils with the attendant risk of dust generation from disturbance of the soil.

The soil's inherent moisture content will help mitigate dust generation. Limited soil replacement shall take place at the cessation of operations, this being undertaken over a period of around one week. Dust generation from replacement of soils is likely to be of a low magnitude and comparable to the normal agricultural activities.

5.5.2 PM_{10}

The Newcastle research suggests that an additional loading of 2µg/m^3 be attributed for new site operations; this relates to large scale opencast coal sites. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2003 suggests that quarrying and construction work are thought to account for less than 1µg/m^3 of PM_{10} levels. Having regard to the small scale of the operations proposed at Lealt, any additional loading would be likely to be less than 1µg/m^3.

On the basis of a worst-case scenario, an additional loading of 2µg/m^3 of PM_{10}, the projected concentration around Borrow Pit would continue to be 6.78µg/m^3 comfortably below the 18µg/m^3 daily mean objective for PM_{10} set in The Air Quality (Scotland) Amendment Regulations 2002.

As the proposal should not breach the objectives set in the Regulations, any additional monitoring is not justified, and site dust control should be undertaken on the basis of 'best practice' measures.

5.5.3 $PM_{2.5}$

As PM_{10} include $PM_{2.5}$ it could be presumed that as a worst case all of the 2µg/m^3 predicted in the Newcastle research is in the $PM_{2.5}$ category then levels of 4.89µg/m^3 could arise at the Borrow Pit. This pessimistic projection is comfortably below the objective levels of 10µg/m^3 hence no further assessment is required in relation to $PM_{2.5}$.

5.6 Cumulative Impacts

As detailed in Chapter 3 no cumulative effects are predicted.

5.7 Site Dust Management Plan

5.7.1 Control Measures

With the emphasis on the use of best practice to maintain acceptable site dust levels, identification of dust sources and the most appropriate mitigation must be considered within overall site management practices. A Site Dust Management Plan has therefore been developed that adopts the principles of:

- prevention, in other words, preventing dust from becoming airborne; and
- containment and/or recapture of dust once it is in the air.

The following control measures will be used in order to minimise dust nuisance:

5.7.1.1 Soil Stripping and Mound Formation

- Restrict the duration of the activity; and
- Seed mounds at earliest opportunity.

5.7.1.2 Drilling Operations

- All drilling rigs are fitted with dust extraction equipment (dust collection during drilling is mandatory under COSHH Regulations); and
- Dust collected from rigs shall be removed from the area prior to blast detonation.

5.7.1.3 Loading of Excavated Material

- Minimise tipping height;
- Avoid lorry overloading; and
- Dampening of surface and around the excavation area during dry windy weather.

5.7.1.4 Site Vehicle Movements

- Water bowser spraying on haul roads;
- Exhausts directed upwards;
- Limit vehicle speeds;
- Maintenance/grading of roads; and
- Minimise gradient of roads where compatible.

5.7.1.5 Crushing and Screening

- Locate within quarry void;
- Emissions monitoring from crushing and screening plant shall be undertaken in accordance with the conditions in the Part B PPC permit for mobile processing plant; this requires regular visual assessment; and

- Where required dust suppression systems shall be used to minimise emissions from crushing.

5.7.1.6 Temporary Aggregate Storage

- Locate crushed aggregate storage within quarry void;
- Stockpiles of material shall be maintained at suitable heights and accessible for dampening during dry or windy conditions; and
- Cover or enclose fine materials.

5.7.1.7 Transportation of Aggregate Off-site

- All loaded vehicles carrying crushed aggregate shall be sheeted;
- Provision of maintained surfaced access; and
- Dampening of access roads during dry windy weather.

5.7.1.8 General

- During prolonged periods of dry weather plant and vehicles shall not travel over unwatered haulage roads;
- A portable water sprayer shall be used to minimise dust on haul roads;
- An adequate supply of water shall be available at all times for the motorised spraying unit;
- All haul roads shall be subject to regular grading;
- All vehicles used for the movement of materials within the site shall be equipped with exhausts pointing away from the ground;
- All relevant heavy plant shall be fitted with radiator fan deflector plates; and
- If, in extreme adverse conditions the aforementioned measures are not adequate, the following action shall be taken:
  a) Restriction on the speed of vehicles on site;
  b) Temporary cessation of activities giving rise to concern.

5.7.2 Dust Management

The following measures shall be adopted to ensure effective day to day dust management during operational periods:

- The site manager will be the responsible person for ensuring that the dust management plan is enforced. In his absence a suitable competent person will be nominated;
- Regular visual inspections of dust conditions will be undertaken by site staff. The frequency of inspections will be determined on a daily basis in accordance with prevailing conditions;
- Regular visual assessments of dust emissions will be made daily by site supervisory staff and remedial actions initiated as necessary. The results of such monitoring will be recorded in a daily log book;
- Site management will give attention to advance weather forecasts and organise dust management requirements accordingly; and
- In the event of a complaint concerning dust emission, the site manager shall immediately undertake an investigation and instigate any necessary remedial action.

5.7.3 Complaint Procedures

Should complaints be made to the quarry management relating to dust emission, then these shall be immediately investigated. All such complaints, and any action undertaken as a result of the investigation, shall be recorded in a log held at the quarry office which shall be available for inspection by the Planning Authority on request.

5.8 Residual Effects

The site characteristics and baseline conditions are set out within this report. The following tables provide a series of assessment matrices which are used to estimate the Dust Impact Risk, the Pathway Effectiveness and the Likely Magnitude of Dis-amenity Effects at each receptor.

The Residual Source Emissions are based on the scale of the anticipated operations and classified as Small, Medium, or Large based on Table 5.3.2 for each relevant operational activity, taking into account the designed-in mitigation. The Residual Source Emissions for each activity are summarised in Table 5.8.1.

Table 5.8.1: Residual Source Emissions Classification

Activity	Residual Source Emissions
Site Preparation and Restoration	Small
Mineral Extraction	Small
Stockpiles and Exposed Surfaces	Small
Materials Handling	Small
Drilling and Blasting	Small
On-site Transportation	Small
Mineral Processing	Small
Off-site Transportation	Small

The dust dis-amenity effects from the proposed operations at each receptor around the mineral's development (identified on Drawing 73.05.01) are summarised in Table 5.8.2 which sets out the risk of impacts for each zone/activity being assessed.

5.8.2: Summary of Dust Dis-amenity Effects at Specific Receptors

Receptor details and location	Location relative to nearest dust source	Residual Source Emissions (Table 5.8.1)	Pathway Effectiveness (Table 5.3.5)	Dust Impact Risk (Table 5.3.6)	Receptor Sensitivity (Table 5.3.1)	Magnitude of Dust Effect (Table 5.3.7)
1 Lealt Falls House	460m upwind of Borrow Pit	Small	(*Very frequent/**Distant) Moderately Effective	Negligible Risk	High	Negligible Effect
2 No.10 Culnacnock	650m downwind of Borrow Pit	Small	(*Very Frequent/**Distant) Moderately Effective	Negligible Risk	High	Negligible Effect
3 No.2 Lealt	970m upwind of Borrow Pit	Small	(*Very Frequent/**Distant) Moderately Effective	Negligible Risk	High	Negligible Effect
4 Lealt Car Park & Picnic Area	75m upwind of Borrow Pit	Small	(*Very Frequent/Close) Highly Effective	Low Risk	Low	Negligible Effect

* Site specific wind/dry day data has not been obtained; in the absence of this data the frequency category (Table 5.3.3) has been assumed as 'very frequent' for all locations; i.e. worst case scenario.

** Whilst these properties are in excess of 400m from dust sources, and therefore fall outwith the Table 5.3.4 criteria; a criterion of 'Distant' has been adopted to allow overall assessment.

From Table 5.8.2 it can be seen that the IAQM assessment indicates that the magnitude of the dust effect at sensitive receptors is assessed as being negligible adverse at all locations. Overall, the proposed Borrow Pit operations are assessed as being not significant in terms of dis-amenity dust.

The dust control measures detailed in the Site Dust Management Plan (Section 5.8) will be implemented to mitigate potential dust impact. With the implementation of the dust management plan, the potential for a dust impact associated with site activities is considered to be negligible. No significant reduction in air quality is anticipated.

5.9 Summary

A local source of aggregates has been identified as the preferred option for the proposed improvement of the SCH in Garafad. The regulation and control of potential nuisance dust from the site shall be based around the principal of "best practice" and emphasis is placed on day-to-day site management to identify on-going requirements for dust mitigation and to ensure prompt remedial action in the event of a failure.

This assessment has given consideration to the method of working, the dust control measures to be employed, the duration of potential dust generating activities, meteorological conditions, and the location and sensitivity of receptors.

The possibility of a cumulative dust impact, attributable to two or more mineral workings, or other developments, operating in close proximity, has been considered; there is no potential for a significant cumulative dust impact.

This assessment has concluded that operations can be undertaken without exceeding the Air Quality Objectives for PM_{10} and $PM_{2.5}$.

If the control of dust emissions and mitigation of the potential environmental impacts of dust from the proposed extension operations is implemented by the Site Dust Management Plan, the potential for any significant dust impact is negligible and it is unlikely that there shall be any significant reduction in air quality.

No residual impacts have been identified.

Table 5.9.1 provides a summary of impacts, mitigation and residual effects

Table 5.9.1: Summary of Impacts, Mitigation and Effects

Receptor	Nature of Impact	Receptor Sensitivity	Dust Risk	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Dust Risk	Significance of Residual Effect
Construction							
Lealt Falls House	Dusting, nuisance	High	Negligible Adverse	Negligible Adverse	Revegetation of soils, implementation of site dust management plan, dust suppression as necessary	Negligible Adverse	Negligible Adverse
No.10 Culnacnock	Dusting, nuisance	High	Negligible Adverse	Negligible Adverse	Revegetation of soils, implementation of site dust management plan, dust suppression as necessary	Negligible Adverse	Negligible Adverse
No.2 Lealt	Dusting, nuisance	High	Negligible Adverse	Negligible Adverse	Revegetation of soils, implementation of site dust management plan, dust suppression as necessary	Negligible Adverse	Negligible Adverse
Lealt Car Park & Picnic Area	Dusting, nuisance	Low	Negligible Adverse	Negligible Adverse	Revegetation of soils, implementation of site dust management plan, dust suppression as necessary	Negligible Adverse	Negligible Adverse

Key

	Significant Effect
	Non-Significant Effect

5.10 References

BS 6069 -BSI British Standards. 1990. Characterization of air quality. General. BS 6069-4:1990.

Institute of Air Quality Management. 2016. Guidance on the Assessment of Mineral Dust Impacts for Planning.

MIRO. 2011. Good practice guide: control and measurement of nuisance dust PM10 from Extractive Industries.

Scottish Office Development Department: The Control of Dust at Surface Mineral Workings (PAN 50 Annex B) 1998

5.11 Glossary

Acronym	Definition
μm	micron, one-millionth of a meter or one-thousandth of a millimeter
AOD	Above ordnance datum
APR	Air Quality Annual Progress Report
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
AURN	Automatic Urban and Rural Network
BS	British Standard
COSHH	Control of Substances Hazardous to Health
IAQM	Institute of Air Quality Management
km	Kilometre
m	metres
mg	Milligram, a thousandth of a gram
MIRO	Mineral Industry Research Organisation
mm	Millimetres
NAQS	National Air Quality Standards
P	Pathway
PAN	Planning Advice Notes
PM_{10}	small particles, 10 microns and less in diameter
$PM_{2.5}$	small particles, 2.5 microns and less in diameter
R	Receptor
S	Source
SAAR	Standard Annual Average Rainfall
SPR	Standard Percentage Runoff
S-P-R	Source-Pathway-Receptor

Chapter 6: Archaeology and Cultural Heritage

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Contents

6 Archaeological and Cultural Heritage

6.1 Introduction

This chapter considers the likely significant effects on archaeology and cultural heritage associated with the construction and operation of the proposed Staffin Community Harbour (SCH) development within the boundary shown on Drawing 73.06.02 and the Borrow Pit development area at Lealt Quarry (Drawings 73.06.04 and 73.06.05).

6.2 Regulations, Guidance and Sources of Information

6.2.1 Relevant Legislation

The statutory framework for heritage in Scotland is outlined in:

- The Town and Country Planning (Scotland) Act 1997, as amended in the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997;
- The Ancient Monuments and Archaeological Areas Act 1979;
- The Historic Environment (Amendment) (Scotland) Act 2011.
- The Planning etc. (Scotland) Act 2006;
- Historic Environment (Scotland) Act 2014; and
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended).

Given that works will take place partially within the marine environment the following may also apply:

- The Merchant Shipping Act 1995;
- The Protection of Military Remains Act 1986; and
- The Marine (Scotland) Act 2010.

6.2.1.1 United Kingdom Marine Heritage Legislation

6.2.1.1.1 Merchant Shipping Act 1995

The Merchant Shipping Act 1995 requires that all recovered wrecks landed in the UK is reported to the Receiver of Wreck, whether recovered from within or outside UK territorial waters, (defined as 12 nautical miles from mean low water spring (MLWS), even if the finder is the owner. According to section 255 of the Merchant Shipping Act 1995, the definition of wreck includes "jetsam, flotsam, lagan and derelict found in or on the shores of the sea or any tidal water" as defined below:

"Jetsam describes goods cast overboard to lighten a vessel in danger of sinking. The vessel may still perish.

Flotsam describes goods lost from a ship which has sunk or otherwise perished. Goods are recoverable because they remain afloat.

Lagan describes goods cast overboard from a ship which afterwards perishes. The goods are buoyed so they can be recovered.

Derelict describes property, whether vessel or cargo, which has been abandoned and deserted at sea by those who were in charge of it without any hope of recovering it.

If a boat comes off its moorings, it isn't generally classified as a wreck for the purposes of the Merchant Shipping Act 1995, as it hasn't been abandoned without hope of recovery.

Also, buoys such as data buoys and mooring buoys aren't classed as wreck. However, buoys which form part of fishing equipment may be classed as wreck when adrift."

If any wreck material, as defined above, is landed, a 'Report of Wreck and Salvage form,' also known as a droit form, will need to be completed, signed and sent to the Receiver of Wreck (RoW) at row@mcga.gov.uk within 28 days of the recovery.

6.2.1.1.2 Protection of Military Remains Act 1986

The Protection of Military Remains Act 1986 has the principal concern to protect the sanctity of vessels and aircraft that are military maritime graves. The purpose of this safeguard is not primarily archaeological, but the Ministry of Defence (MoD) liaises closely with Department for Culture, Media and Sport and Historic Environment Scotland in the process of site designation. Any aircraft lost while in military service is automatically protected under this Act.

6.2.1.1.3 Marine (Scotland)) Act 2010

The Marine (Scotland) Act 2010, Section 73, concerns the potential designation of Historic Marine Protected Areas (HMPA). This Act repealed the Protection of Wrecks Act 1973 within Scotland and this section the Act defines a marine historic asset as any of the following:

- a vessel, vehicle or aircraft (or a part of a vessel, vehicle or aircraft);
- the remains of a vessel, vehicle or aircraft (or a part of such remains);
- an object contained in, or formerly contained in, a vessel, vehicle or aircraft;
- a building or other structure (or a part of a building or structure);
- a cave or excavation; and
- a deposit or artefact (whether or not formerly part of a cargo of a ship) or any other thing which evidences, or groups of things which evidence, previous human activity.

6.2.2 Terrestrial Policy

Planning policy relevant to this chapter is contained within:

- Scottish Planning Policy (SPP) (Scottish Government 2020);
- Historic Environment Policy for Scotland (HEPS) (HES 2019a);
- The adopted Highland-wide Local Development Plan (The Highland Council (THC) 2012).

SPP expresses the following policy principles:

"*The planning system should:*

- *promote the care and protection of the designated and non-designated historic environment (including individual assets, related settings and the wider cultural landscapes) and its contribution to sense of place, cultural identity, social well-being, economic growth, civic participation and lifelong learning; and*
- *enable positive change in the historic environment which is informed by a clear understanding of the importance of the heritage assets affected and ensure their future use. Change should be sensitively managed to avoid or minimise adverse impacts on the fabric and setting of the asset, and ensure that its special characteristics are protected, conserved or enhanced*" (Scottish Government 2020, Para 137)."

HEPS (HES, 2019b) sets out the Scottish Government's policy for decision making that affects the historic environment. It contains six policies for managing the historic environment, all of which favour protection, understanding and promotion of the historic environment as well as the preservation of the benefits of the historic environment for future generations. Historic Environment Policies 3 and 4 both state *"if detrimental impact on the historic environment is unavoidable, it should be minimised. Steps should be taken to demonstrate that alternatives have been explored, and mitigation measures should be in place"* (HES, 2019b). The following historic environment policies are relevant to this assessment:

- HEP1

  "*Decisions affecting any part of the historic environment should be informed by an inclusive understanding of its breadth and cultural significance*."

- HEP2

  "*Decisions affecting the historic environment should ensure that its understanding and enjoyment as well as its benefits are secured for present and future generations."*

- HEP3

  "*Plans, programmes, policies and strategies, and the allocation of resources should be approached in a way that protects and promotes the historic environment.*

  If detrimental impact on the historic environment is unavoidable, it should be minimised. Steps should be taken to demonstrate that alternatives have been explored and mitigation measures should be put in place."

- HEP4

  "*Changes to specific assets and their context should be managed in a way that protects the historic environment. Opportunities for enhancement should be identified where appropriate.*

  If detrimental impact on the historic environment is unavoidable, it should be minimised. Steps should be taken to demonstrate that alternatives have been explored, and mitigation measures should be put in place."

THC's approach to proposals that affect the historic environment is set out in Policy 57 of the Highlands-wide Local Development Plan (HwLDP) which states that:

> *"development proposals will be assessed taking into account the level of importance and type of heritage features, the form and scale of the development, and any impact on the feature and its setting*".

6.2.3 Marine Policy

6.2.3.1 UK Marine Policy Statement (2011)

Her Majesty's Government's UK Marine Policy Statement (2011) states heritage assets should be conserved through marine planning in a manner appropriate and proportionate to their significance. Many heritage assets with archaeological interest are not currently designated as scheduled monuments or protected wreck sites but are demonstrably of equivalent significance. The absence of designation for such assets does not necessarily indicate lower significance and the marine planning authority should consider them subject to the same policy principles as designated heritage assets based on information and advice from the relevant Regulator and advisors.

6.2.3.2 Scotland's National Marine Plan (2015)

Scotland's National Marine Plan was published in 2015. It states in policy under General Planning Principles (GEN) 6 Historic Environment that:

> '*Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance...*
>
> *4.24 Proposals for development and use that may affect the historic environment should provide information on the significance of known heritage assets and the potential for new discoveries to arise. They should demonstrate how any adverse impacts will be avoided, or, if not possible, minimised and mitigated. Where it is not possible to minimise or mitigate impacts, the benefits of proceeding with the proposal should be clearly set out.'*

This has been discussed in detail in Section 4.5.1 of Chapter 4, Statutory Context and Policy.

6.2.4 Guidance

Recognisance has been taken of the following best practice guidelines/guidance in preparing this assessment:

- THC Supplementary Guidance: Historic Environment Strategy (2013);
- PAN2/2011 'Planning and Archaeology' (Scottish Government 2011);
- Chartered Institute for Archaeologists (CIfA) Standards and Guidance for Historic Environment Desk Based Assessments (CIfA 2017) and Commissioning Work or Providing Consultancy Advice on the Historic Environment (CIfA 2014);
- HES "Managing Change in the Historic Environment" guidance note series, particularly Historic Environment Scotland's Managing Change in the Historic Environment: Setting (HES 2020); and
- NatureScot & Historic Environment Scotland's Environmental Impact Assessment Handbook v5 (SNH & HES 2018).

HES's setting guidance defines setting as '*the way the surroundings of a historic asset or place contribute to how it is understood, appreciated, and experienced*' (HES 2020). The guidance further notes that '*planning authorities must take into account the setting of historic assets or places when drawing up development plans and guidance, when considering various types of environmental and design assessments/statements, and in determining planning applications*'. It advocates a three-stage approach to assessing potential impacts upon setting:

- Stage 1: identify the historic asset.
- Stage 2: define and analyse the setting.
- Stage 3: evaluate the potential impact of the proposed changes.

THC's Supplementary Guidance on the historic environment (2013) supports the policy on the historic environment and provides a definition of THC's approach to the protection of the historic environment through the planning process. This strategy is implemented through strategic aims. Those relevant of particular relevance to this assessment are:

- Strategic Aim 6: That listed buildings within Highland are protected from harmful developments…which may affect their special architectural and historic interest or their setting.
- Strategic Aim 13: That scheduled monuments – and their setting – within Highland are protected from harmful developments that may affect their national importance.
- Strategic Aim 16: To ensure that the importance of non-designated archaeological sites and landscapes and their settings are understood and wherever possible are protected from harmful developments.
- Strategic Aim 17: To ensure no asset or its setting is lost or altered without adequate consideration of its significance and of the means available to preserve, record and interpret it in line with national and local policy and Highland Council's Standards for Archaeological Work. (Highland Council, 2013: 16)

The following professional and industry standards and best practice that has informed the methodology for assessment of the marine heritage assets are listed below:

- Wessex Archaeology (2007) Historic Environment Guidance for the Offshore Renewable Energy Sector. Commissioned by COWRIE Ltd;
- Wessex Archaeology (2006) On the Importance of Wrecks;
- Historic England (2012 Updated 2017) Ships and Boats: Prehistory to Present Selection Guide;
- Historic England (2012 Updated 2016) Ships and Boats: Prehistory to 1840 Introductions to Heritage Assets;
- Historic England (2012 Updated 2016) Ships and Boats: 1840-1950 Introductions to Heritage Assets
- Strategic Environmental Assessment of continental shelf in regard to prehistoric archaeological remains http://www.offshore-sea.org.uk; and
- Wessex Archaeology (2008) Selection Guide: Prehistoric Landsurfaces and Deposits.

6.2.5 Sources of Information

A detailed desk-based assessment was carried out, drawing on existing databases, archive records, historical maps and historical and modern aerial photography and was used to identify sites and areas that have archaeological and historic environment potential. The following sources were consulted:

- National Record for the Historic Environment (NRHE) as held by HES:
  For designated and non-designated terrestrial and marine heritage asset data, including Canmore Maritime ();
- Highland Historic Environment Record:
  For Historic Environment Record data for the Isle of Sky;
- National Collection of Aerial Photography (NCAP) (online only) as held by HES:
- National Map Library (National Library of Scotland, Causewayside, Edinburgh-):
  For old Ordnance Survey maps (1st & 2nd Edition, small- and large-scale), pre-Ordnance Survey historical maps, pre Hydrographic Office (HO)/United Kingdom Hydrographic Office (UKHO) charts and historic HO/UKHO charts;
- United Kingdom Hydrographic Office (UKHO) Marine Data Portal (Available at: https://datahub.admiralty.co.uk/portal/apps/sites/#/marine-data-portal) or United Kingdom Hydrographic Office (UKHO) Register of Wrecks; and

- Underwater Marine Survey of Staffin Harbour Video footage and stills as supplied by Affric Limited.

6.3 Method of Assessment

6.3.1 Baseline

6.3.1.1 Extent of the Terrestrial Study Areas

The aim of this assessment is to identify the archaeological and cultural heritage significance of the Site and to identify the likely significant direct and setting effects which may result as a consequence of the proposed SCH development and the Borrow Pit. This was completed by examining a variety of evidence for upstanding and buried remains of heritage interest including designated and non-designated heritage assets within 1km of the proposed SCH development and the Borrow Pit (Drawings 73.06.02 and 73.06.04 to 73.06.05).

6.3.1.2 Extent of the Marine Study Area

All marine assets; designated or otherwise within the proposed SCH development boundary and a 10km Study Area (10km Study Area outwith area of Drawing 73.06.05) have been assessed for inclusion in this assessment. As the Borrow Pit does not extend into the inter-tidal and marine environments no assessments of marine assets is required for the Borrow Pit and its 1km Study Area.

The nature of the wrecking process means that the position of wrecking of a marine craft or ship is often an approximate position. This is especially true in periods prior to the 20th century and the development of modern navigational systems that allow for more accurate positions of ships and craft to be charted. Ships or marine craft that have been wrecked may also not sink straight away; they may shift with the tides and weather conditions before finally coming to rest on the seabed; elements of the wreck may be scattered over several locations on the seabed with wreckage coming ashore in the inter-tidal zone. Therefore, there is a degree of uncertainty as to where wrecks with unknown or approximate positions of wrecking may have their final wreck sites within a specific area; in this case within the boundary of the proposed SCH development. Furthermore, where wrecks have tentative locations the NRHE tends to assign the record of their loss to the lower left corner of a 1km Ordnance Survey grid square.

Therefore, marine assets within the 10km Study Area that have positive geographical locations that preclude their location with the proposed SCH development have not been included within the Site gazetteer as presented in Appendix F1.

Any relevant marine assets included within the Site gazetteer in Appendix F1 will be discussed within their relevant chronological periods.

6.3.1.3 Site Gazetteer

Each heritage asset referred to in the text is listed in the Gazetteer in Appendix F1. Each has been assigned a 'Site No.' unique to this assessment, and the Gazetteer includes information regarding the type, period, grid reference, HER number, protective designation, and other descriptive information, as derived from the consulted sources.

6.3.1.4 Field Survey

An archaeological walkover survey of the proposed SCH development and the Borrow Pit was undertaken with the aim of identifying any previously unknown archaeological features. Wherever possible, all known and accessible heritage assets were assessed in the field to establish their survival, extent, significance and relationship to other assets. Weather and any other conditions affecting the visibility during the survey were also recorded. All heritage assets encountered were recorded and photographed. The location of assets noted in the field was recorded using digital photography, written records and a Trimble Real Time Kinematic (RTK) Virtual Reference Station (VRS) GNSS unit. All assets were recorded directly in full British National Grid coordinates.

6.3.1.5 Setting Assessment Survey

All designated assets within the 1km Study Area of the proposed SCH development were visited during the Field Survey to undertake setting assessments. As no designated assets are recorded within the 1km Study Area of the Borrow Pit no setting assessment surveys were required.

6.3.2 Method of Assessment

6.3.2.1 Criteria for Assessing Importance and Sensitivity of Heritage Assets

The definition of cultural significance is readily accepted by heritage professionals both in the UK and internationally and was first fully outlined in the Burra Charter, which states in article one that 'cultural significance' or 'cultural heritage value' means aesthetic, historic, scientific, social or spiritual value for past, present or future generations. This definition has since been adopted by heritage organisations around the world, including HES. HEPS notes that to have cultural significance an asset must have a particular "*aesthetic, historic, scientific or social value for past, present and future generations*". Heritage assets also have value in the sense that they "*...create a sense of place, identity and physical and social wellbeing, and benefits the economy, civic participation, tourism and lifelong learning*" (Scottish Government 2014).

All heritage assets have significance; however, some heritage assets are judged to be more important than others. The level of that importance is, from a cultural resource management perspective, determined by establishing the asset's capacity to contribute to our understanding or appreciation of the past (HES, 2019b). In the case of many heritage assets their importance has already been established through the designation (i.e. Scheduling, Listing and Inventory) processes applied by HES.

The rating of importance of heritage assets is first and foremost made in reference to their designation. For non-designated assets importance will be assigned based on professional judgement and guided by the criteria presented in Table 6.3.1; which itself relates to the criteria for designations as set out in Designation Policy and Selection Guidance (HES, 2019b) and Scotland's Listed Buildings Guidance (HES, 2019c).

Table 6.3.1: Criteria for Establishing Importance of Heritage Assets

Importance	Receptors
Very High	• World Heritage Sites; or • Other designated or non-designated assets with demonstrable Outstanding Universal Value.
High	• Scheduled Monuments (as protected by the Ancient Monuments and Archaeological Areas Act 1979 (the "1979 Act"); • Category A Listed Buildings (as protected by the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997) (the "1997 Act"); • Inventory Gardens and Designed Landscapes (as protected by the 1979 Act, as amended by the Historic Environment (Amendment) (Scotland) Act 2011 (the "2011 Act"); • Inventory Battlefields (as protected by the 1979 Act, as amended by the 2011 Act); • Outstanding examples of some period, style or type; or • Non-Designated assets considered to meet the criteria for the designations as set out above (as protected by SPP, 2020).
Medium	• Category B and C Listed Buildings (as protected by the 1997 Act); • Conservation Areas (as protected by the 1997 Act); • Major or representative examples of some period, style or type; or • Non-designated assets considered to meet the criteria for the designations as set out above (as protected by SPP, 2020).
Low	• Locally Listed assets; • Examples of any period, style or type which contribute to our understanding of the historic environment at the local level.
Negligible	• Relatively numerous types of features; • Findspots of artefacts that have no definite archaeological remains known in their context; or • The above non-designated features are protected by Paragraph 137 of SPP, 2020.

The importance attributed to each asset was determined based on professional judgment following the guidelines outlined in Table 6.3.2 below. The weight given to historic environment considerations will depend on a number of factors, including:

- the relative rarity of the asset concerned;
- the historical or cultural associations of the asset;
- the value given to the asset by the local community;
- the potential value of the asset as an in situ educational or research resource; and
- the potential value of retaining the asset for tourism or place-making.

Table 6.3.2 defines the level of importance attributed to assets within the marine historic environment. It does not signify the likelihood that specified assets will be found within the Site (specified assets are listed in the Gazetteer in Appendix F1). Furthermore, it should be noted that an asset that has not been statutorily designated can still be of high importance. Assets that would require considerable further work to interpret them are recorded as being of uncertain importance.

Table 6.3.2: Definitions of Importance of Cultural Heritage Assets within the Marine Environment

Importance	Criteria
Very High	Archaeological and historical assets, submerged prehistoric landscapes and deposits, wrecks or areas of international importance, such as World Heritage Sites, and may also include some Designated Wrecks or Historic Marine Protected Areas that are not only of national but of international importance. Shipwrecks dating to the prehistoric, Norse and medieval periods are rare and therefore of very high importance. Submerged caves have high potential for retaining cultural heritage information. This would also include vessels lost in international conflicts and aircraft, which may have involved large losses in life and cargos with very high intrinsic, contextual or associative characteristics.
High	Archaeological and historical assets, wrecks or areas of national importance, Designated Wrecks and Historic MPAs. Up to 1913 the shipping industry was a major element in Britain's world influence and wrecks up to this period may (though not necessarily) be of high importance if involved in national and international trade; wrecks and cargos with high intrinsic, contextual or associative characteristics (e.g. rarity, evidence of technological change).
Medium	Archaeological and historical sites, wrecks and areas of regional importance. This would involve shipwrecks, anchorages and fishing areas prior to 1913 involved in regional industry and trade; wrecks and cargos with moderate intrinsic, contextual or associative characteristics.
Low	Locally important sites, wrecks or areas. Shipwrecks dating from after 1913 relating to fishing, ferrying or local coastwise trade. Wrecks and cargos with low intrinsic, contextual or associative characteristics.
Negligible	Features that have been recorded but assessed as of no archaeological or historical interest, such as recent wrecks, or have been so damaged they no longer have any historic merit.
Uncertain	Features that cannot be identified without detailed work, but potentially of some interest. Also, for example, if the date of construction and rarity of a vessel is not known, but potentially of some interest. Findspots, which may represent an isolated find, or could represent the location of a hitherto unknown asset.

Determining cultural heritage significance can be made with reference to the intrinsic, contextual and associative characteristics of an asset as set out in HEPS (HES, 2019a) and its accompanying Designation Policy and Selection Guidance (HES 2019b). HEPS Designation Policy and Selection Guidance (2019b) indicates that the relationship of an asset to its setting or the landscape makes up part of its contextual characteristics. The Xi'an Declaration (ICOMOS 2005) set out the first internationally accepted definition of setting with regard to heritage assets and features, indicating that setting is important where it forms part of or contributes to the significance of a heritage asset. While SPP does not differentiate between the importance of the asset itself and the importance of the asset's setting, HES's Managing Change Guidance, in defining what factors need to be considered in assessing the impact of a change on the setting of a historic asset or place states that the magnitude of the proposed change should be considered *"relative to the sensitivity of the setting of an asset"* (HES, 2020); thereby making clear that assets vary in their sensitivity to changes in setting and thus have a relative sensitivity. The EIA Handbook suggests that cultural significance aligns with sensitivity but also states that *"the relationship between value and sensitivity should be clearly articulated in the assessment"* (SNH and HES, 2018). It is therefore recognised (ibid;) that the importance of an asset is not the same as its sensitivity to changes to its setting. Elements of setting may make a positive, neutral or negative contribution to the significance of an asset. Thus, in determining the nature and level of effects upon assets and their settings by the development, the contribution that setting makes to an asset's significance and thus its sensitivity to changes to setting need to be considered.

This approach recognises the importance of preserving the integrity of the setting of an asset in the context of the contribution that setting makes to the experience, understanding and appreciation of a given asset. It recognises that setting is a key characteristic in the understanding and appreciating of some, but by no means all, assets. Indeed, assets of High or Very High importance do not necessarily have high sensitivity to changes to their settings (e.g. do not necessarily have a high relative sensitivity). An asset's relative sensitivity to alterations to its setting refers to its capacity to retain its ability to contribute to our understanding and appreciation of the past in the face of changes to its setting. The ability of an asset's setting to contribute to an understanding, appreciation and experience of it and its significance also has a bearing on the sensitivity of that asset to changes to its setting. While heritage assets of High or Very High importance are likely to be sensitive to direct effects, not all will have a similar sensitivity to effects on their settings; this would be true where setting does not appreciably contribute to their significance. The HES's guidance on setting makes clear that the level of effect may relate to *"the ability of the setting* [of an asset] *to absorb new development without eroding its key characteristics"* (2020, 11). Assets with Very High or High relative sensitivity to settings effects may be vulnerable to any changes that affect their settings, and even slight changes may erode their key characteristics or the ability of their settings to contribute to the understanding, appreciation and experience of them. Assets whose relative sensitivity to changes to their setting is lower may be able to accommodate greater changes to their settings without having key characteristics eroded.

The criteria used for establishing an asset's relative sensitivity to changes to its setting is detailed in Table 6.3.3. This table has been developed based on AOC's professional judgement and experience in assessing setting effects. It has been developed with reference to the policy and guidance noted above including SPP (Scottish Government 2020), HEPS (HES 2019a) and its Designation Policy and Selection Guidance (HES 2019b), the Xi'an Declaration (ICOMOS 2005), the EIA Handbook (SNH & HES 2018) and HES's guidance on the setting of heritage assets (HES, 2020).

Table 6.3.3: Criteria for Establishing Relative Sensitivity of a Heritage Asset to Changes to its Setting

Relative Sensitivity	Criteria
Very High	An asset, the setting of which, is critical to an understanding, appreciation and experience of it should be thought of as having Very High Sensitivity to changes to its setting. This is particularly relevant for assets whose settings, or elements thereof, make an essential direct contribution to their cultural significance (e.g. form part of their Contextual Characteristics (HES, 2019b, Annex 1)).
High	An asset, the setting, of which, makes a major contribution to an understanding, appreciation and experience of it should be thought of as having High Sensitivity to changes to its setting. This is particularly relevant for assets whose settings, or elements thereof, contribute directly to their cultural significance (e.g. form part of their Contextual Characteristics (HES, 2019b, Annex 1)).
Medium	An asset, the setting of which, makes a moderate contribution to an understanding, appreciation and experience of it should be thought of as having Medium Sensitivity to changes to its setting. This could be an asset for which setting makes a contribution to significance but whereby its value is derived mainly from its other characteristics (HES, 2019b).
Low	An asset, the setting of which, makes some contribution to an understanding, appreciation and experience of it should generally be thought of as having Low Sensitivity to changes to its setting. This may be an asset whose value is predominantly derived from its other characteristics
Negligible	An asset whose setting makes minimal contribution to an understanding, appreciation and experience of it should generally be thought of as having Marginal Sensitivity to changes to its setting.

The determination of a heritage asset's relative sensitivity to changes to its setting is first and foremost reliant upon the determination of its setting and the key characteristics of setting which contribute to its cultural significance and an understanding and appreciation of that cultural significance. This aligns with Stage 2 of the HES guidance on setting (HES, 2020). The criteria set out in Table 6.3.3 are intended as a guide. Assessment of individual heritage assets is informed by knowledge of the asset itself; of the asset type if applicable and by site visits to establish the current setting of the assets. This will allow for the use of professional judgement and each asset is assessed on an individual basis.

6.3.2.2 Criteria for Assessing Magnitude of Impact

Potential impacts, that is the physical change to known heritage assets, and unknown buried archaeological remains, or changes to their settings, in the case of the Proposed Development relate to the possibility of disturbing, removing or destroying in situ remains and artefacts during the construction phase or the placement of new features within their setting during the operational phase.

The magnitude of the impacts upon heritage assets caused by the Proposed Development is rated using the classifications and criteria outlined in Table 6.3.4.

Table 6.3.4: Criteria for Classifying Magnitude of Change

Magnitude of change	Criteria
High	• Substantial loss of information content resulting from total or large-scale removal of deposits from an asset; or • Major alteration of an asset's baseline setting, which materially compromises the ability to understand, appreciate or experience the contribution that setting makes to the significance of the asset and erodes the key characteristics (HES, 2020) of the setting.
Medium	• Loss of information content resulting from material alteration of the baseline conditions by removal of part of an asset; or • Alteration of an asset's baseline setting that effects the ability to understand, appreciate or experience the contribution that setting makes to the significance of the asset to a degree but whereby the cultural significance of the monument in its current setting remains legible. The key characteristics of the setting (HES, 2020) are not eroded.
Low	• Detectable impacts leading to minor loss of information content; or • Slight alterations to the asset's baseline setting, which do not affect the ability to understand the contribution that setting makes to the asset's overall significance.
Negligible	• Loss of a small percentage of the area of an asset's peripheral deposits; • A reversible alteration to the fabric of the asset; or • A marginal alteration to the asset's baseline setting.
None	No effect predicted

6.3.2.3 Criteria for Assessing Significance

The predicted level of effect on each heritage asset is then determined by considering the asset's importance and/or relative sensitivity in conjunction with the predicted magnitude of the impact. The method of deriving the level of effect is provided in Table 6.3.5

Table 6.3.5: Level of based on Inter-Relationship between the Importance/and or Relative Sensitivity of a Heritage Asset and/or its setting and the Magnitude of Impact

Magnitude of Impact	Importance/Relative Sensitivity				
	Negligible	Low	Medium	High	Very High
High	Minor	Moderate	Moderate	Major	Major
Medium	Negligible/Neutral	Minor	Moderate	Moderate	Major
Low	Negligible/Neutral	Negligible/Neutral	Minor	Minor	Moderate
Negligible	Negligible/Neutral	Negligible/Neutral	Negligible/Neutral	Minor	Minor

The level of effect is judged to be the interaction of the asset's importance and/or relative sensitivity (Tables 6.3.1 and/or 6.3.3) and the magnitude of the impact (Table 6.3.4). In order to provide a level of consistency, the assessment of importance and relative sensitivity, the prediction of magnitude of impact and the assessment of level of effect is guided by pre-defined criteria. However, a qualitative descriptive narrative is also provided for each asset to summarise and explain each of the professional value judgements that have been made in establishing sensitivity and magnitude of impact for each individual asset.

Using professional judgment and with reference to the Guidelines for Environmental Impact Assessment (as updated) (IEMA 2017), and the EIA Handbook (SNH & HES, 2018) the assessment considers moderate and greater effects to be significant, while minor and lesser effects are considered not significant.

6.3.2.4 Integrity of Setting

SPP notes that where there is potential for a proposed development to have an adverse effect on a Scheduled Monument or on the integrity of its setting permission should only be granted where there are 'exceptional circumstances'. Adverse effects on integrity of setting are judged here to relate to whether a change would seriously adversely affect the asset's key attributes or elements of setting which contribute to an asset's significance to the extent that the setting of the asset can no longer be understood or appreciated.

In terms of effects upon the setting of heritage assets, it is considered that only those effects identified as 'significant' in the assessment will have the potential to adversely affect integrity of setting. Where no significant effect is found it is considered that the integrity of an asset's setting will remain intact. This is because for many assets, setting may make a limited contribution to their significance and as such changes would not affect integrity of their settings. Additionally, as set out in Table 6.3.4, lower ratings of magnitude of change relate to changes that would not obscure or erode key characteristics of setting.

Where significant effects are found, a detailed assessment of adverse effects upon integrity of setting is made. Whilst non-significant effects are unlikely to affect integrity of setting, the reverse is not always true. That is, the assessment of an effect as being 'significant' does not necessarily mean that the adverse effect to the asset's setting will harm its integrity. The assessment of adverse effect upon the integrity of an asset's setting, where required, will be a qualitative one, and will largely depend upon whether the effect predicted would result in a major impediment to the ability to understand or appreciate the heritage asset and therefore reduce its cultural significance.

6.4 Baseline

6.4.1 Overview of Statutory Designated Sites

6.4.1.1 Proposed SCH Development and its' 1km Study Area

As detailed on Drawing 73.06.02. There are no archaeological or cultural heritage designations within the proposed SCH development boundary. It is however, noted that the Geological Conservation Review Site of An Corran centred at Site 56 extends to the western boundary of the proposed SCH development. It extends from the northern tip of An Corran beach, 455m to the north of the proposed SCH development to the existing southern breakwater of Staffin Slipway. These preserved remains of the footprints of sauropod and bipedal carnivorous dinosaurs in the northern portion at An Corran beach. This is discussed in detail in Chapter 12 Soils, Geology and Palaeontology.

Within the 1km Study Area of the proposed SCH development there are five Scheduled Monuments, note Site numbers relate to the numbers provide in Drawing 73.06.02:

- *Garafad, Depopulated Settlement, Kilmuir* (Site 11 List No. SM3510) situated 185m southwest of the proposed SCH development;
- *Staffin House, shell midden 1050m NNE* (Site 45, List No. SM7848) situated 305m northwest of the proposed SCH development;
- *Garafad School, homestead 740m NE of* (Site 12, List No. SM3515) situated approximately 480m southeast of the proposed SCH development.
- *Garafad,chambered cairn 100m W of Cadha Riach* (Site 14, List No. SM3519) situated 525m south of the proposed SCH development; and
- *Carn Ban, cairn 350m E of Staffin Lodge, Kilmuir* (Site 44, List No. SM3517) situated 665m west of the proposed SCH development.

There are two Listed Buildings of Category B status within the 1km Study Area of the proposed SCH development:

- Staffin Stenscholl Parish Church (Site 22, List No. LB 7249) situated 955m southwest of the proposed SCH development; and
- Staffin Stenscholl Parish Manse (Site 21, List No. LB7250) situated 1km, southwest of the proposed SCH development.

There are no World Heritage Sites, Inventory Battlefields, Inventory Garden and Designed Landscapes, Conservation Area, Historic Marine Protected Areas or sites designated under the Protection of Military Remains Act 1986 within the 1km Study Area of the proposed SCH development.

6.4.1.2 Borrow Pit and its' 1km Study Area

There are no designated assets within the Borrow Pit. There are no designated assets within the 1km Study Area of the Borrow Pit (Drawing 73.06.04).

6.4.2 Non-designated Assets and Archaeological Potential

6.4.2.1 Prehistoric (8000 BC-AD 410)

6.4.2.1.1 Proposed SCH Development Terrestrial

There are no finds or remains dating to the prehistoric period within the proposed SCH development.

Eight assets shown on Drawing 73.06.02 within the 1km Study Area of the proposed SCH development date to the prehistoric period, including four Scheduled Monuments.

The Scheduled Monument of *Staffin House, shell midden 1050m NNE of* (Site 45, List No. SM7848) situated 305m northwest of the proposed SCH development is the closest of any of these eight assets to the proposed SCH development. Site 45 dates primarily to the Mesolithic period and is located in the rock face close to the coast. Partially excavated, the deposits investigated consisted of a Mesolithic shell midden dated to around 5,500 BC and contained bone, stone tools and animal remains. Upper layers of the deposit produced one Iron Age object and evidence of occupation from the 19th century (HES, 2021).

A further shell midden dating to the Mesolithic period is situated At Site 6, 445m to the northwest of the proposed SCH development and has been assessed as containing a very important assemblage of bone and lithic tools and abundant faunal remains. Site 6 is situated towards the eastern corner of Staffin Bay away from the proposed SCH development in cliffs overlooking the bay.

Further prehistoric remains within the 1km Study Area of the proposed SCH development include a prehistoric flint scatter dating to the Mesolithic period at Site 4, 650m northwest of the proposed SCH development on Staffin Bay. Mesolithic flint scatters have also been recorded at Site 3, situated 815m west of the proposed SCH development on Staffin Bay and this prehistoric material continues to erode out of the cliff.

Flint scatters are recorded closer to the proposed SCH development, albeit on Staffin Island at Site 8,550m north of the proposed SCH development; this eroding cliff asset also included midden material. Although flint scatters were not recorded during the walkover survey within the proposed SCH development some prehistoric worked lithics were noted further north beyond the boundary of the proposed SCH development eroding out of the ground within modern drainage ditches next to the single-track road leading to the slipway along the southeast side of Staffin Bay.

The Scheduled Neolithic chambered cairn *Garafad, chambered cairn 100m W of Cadha Riach* at Site 14, situated on the clifftop 525m south of the proposed SCH development, dates to the Neolithic period; beaker and plain sherds have been found at the site along with cremated bone.

The Scheduled Monument of *Garafad School, homestead 740m NE of* (Site 12, List No. SM3515) is situated approximately 480m southeast of the proposed SCH development. Although undated it is believed to be a prehistoric settlement. This asset is located on lower lying ground which would have had access to the coastline within the proposed SCH development and therefore occupants may have beached boats and craft within the area of the Harbour (Figure 6.4.1).

Figure 6.4.1: View northwest from Site 12 towards Staffin Slipway

The proposed SCH development is located within a rich landscape of prehistoric remains. The prehistoric assets within the 1km Study Area of the proposed SCH development tend to be located on higher ground such as the cliffs to the northwest along Staffin Bay itself or to the south. No prehistoric features were observed along the area of beach accessible within the proposed SCH development boundary. Substantial middens and cairns tend to be located higher up within cliff faces. These were probably located for visual prominence as well as for practical considerations such as keeping these assets clear of any stormy weather. This would be particularly true for the prehistoric middens; they are sufficiently close to the shoreline to access material but are sheltered further inland from storms for domestic activities to be undertaken. The area of the proposed SCH development is lower lying and as such there is less potential for substantial prehistoric remains of a type similar to those discussed above, to survive in this area.

It is possible that other buried prehistoric features may be present within the beach area of the proposed SCH development area and such remains would likely take the form of lithic scatter. It is considered that there is a Medium potential for finds or features in the form of lithic scatters to be present within the proposed SCH development. There is a Low potential for finds or remains relating to the potential use of the area of the proposed SCH development as a prehistoric harbour.

6.4.2.1.2 Proposed SCH Development Marine

There are no known finds or remains relating to submerged prehistoric landscapes or assets within the proposed SCH development and its 1km Study Area. There are no submerged landscapes and/or submerged prehistoric sites recoded within the 10km Study Area of the proposed SCH development.

Hominids and humans have occupied the UK Continental Shelf at various times for more than 700,000 years. The scope of Strategic Environmental Assessment of Area SEA4 in regard to prehistoric archaeological remains (Flemming, 2003) covers the area of the proposed SCH development. Post-glacial sea level rise terminated about 5,000 years ago. However there has been continuing subsidence of the continental shelf creating a complex sequence at coastal sites; these sites may have been dry land over 5,000 years ago, then covered by rising sea levels before being uplifted again.

Therefore, it is unlikely that submerged landscapes, sites or remains of a prehistoric nature pre-dating 5,000 before present (BP) will be located within the proposed SCH development. As the marine environment became more accessible 5,000 years ago, it is considered that there is a Low potential for finds or remains of a prehistoric date within 15,000 years. While potential is deemed to be Low, if remains are present they could include assets related to the utilisation of the marine resource, such as fish traps or marine craft such as logboats.

6.4.2.1.3 Borrow Pit

There are no finds or remains dating to the prehistoric period within the Borrow Pit or within the 1km Study Area of the Borrow Pit (Drawing 73.06.04).

The Borrow Pit is located slightly inland from the coastline with a steep river valley to the south and was probably not an ideal location for coastal settlements or activities within the prehistoric period. Furthermore, it is highly likely that the extraction of material from the Borrow Pit undertaken at the 19th century Inver Tote Quarry (centred Site 28, Drawing 73.06.05) has removed any material dating to the prehistoric period.

Although the presence of finds or remains dating to the prehistoric period within the Borrow Pit cannot be discounted; the lack of finds or remains dating to this period within the 1km Study Area and the previous extraction activities in the area, it is judged that there is a Low potential for such finds or remains to be present within the Borrow Pit.

6.4.2.2 Early Historic and Medieval (AD 410-1600)

6.4.2.2.1 Proposed SCH Development Terrestrial & Marine

There are no known finds dating to the early historic and medieval periods within proposed SCH development and the 1km Study Area of the proposed SCH development.

It cannot be ruled out that the area of coastline within the proposed SCH development would have been used as an active harbour with the potential for the presence of boat remains, harbour structures and boat shelters such as nausts within the proposed SCH development. The lack of known assets further does not preclude the use of the area of the proposed SCH development for small boats, accessible via a path down from the cliff or along the shorelines. However, it is possible that during these periods the area of Staffin Bay was probably a more accepted place for anchoring and use as a harbour considering its easier accessibility to the hinterland. The area within the proposed SCH development may have been hindered due to its location near cliffs (Figure 6.4.2 and 6.4.3), although it is accessible from the south. While the presence of early historic or medieval finds or remains within the proposed SCH development cannot be discounted it is considered that there is a Low potential for such finds or remains to be present. Any remains which did survive would likely be related to the use of the area for small boats only.

Figure 6.4.2: View northeast from Garafad township (Site 11) towards Staffin Slipway

Figure 6.4.3. View northwest towards An Corran rock shelter (Site 45) from Staffin Slipway

6.4.2.2.2 Borrow Pit

There are no finds or remains dating to the early historic and medieval periods within the Borrow Pit and the 1km Study Area of the Borrow Pit.

Although the presence of finds or remains dating to the early historic and medieval periods within the Borrow Pit cannot be discounted, due to the current lack of evidence within the 1km Study Area of the Borrow Pit, it is judged that there is a Low potential for such finds or remains to be present within the Borrow Pit.

6.4.2.3 Post-medieval (AD 1600-1900)

Early pre-Ordnance Survey maps of both the proposed SCH development and the Borrow Pit tend to be schematic and lack detail. The earliest map to depict the land in the vicinity of both sites is Blaeu's Map of 1654 (Drawing 73.06.06).

6.4.2.3.1 Proposed SCH Development

No detail is depicted within the vicinity of the proposed SCH development, although a placename of *"Geruad"* is depicted and probably equates to the settlement of Garafad (Scheduled Monument centred Site 11, situated 185m southwest of the proposed SCH development) before it became depopulated.

Murdock Mackenzie's chart of 1775 (Drawing 73.06.07) is the first accurate map of the east coast of the Island of Skye. The Mackenzie charts were created specifically to record land masses accurately with islands, depths and places of anchorages to enable safe navigation. The Mackenzie charts record prominent houses and landmarks on land including rivers and burns and display the profile of the land as seen from the sea. Therefore, their depiction of terrestrial elements is limited. However, within the vicinity of the proposed SCH development, Staffin Island is depicted (labelled as *"I. Fladda"*). Due to the surveyed accuracy of the Mackenzie charts this island is Staffin Island despite its annotation as *"I. Fladda"*. It is also noticeable that the placename of *"Fladda"* is placed on the southern shoreline of Staffin Bay. It is probable at this time that there was relatively little settlement within the area of Staffin Bay and that the area of Staffin Bay had not yet acquired its modern name of Staffin.

An out-crop of land, along which the modern, southern breakwater and slip have been constructed can be discerned. No breakwater and slipway is depicted on this chart. As these are features that would have been included on the Mackenzie charts for purposes of safe navigation, this indicates that no fixed harbour facilities had been constructed within the proposed SCH development boundary by this time. A transect navigation line is depicted leading from the proposed SCH development, aligned on the southern point of *"I. Fladda"*. This indicates that the area of the proposed SCH development would have been used for beaching vessels at this time, although the deeper area of Staffin Bay (labelled *"L. Staffin"*, presumably standing for Loch Staffin) would have been the preferred place for the safe anchoring of vessels of deeper draught; the symbol for a safe anchorage is depicted here.

Johnson's map of 1832 (Drawing 73.06.08) depicts a road down the east coast of the Isle of Skye. *"Geaprightfada"* is also depicted and probably equates to the settlement of Garafad (Scheduled Monument centred Site 11, situated 185m southwest of the proposed SCH development). Garafad's depiction indicates that it had not been depopulated at the time this map was surveyed.

The Ordnance Survey map of 1878 (Drawing 73.06.09) shows the proposed SCH development in detail for the first time. An access track leading to a labelled *"Boat Slip"* is clearly depicted. The nature of this boat slip is not clear, although it and its access track do not appear to be substantial structures.

6.4.2.3.2 Proposed SCH Development Terrestrial

Within the 1km Study Area of the proposed SCH development, Site 13 situated 645m southeast of the proposed SCH development marks the location of an undated cave shelter. The presence of a stone fireplace within the cave does indicate that it may have been in use in the post-medieval period.

The Scheduled Monument of *Garafad School, homestead 740m NE of* (Site 12, List No. SM3515) is situated approximately 480m southeast of the proposed SCH development. Although this asset is believed to date from the prehistoric period it has also been assessed as being in use as a post-medieval dwelling. The importance of its position relative to the coastline is clear from historic mapping, with the nearby public pathway forming an important route between the settlement at the top of the cliffs to the shoreline below. The post-medieval settlement would have also placed importance on the areas of rig and furrow cultivation between the monument and the sea.

The date of the boat nausts (centred at Site 10) or their predecessors is unknown, although their current incarnation is likely to date to the 19th century at the earliest. It is probable that Staffin harbour had been extensively used as a harbour for small craft with a potential requirement for boat nausts for boats.

Although the presence of finds or remains dating to the post-medieval periods within the proposed SCH development cannot be discounted, due to the lack of finds or remains dating to this period within close proximity of the proposed SCH development it is judged that there is a Low potential for such finds or remains to be present within the SCH development area. Due to the relatively undeveloped nature of the harbour and slipway at Staffin Harbour within this period any such finds or remains are likely to be associated with use of Staffin Harbour as small harbour area, particularly for the potential post-medieval settlement areas at the Scheduled Monument of *Garafad School, homestead 740m NE of* (Site 12, List No. SM3515) situated approximately 480m southeast of the proposed SCH development.

6.4.2.3.3 Proposed SCH Development Marine

One marine asset is recorded at Site 48, situated 1.6km to the northwest of the proposed SCH development within Staffin Bay (Drawing 73.06.03). The *Sampson*, a sloop was recorded as wrecked in Loch Staffin or Staffin Bay in 1867. The *Sampson* became a total loss although part of the cargo of timber was landed in a damaged state. Although this asset has a recorded geographical location its position is still approximate and therefore the NRHE has assigned its wrecking position to the lower left corner of a 1km Ordnance Survey grid square within Staffin Bay. Therefore, although the *Sampson* is recorded as wrecked somewhere within Staffin Bay it is possible that it may have been wrecked further around the coast towards or in the proposed SCH development or that parts of the wreck were swept around the coast and finally settled within the area of the proposed SCH development. However, it is considered that there is a Low potential for finds or remains from this asset to be within the proposed SCH development.

Three marine assets are located at Sites 51 to 53, situated 5km to the northwest of the proposed SCH development (Drawing 73.06.03). These three vessels lost in the 19th century are recorded as tentatively lost off the north end of the Isle of Skye. Although these assets have a recorded geographical location, their position is still approximate and therefore the NRHE has assigned their wrecking positions to the lower left corner of a 1km Ordnance Survey grid square, such that the location of these assets is recorded on dry land. Records for Sites 51 and 52 do not supply additional information; in particular, they do not mention any geographical location near the proposed SCH development. Such description would be expected in the case of Site 51, where part of the cargo was saved, and Site 52, where the wrecked ship was observed from a passing vessel. Therefore, although it is possible that these wrecks may have been wrecked further around the coast towards or in the proposed SCH development or that parts of the wreck were swept around the coast and finally settled within the proposed SCH development area, it is deemed unlikely. As such, it is considered that there is a Low potential for finds or remains from these assets to be within the proposed SCH development.

6.4.2.3.4 Borrow Pit

Within the vicinity of the Borrow Pit a placename of *"Iouttin Yo"* is depicted and probably equates to the modern name of Inver Tote.

Mackenzie's chart does not show any details regarding the location of the Borrow Pit, although the river equating to the Lealt River is depicted.

The Ordnance Survey map of 1880 (Drawing 73.06. 12) shows no development within the Borrow Pit boundary.

The Ordnance Survey map of 1903 (Drawing 73.06.13) shows the Diatomite Works at Sites 29 and 30, both situated 100m to the south of the Borrow Pit. The Diatomite Tramway centred at Site 35, 65m to the southeast of the Borrow Pit is also depicted. It is likely that these assets were constructed between the time of the Ordnance Survey map of 1880 (Drawing 73.06.12) and the Ordnance Survey map of 1903. Furthermore, information from Highland HER in the form of shapefiles and further Ordnance Survey maps in the modern period indicate that the tramway crosses the southern portion of the Borrow Pit

On the basis of the above, prior to the late 19th century there is considered to be a Low potential for finds or remains from the post-medieval period to be present within the Borrow Pit. From 1880 onwards, where it has not already been impacted by the subsequent development of Inver Tote Quarry (centred Site 28, Drawing 73.06.05), there is considered to be a Medium potential for finds or remains from the Diatomite Tramway (centred at Site 35, Drawing 73.06.05, 65m to the southeast of the Borrow Pit) to be present within the Borrow Pit.

6.4.2.4 Modern (AD post 1900)

6.4.2.4.1 Proposed SCH Development Terrestrial

There are few changes between the time of the Ordnance Survey map of 1878 (Drawing 73.06.09) and the Ordnance Survey map of 1904 (Figure 73.06.10). The major difference is that the access track leading to the boat slip is labelled *"F.P."* indicating that this track is just a footpath and is not a substantial access way.

The precursor to the modern slipway (centred Site 9) was built in the early 1900s (Ports and Harbours of the UK, 2021); though it is clear from the Ordnance Survey map of 1904 (Drawing 73.06.09) that this slipway had not been built by this date.

The current slipway is first shown on the Ordnance Survey map of 1967 (Drawing 73.06.11). The boat nausts centred at Site 10 are depicted for the first time on this map and there is no breakwater present. The date of the boat nausts or their predecessors is unknown, although their current incarnation is likely to date to the 19th century at the earliest. It is probable that Staffin harbour had been extensively used as a harbour for small craft with a potential requirement for boat nausts for boats.

An access track is depicted leading to the slipway from the northwest; it is unclear what the nature of this track is but its dashed depiction indicates that it is probably not a fully metalled road.

The modern slipway and breakwater (centred Site 9) (Drawing 73.06.02) was constructed using funding from the European Union (EU) and opened in June 2000 (Ports and Harbours of the UK, 2021).

6.4.2.4.2 Proposed SCH Development Marine

One non-designated marine asset is recorded at Site 48 (Drawing 73.06.03), situated 1.6km to the northwest of the proposed SCH development within Staffin Bay. The *Pride of Moray*, a steam drifter was recorded as stranded in Loch Staffin or Staffin Bay in 1927; the record does not reveal whether the *Pride of Moray* was recovered; although the record implies that the steam drifter was a total loss. Although this asset has a recorded geographical location its position is still approximate and therefore the NRHE has assigned its wrecking position to the lower left corner of a 1km Ordnance Survey grid square within Staffin Bay. Although the *Pride of Moray* is recorded as wrecked somewhere within Staffin Bay it is possible that it may have been wrecked further around the coast towards or in the proposed SCH development or that parts of the wreck were swept around the coast and finally settled within the area of the proposed SCH development. However, it is considered that there is a Low potential for finds or remains from this asset to be within the proposed SCH development.

A steam lighter built in 1844 and named the *Tom Telford* has also been recorded within Staffin Bay at Site 47 (Drawing 73.06.03), situated 1.9km to the northwest of the proposed SCH development. A survey of the inter-tidal zone of Staffin Bay conducted as part of project SAMPHIRE in 2014 and 2015 has recorded a wreck within Staffin Bay; a steam boiler has clearly been identified on this wreck. It is highly likely that this wreck is the *Tom Telford*. According to local accounts part of the cargo of bricks from the wreck were recovered and reused in local houses (Wessex Archaeology, 2014: 23). Although aspects of this wreck may have been swept round from the coast during its wrecking and subsequent deterioration this is considered unlikely due to the wreck's stable location within the matrix of the inter-tidal zone of Staffin Bay. Therefore, it is considered there is a Negligible potential for finds or remains associated with this asset to be within the proposed SCH development.

Overall, it is considered that there is a Low potential for marine finds or assets of a modern date to be within the proposed SCH development.

6.4.2.4.3 Borrow Pit

There are two modern assets within the Borrow Pit boundary. These consist of Inver Tote Quarry (centred Site 28) which occupies the entire footprint of the Borrow Pit. This quarry is present on the War Office map of 1941 (not illustrated) and the Ordnance Survey map of 1966 (not illustrated). It is likely that this quarry has removed any finds or remains from all periods within the Borrow Pit boundary. Exceptions to this would be finds or remains associated with Inver Tote Quarry itself. There is a Medium potential for finds or remains from the modern period associated with Inver Tote Quarry to be present within the Borrow Pit

6.4.2.5 Walkover Survey

6.4.2.5.1 Summary

The walkover survey and settings assessments for Staffin Harbour were undertaken on the 16th of March 2021 in clear, sunny conditions. The proposed SCH development and the Borrow Pit were walked systematically by two archaeologists and assets were recorded using digital photography, written records and a Trimble Real Time Kinematic (RTK) Virtual Reference Station (VRS) GNSS unit. Five Scheduled Monuments and two Listed Buildings within the 1km Study Area of the proposed SCH development were also visited to inform the assessment of potential effects upon their settings.

6.4.2.5.2 Proposed SCH Development

The proposed SCH development consists of a ramped slipway and pier (Figure 6.4.4), with a small carpark at the south side. There were a few modern metal containers set up in the car park alongside several drystone built boat nausts (Figure 6.4.5). A stony, tidal beach formed the shoreline along the western side of the slipway (Figure 6.4.6), with a steep, narrow, grassy slope rising above to the modern single-track road. The ground on the south side of the slipway (Site 9) within the proposed SCH harbour was formed by rough, boggy grass, which eventually became post-medieval rig and furrow or lazy beds, although there was no evidence of this cultivation within the proposed SCH development boundary. Two archaeological features were noted within the proposed SCH development, including a drystone-built culvert (Site 57) and the series of drystone-built boat nausts (Site 10).

Figure 6.4.4: View north along Staffin Slipway (Site 9)

Figure 6.4.5: View west-southwest of remains of drystone boats nausts (Site 10) at Staffin harbour

Figure 6.4.6: General view east of Staffin Harbour

Site 57 (Figure 6.4.7) comprised a drystone built culvert running under the road, measuring around 3m wide and up to 1.3m high. It was built with up to 10 courses of flat stone slabs, with large stone lintels forming a narrow drainage passage for a small stream under the road. This culvert was likely built when the original dirt track access to the slipway was upgraded to a tarred road.

Figure 6.4.7: View west of drystone-built culvert (Site 57)

Site 10 comprised the remains of several drystone-built boat nausts on the shore next to the slipway (Figure 6.4.5). On average the walls measured 0.6m wide and up to 1.3m high, forming several compartments between 1.6m-2m wide and 6m-8m long. The modern metal containers appear to have been built on top of the remains of further collapsed nausts. The easternmost of the nausts had a tarred, corrugated iron roof and a kerb of stones around the base. Although collapsed in places, most of the nausts were still in use to store boats and fishing equipment.

The slipway has clear views across to Staffin Island and along the shoreline to the north and south. View's inland are limited by the steep, high cliffs that run parallel to the shore (Figure 6.4.5). During the walkover survey, some prehistoric worked lithics were noted eroding out of the ground within modern drainage ditches next to the single-track road leading to the slipway, along the southeast side of Staffin Bay. No lithics were seen within the proposed SCH development boundary.

Viewed from the area of the beach, the road leading to the proposed SCH development has been buttressed with a zone of boulders which protect the grassed bank that leads up to the road that leads to the proposed SCH development. This buttressing is required as the road is closer to the shoreline than is the case with Staffin Bay around the coast to the northwest. This landscaping has probably impacted upon any prehistoric assets that could have eroded out of this coastline; some assets may have been removed without being recognised as prehistoric assets. Equally the buttressing will limit any erosion along this northeast facing coastline, limiting the possibility of uncovering prehistoric remains.

No fossils (body and trace) were observed on the walkover survey within the proposed SCH development boundary.

6.4.2.5.3 Borrow Pit

The Borrow Pit consists of the disused Inver Tote Quarry (Site 28) situated at the top of a steep cliff above the Lealt River. The ground conditions comprised a mixture of open rock faces and grassed-over spoil heaps. Most of the area was disturbed by previous quarrying works, which included borrow pits, spoil heaps, and piles of loose rock. A modern tourist car park and footpaths have also been recently installed on the south side of the quarry and along the cliff top (Figure 6.4.8). Six archaeological features were noted within the quarry area, including the very degraded remains of four walls, a turf bank, and two displaced concrete blocks (Drawing 73.06.05).

Figure 6.4.8: General view southeast of Inver Tote Quarry (Site 28)

Sites 58 and 59 comprised two large concrete blocks with attached iron fittings. The blocks measured 0.8m x 0.6m x 0.6m and 1.5m x 0.8m x 0.6m respectively and had both been moved or displaced from their original positions, possibly by quarrying works. The remains of other concrete blocks of varying sizes were visible within other rock piles in the quarry. These may have been part of buildings or machinery associated with the tramway (centred Site 35) or the Diatomite works at Sites 29 and 30, both assets were situated approximately 100m to the south of the Borrow Pit.

Site 60 comprised the concrete footings of a wall partly covered by grass and situated at the top of a steep, east-facing slope. The wall was aligned north-northeast to south-southwest and measured around 12m long by 0.4m wide and up to 0.4m high, with a second shorter wall running parallel at the northern end. The wall was degraded, and it is possible that some parts of it have eroded downslope or have been removed by later quarrying activities. Based on its location above the Diatomite works (Sites 29 and 30, both assets situated approximately 100m to the south of the Borrow Pit) this may have been associated with the tramway (centred Site 35) or another related building.

Site 61 comprised a highly degraded section of drystone-built revetment wall, located a few metres downslope from Site 60. The wall survived up to 1m high, with at least six courses of stonework in the best preserved section. The stonework was bulging outwards and some had collapsed downslope. It ran roughly north-northeast to south-southwest along the cliffside for up to 11m but with varying levels of preservation along its length. This wall was also likely to have been associated with the Diatomite works.

Site 62 (Figure 6.4.9) comprised a second section of drystone-built, revetment wall located a few metres downslope from Site 61. It was also highly degraded and partly grassed-over with collapsed stone on the downslope side. It ran parallel to Site 61 and measured around 9m long and up to 0.6m high.

Figure 6.4.9: View southwest of remains of a drystone revetment wall (Site 62) within the Borrow Pit

Site 63 comprised a concrete and brick wall which may have acted as a stanchion or buttress. It stood up to 1m high, was 1m wide, and projected up to 2m out from the hillside. The construction was very mixed and included brick, concrete, and natural boulders. It was located at the northern end of Site 62. It may have formed a support for the other wall or for a structure or mechanism linking the tramway (centred Site 35) above to the Diatomite works (Sites 29 and 30, both assets are situated approximately 100m to the south of the Borrow Pit) below.

Just outwith the boundary of the Borrow Pit is Site 64 a turf bank with a stone foundation spread up to 1.8m wide and surviving up to 0.5m high. The bank ran north to south for approximately 33m along the upper edge of the steep slope. The north end had been truncated by later quarrying works. It appears to be the remains of a post-medieval boundary dyke, which may have been used to prevent livestock from falling down the cliff. Site 64 is 8m to the east of the Borrow Pit at its northern point.

The remains of the Diatomite Works buildings and chimney stack (centred at Site 29, situated 100m to the south of the Borrow Pit) were visible on the shoreline from the edge of Invertote Quarry (centred Site 28) but were not within the Borrow Pit boundary. There was no visible evidence of the tramway (centred Site 35) within the Borrow Pit, but it is possible that it has been disturbed by later quarrying activities or the modern footpaths and car park.

6.4.2.6 Underwater Survey: Proposed SCH Development

No finds or features of an archaeological nature were observed or recorded during the underwater survey of the area of the proposed SCH development.

6.4.2.7 Aerial Photographs

The National Centre for Aerial Photography (NCAP) held by Historic Environment Scotland at John Sinclair House, Edinburgh was not accessed due to restrictions associated with the current Covid-19 pandemic. A search was made of aerial photographs of the Site that may be available online via AOC Archaeology's annual subscription. One sortie dating from the 14th of October 1988 include the area of the proposed SCH development Site. No new finds or features were recorded. No photographs were available to view online of the Borrow Pit.

A search was made of the Cambridge University Centre for Aerial Photographs (CUCAP) and Britain from Above; no photographs of the proposed SCH development and the Borrow Pit were available to view.

6.4.3 Identification of Receptors

6.4.3.1 Proposed SCH Development

There are three known heritage assets within the proposed SCH development boundary the current slipway (Site 9), the boat nausts (Site 10) and the culvert (Site 57). The impact assessment will consider the potential for direct impacts upon these as a result of the construction phase.

There are seven designated heritage assets within the 1km Study Area for the proposed SCH development. Including five Scheduled Monuments (Sites 11, 12, 14, 44 and 45) and two Category B Listed Buildings (Sites 21 and 22). The impact assessment will consider the potential for impacts upon the setting of these assets during the operational phase of the proposed SCH development.

6.4.3.2 Borrow Pit

There are six known assets within the Borrow Pit boundary (Sites 58 to 63). The impact assessment will consider the potential for direct impacts upon these as a result of the construction phase.

There are no designated assets within the 1km Study Area for the Borrow Pit and works within the Borrow Pit will be temporary and limited to the construction phase. As such the consideration of setting effects associated with Borrow Pit are not considered further.

6.5 Impact Assessment

6.5.1 Construction

6.5.1.1 Proposed SCH Development

During construction, direct physical impacts are likely to occur from earthmoving operations and construction of all infrastructure associated with the construction of the proposed SCH development. Setting effects are likely to occur due to the introduction of construction machinery on Site, additional construction traffic and construction of compounds. Settings effects relating to construction would be short term, temporary effects and would not exceed the operational effects upon setting and so are not discussed further in this section.

Construction activities within the area of the proposed SCH development will not impact upon Site 9, the current slipway within Staffin Harbour. The current development proposal includes the removal of the boat nausts centred at Site 10 within the proposed SCH development. The existing road to the Staffin Harbour slipway will not be altered and therefore, there will be no direct impact upon Site 57 the Drystone Culvert situated under the road within the proposed SCH development.

The boat shelters or nausts at Site 10 will be directly impacted by the proposed SCH development due to their proposed removal, resulting in a **high** magnitude impact. However, boat nausts that date to the late post-medieval period are a relatively common heritage asset within Scotland, their importance is within the local area of Staffin and therefore their importance is judged to be **negligible**. The resulting level of effect will be **minor: non-significant**.

6.5.1.2 Borrow Pit

The proposed SCH development has been designed to avoid direct impacts on known heritage assets where possible. Table 6.5.1 below provides a list of assets which may be subject to direct effects (see Drawing 73.06.05 for locations) and summarises the expected magnitude of impact and level of effect.

Table 6.5.1: Summary of Direct Effects: Borrow Pit

Receptor	Importance	Magnitude of Impact	Level of Effect
Site 35 – Diatomite tramway – Loch Cuithir, Lealt, Borrow Pit	Low	Low	Negligible
Site 58 – Concrete Block, Borrow Pit	Low	Low	Negligible
Site 59 – Concrete Block, Borrow Pit	Low	Low	Negligible
Site 60 – Wall, Borrow Pit	Low	Low	Negligible
Site 61 – Drystone Wall, Borrow Pit	Low	Low	Negligible
Site 62 – Drystone Wall, Borrow Pit	Low	Low	Negligible
Site 63 – Wall, Borrow Pit	Low	Low	Negligible

The above assets are not expected to be directly impacted by extraction activities within the Borrow Pit. Furthermore, such assets , are a relatively common heritage asset within Scotland, their importance is within the local area of Staffin and the use of the Borrow Pit as a quarry within the 20th century and therefore their importance is judged to be **low**. The resulting level of effect will be **negligible: non-significant**.

6.5.2 Operation

6.5.2.1 Proposed SCH Development

Direct effects upon known and any previously unknown archaeological remains which may be present on within the proposed SCH development would cease with the completion of the groundworks stage of construction and consequently no direct effects are predicted during the operational phase of the development.

Operational phase effects have the potential to impact upon the settings of five Scheduled Monuments and two Listed Buildings of Category B status. Table 6.5.2 summarises the effects on setting of the various assets.

Table 6.5.2: Summary of Setting Effects: Proposed SCH Development

Receptor	Sensitivity	Magnitude of Impact	Level of Effect
Site 12 – Garafad School, homestead 740m NE of (Scheduled Monument, List No. SM3515)	High	Low	Minor
Site 14 – Garafad,chambered cairn 100m W of Cadha Riach (Scheduled Monument, List No. SM3519)	High	None	None
Site 11 – Garafad, Depopulated Settlement, Kilmuir (Scheduled Monument, List No. SM3510)	Medium	Low	Minor
Site 44 – Carn Ban, cairn 350m E of Staffin Lodge, Kilmuir (Scheduled Monument, List No. SM3517)	High	None	None
Site 45 – Staffin House, shell midden 1050m NNE (Scheduled Monument, List No. SM7848)	High	Low	Minor
Category B Listed Staffin Stenscholl Parish Manse (Site 21, List No. LB7250)	Low	None	None
Category B Listed Staffin Stenscholl Parish Church (Site 22, List No. LB 7249)	Low	None	None

6.5.2.2 Scheduled Monument

The Scheduled Monument of *Garafad School, homestead 740m NE of* (Site 12, List No. SM3515) is situated approximately 480m southeast of the proposed SCH development. The monument was scheduled as a 'galleried dwelling' or possible dun and consisted of a large spread of boulders located at the base of the cliff. The footings of a post-medieval rectangular building were clearly visible on the north side of the boulders, with several small drystone dykes built within the boulder spread which continued outside the scheduled area. There was no clear evidence of a prehistoric stone structure or dun. Use of the site as a prehistoric defensive and domestic dwelling would have placed high importance on the views out to sea and along the coastline, however, it is likely that the area of the proposed SCH development was used for fishing activities during the prehistoric period, similar to its uses today. Later use of the monument as a post-medieval dwelling would have also placed importance on the coastline, with the nearby public pathway forming an important route between the settlement at the top of the cliffs and the shoreline below. The post-medieval settlement would have also placed importance on the areas of rig and furrow cultivation between the monument and the sea, which likely would have served the occupants of the asset. The asset is judged to have High relative sensitivity to changes to its setting. Although the proposed SCH development will be clearly visible from the monument (Figure 6.5.1), it is **unlikely** to alter the understanding of the monument since the slipway represents a likely continuity of fishing activities in the area. The proposed SCH development further will not affect the ability to understand, appreciate or experience the relationship between the asset and the coastline or the cliff or the relationship between the asset and the adjacent agricultural land. Therefore, the magnitude of impact on the setting of the asset would be **low** and the level of effect would be **minor**: **non-significant**.

Figure 6.5.1: View southeast towards Staffin Slipway from An Corran rock shelter (Site 45)

The Scheduled Monument of *Garafad,chambered cairn 100m W of Cadha Riach* (Site 14, List No. SM3519) is located on the clifftop approximately 525m south of the proposed SCH development. The monument comprised a mostly grass-covered cairn, with a visible outer kerb and inner stone-lined chamber. The monument would have been used as a prehistoric (Neolithic) religious or ritual site with likely funerary associations. The main views from the monument were along the top of the cliffs to the northwest and over the agricultural and settled ground to the southwest. The proposed SCH development would not be visible from the asset and therefore would not impact the setting of the monument.

The Scheduled Monument of *Garafad, Depopulated Settlement, Kilmuir* (Site 11 List No. SM3510) was located on the clifftop 185m southwest of the proposed SCH development. The monument comprised the remains of a depopulated post-medieval settlement, including a head dyke, boundary walls, a kiln barn, and several dwelling houses. With mainly domestic, agricultural functions, the main setting of the township was that of the immediate surrounding agricultural land. Views of the slipway and the proposed SCH development were only possible from the very edge of the cliffs, but it is likely that the shoreline was also used for fishing activities at the time the settlement was occupied. The asset is considered to have Medium relative sensitivity to changes to its setting. The proposed SCH development is **unlikely** to impact upon the setting or understanding of the monument as it will not impact upon its relationship with the adjacent agricultural land, the cliff and the wider coastline. Therefore, the magnitude of impact on the setting of the asset would be **low** and the level of effect would be **minor: non-significant**.

The Scheduled Monument of *Carn Ban, cairn 350m E of Staffin Lodge, Kilmuir* (Site 44, List No. SM3517) is located approximately 665m west of the proposed SCH development. The monument comprised a grass-covered cairn with an outer stone kerb. The monument was located downslope from the clifftop with clear views across Staffin Bay to the north and the settlements of Garafad and Staffin to the south. The monument is thought to have been used as a prehistoric burial monument or perhaps as a dwelling such as a dun or broch. The monument has no intervisibility with the proposed SCH development and as such the development would not impact upon its setting.

The Scheduled Monument of *Staffin House, shell midden 1050m NNE* (Site 45, List No. SM7848) is located approximately 305m northwest of the proposed SCH development. The asset comprised the remains of a Mesolithic rock shelter and shell midden at the base of the cliff above the shore. Much of the asset has been altered by the upgrading of the road, however previous archaeological excavations revealed a considerable depth of Mesolithic occupation material, much of which has been preserved below ground. The asset would have been used a domestic camp for hunting and fishing and was probably situated for its good access to the sea and to Staffin Island. The relationship that Site 45 had to the sea and the shoreline is key in understanding and appreciating the asset. It is considered to have a High relative sensitivity to changes to its setting. The monument has distant views along the shore toward the proposed SCH development (Figure 6.5.1), although it is slightly obscured by the cliffs. The proposed SCH development may have minor impacts on the setting; however, these would not affect the ability to understand the relationship between the midden and the coast and Staffin Island and would further be mitigated by the fact that the proposed SCH development represents a continuity of the human relationship with the sea in the area. Therefore, the magnitude of impact on the setting of the asset would be **low** and the level of effect would be **minor: non-significant**.

6.5.2.3 Listed Buildings

The Category B Listed Staffin Stenscholl Parish Manse (Site 21, List No. LB7250) and the Category B Listed Staffin Stenscholl Parish Church (Site 22, List No. LB 7249) are situated 1km and 955m southwest of the proposed SCH development, respectively. The two buildings are post-medieval religious buildings associated with the settlement of Staffin. Their main setting, insofar as it contributes to an understanding and appreciation of them, relates to their central location within the village. There is no intervisibility between these buildings and the proposed SCH development and as such their settings would not be impacted.

6.5.2.4 Borrow Pit

Direct effects upon known and any previously unknown archaeological remains which may be present on within the Borrow Pit would cease with the completion of the of construction SCH development, consequently no direct effects are predicted during the operational phase.

6.6 Mitigation Measures

6.6.1 Construction

6.6.1.1 Proposed SCH Development

A programme of Historic Building Recording will be undertaken on the boat nausts at Site 10 within the proposed SCH development prior to their dismantling. A watching brief will be undertaken during their dismantling and groundworks in their immediate vicinity, to assess the potential for hitherto unrecorded buried archaeological remains. The aim of the Watching Brief would be to identify any archaeological remains threatened by the proposed SCH development, to assess their significance and to mitigate any impact upon them either through avoidance or, if preservation in situ is not warranted, through preservation by record. If, significant archaeological remains are identified during the Watching Brief there is the potential that further works, such as excavation and post-excavation analyses, could be required.

In accordance with national and local planning policies on heritage a Protocol for Archaeological Discovery (PAD) will be put in place for marine works. The construction team will be briefed on the PAD which will detail whom to contact for further advice in event of a find. An appropriately archaeologist would then implement the methodology for the examination and identification of any finds or remains retrieved from the marine archaeological environment and thus their preservation by record as detailed in the PAD.

6.6.1.2 Borrow Pit

Disturbance of the areas in the immediate vicinity of the known non-designated assets (Sites 35, and 58 to 63) along the southern and eastern edges of the development should be avoided as far as practicable. If works are required in this area there is a potential for hitherto unrecorded buried archaeological remains to be present where there are soils/ made ground present above bed rock. Hence, a watching Brief may be required to identify any archaeological remains threatened by the Borrow Pit, to assess their significance and to mitigate any impact upon them either through avoidance or, if preservation in situ is not warranted, through preservation by record. If significant archaeological remains are identified during the Watching Brief there is the potential that further works, such as excavation and post-excavation analyses, could be required.

6.6.2 Operation

6.6.2.1 Proposed SCH Development

Direct effects upon known and any previously unknown archaeological remains which may be present on within the proposed SCH development would cease with the completion of the groundworks stage of construction and consequently no direct effects are predicted during the operational phase of the development. As such no mitigation for direct effects during the operational phase is required.

No significant setting effects on designated heritage assets within the proposed SCH development's operational phase. Indeed, setting effects would be, at most, minor. As such no mitigation is deemed necessary.

6.6.2.2 Borrow Pit

Direct effects upon known and any previously unknown archaeological remains which may be present on within the Borrow Pit would cease with the reinstatement of the Borrow Pit hence, no mitigation for direct effects is required.

No designated heritage assets are located in proximity to the Borrow Pit and as such no setting effects are predicted and no mitigation is necessary.

6.7 Cumulative Impacts

As detailed in Chapter 3 no cumulative effects are predicted.

6.8 Residual Effects

No significant effects on cultural heritage assets were identified as such there is no need to assess the residual effects. The mitigation identified will however, help to minimise the over impacts on the known assets.

Potential effects on unknown and previously unrecorded buried remains cannot be predicted at this stage, although mitigation of any such impact is also addressed by the proposed mitigation measures.

6.9 Summary

This chapter identifies the archaeological and cultural heritage value of the proposed SCH development and Borrow Pit and assesses the potential for both for direct and setting effects on heritage assets resulting from the construction and operation of the Proposed Development within the proposed SCH development and the Borrow Pit. This chapter also identifies measures that should be taken to mitigate predicted adverse effects.

Operational effects include impacts upon the settings of three Scheduled Monuments. Table 6.9.1 provides a summary of the effects that may arise during the construction and operational phase of the proposed SCH development and the Borrow Pit.

Table 6.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction: Proposed SCH Development							
Site 10 – Skye, Staffin, Ob Nan Rob, Boat Shelters	Removal of assets.	Negligible	High Adverse	Minor: Non-Significant Adverse	A programme of Historic Building Recording should be undertaken on the boat nausts at Site 10 within the proposed SCH development prior to their dismantling. A watching brief should be undertaken during their dismantling and for groundworks in the immediate vicinity.	Medium Adverse	Negligible: Non-Significant Adverse
Construction Borrow Pit							
Site 35 – Diatomite tramway – Loch Cuithir, Lealt (Borrow Pit)	Potential direct effects.	Low	Low Adverse	Negligible: Non-Significant Adverse	Avoidance of groundworks near Sites 35 and 58 to 63. If soil stripping is required in their vicinity a watching brief may be required.	Negligible Adverse	Negligible: Non-Significant Adverse
Site 58 – Concrete Block, Borrow Pit	Potential direct effects.	Low	Low Adverse	Negligible: Non-Significant Adverse	Avoidance of groundworks near Sites 35 and 58 to 63. If soil stripping is required in their vicinity a watching brief may be required.	Negligible Adverse	Negligible: Non-Significant Adverse
Site 59 – Concrete Block, Borrow Pit	Potential direct effects.	Low	Low Adverse	Negligible: Non-Significant Adverse	Avoidance of groundworks near Sites 35 and 58 to 63. If soil stripping is required in their vicinity a watching brief may be required.	Negligible Adverse	Negligible: Non-Significant Adverse
Site 60 – Wall, Borrow Pit	Potential direct effects.	Low	Low Adverse	Negligible: Non-Significant Adverse	Avoidance of groundworks near Sites 35 and 58 to 63. If soil stripping is required in their vicinity a watching brief may be required.	Negligible Adverse	Negligible: Non-Significant Adverse
Site 61 – Drystone Wall, Borrow Pit	Potential direct effects.	Low	Low Adverse	Negligible: Non-Significant Adverse	Avoidance of groundworks near Sites 35 and 58 to 63. If soil stripping is required in	Negligible Adverse	Negligible: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
					their vicinity a watching brief may be required.		
Site 62 – Drystone Wall, Borrow Pit	Potential direct effects.	Low	Low Adverse	Negligible: Non-Significant Adverse	Avoidance of groundworks near Sites 35 and 58 to 63. If soil stripping is required in their vicinity a watching brief may be required.	Negligible Adverse	Negligible: Non-Significant Adverse
Site 63 – Wall, Borrow Pit	Potential direct effects.	Low	Low Adverse	Negligible: Non-Significant Adverse	Avoidance of groundworks near Sites 35 and 58 to 63. If soil stripping is required in their vicinity a watching brief may be required.	Negligible Adverse	Negligible: Non-Significant Adverse
Operation							
Site 12 – Garafad School, homestead 740m NE of (Scheduled Monument, List No. SM3515)	Effects on Setting.	High	Low Adverse	Minor: Non-Significant Adverse	Sympathetic design of development, in keeping with historic uses.	Low	Minor: Non-Significant Adverse
Site 11 – Garafad, Depopulated Settlement, Kilmuir (Scheduled Monument, List No. SM3510)	Effects on Setting.	Medium	Low Adverse	Minor: Non-Significant Adverse	Sympathetic design of development, in keeping with historic uses.	Low	Minor: Non-Significant Adverse
Site 45 – Staffin House, shell midden 1050m NNE (Scheduled Monument, List No. SM7848)	Effects on Setting.	High	Low Adverse	Minor: Non-Significant Adverse	Sympathetic design of development, in keeping with historic uses.	Low	Minor: Non-Significant Adverse

Key

Significant Effect
Non-Significant

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Sortie number	Frame number(s)	Date
ASS/64088	0029 and 0030	14 October 1988

6.11 Glossary

Acronym	Definition
AD	Anno Domini
BC	Before Christ
BP	Before Present
CUCAP	Cambridge University Centre for Aerial Photographs
E	East
EIA	Environmental Impact Assessment
EU	European Union
GEN	General Planning Principles
GNSS	Global Navigation Satellite System
HEPS	Historic Environment Policy for Scotland
HER	Historic Environment Record
HES	Historic Environment Scotland
HMPA	Historic Marine Protected Area
HO	Hydrographic Office
ICOMOS	International Council on Monuments and Sites
IEMA	Institute of Environmental Management and Assessment
km	kilometres
LWM	Low Water Mark
m	Metres
MLWS	Mean low water springs
MoD	Ministry of Defence
NCAP	National Centre for Aerial Photography
NE	North east
NLS	National Library of Scotland
NNE	North northeast
NRHE	National Record of the Historic Environment

Acronym	Definition
PAD	Protocol for Archaeological Discovery
PMRA	Protection of Military Remains Act
RoW	Receiver of Wreck
RTK	Real Time Kinematic
SAMPHIRE	Scottish Atlantic Maritime Past: Heritage, Investigation, Research & Education
SCH	Staffin Community Harbour
SNH	Scottish Natural Heritage
SPP	Scottish Planning Policy
THC	The Highland Council
UNCLOS	United Nations Convention of the Law of the Sea
UNESCO	United Nations Educational, Scientific and Cultural Organization
VRS	Virtual Reference Station
W	West
WSI	Written Scheme of Investigation

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Chapter 7: Biodiversity

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Contents

7 Biodiversity

7.1 Introduction

This general biodiversity chapter lays out the guidance and regulations relevant to ecological receptors and the impact assessment methodology that the following topic-specific chapters then utilise:

- Chapter 8: Benthic Ecology;
- Chapter 9: Fish;
- Chapter 10: Marine Mammals; and
- Chapter 11: Terrestrial Ecology.

7.2 Regulations and Guidance

7.2.1 The Habitats Directive

The European Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, also referred to as the 'Habitats Directive', has the primary aim of maintaining biodiversity within the Member States. The Habitats Directive is transposed into Scottish law by a combination of the Conservation (Natural Habitats, & c.) Regulations 1994 (as amended in Scotland), commonly known as the 'Habitats Regulations' together with the Habitats Regulations 2010 (in relation to reserved matters).

The Habitats Regulations identify several habitats or species whose conservation interest requires the designation of Special Areas of Conservation, which form the Natura 2000 network of protected sites (see Section 7.3.1).

In addition, the Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. However, these actions can be made lawful through the granting of licenses by the appropriate authorities. These species are commonly termed European Protected Species (EPS).

7.2.2 The Marine (Scotland) Act 2010

The Marine (Scotland) Act 2010 contains provisions for new Marine Protected Areas (MPAs) in Scottish territorial waters and sets out duties to ensure Scotland's seas are managed sustainably. In order to help meet this requirement, the Joint Nature Conservation Committee (JNCC) and Nature Scot have produced a list of habitats and species occurring in Scottish waters, which are noted for their conservation importance; these are referred to as Priority Marine Features (PMFs). A subset of the PMFs, called MPA search features, will be used to help identify possible areas for MPAs and develop the network in Scottish waters. MPAs are discussed further in Section 7.3.2.

7.2.3 Wildlife and Countryside Act 1981 & Nature Conservative (Scotland) Act 2004

The Wildlife and Countryside Act 1981 (WCA) (as amended in Scotland) was originally conceived to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and the European Birds Directive in Great Britain. It has been extensively amended since it first came into force.

Schedule 5 of the WCA provides special protection to selected animal species other than birds, through section 9(4) of the Act, against damage to "*any structure or place which [any wild animal included in the schedule] uses for shelter and protection*", and against causing disturbance whilst in such places.

The WCA contains measures for preventing the establishment of non-native species, which may be detrimental to native wildlife, prohibiting the release of animals and planting of plants listed in Schedule 9. It also provides a mechanism making the above offences legal through the granting of licenses by the appropriate authorities.

Important amendments to the WCA have been introduced in Scotland, including the Nature Conservation (Scotland) Act 2004 (NCSA). Part 3 and Schedule 6 of this Act make amendments to the WCA, strengthening the legal protection for threatened species. The Nature Conservation (Scotland) Act 2004 is also the instrument under which Sites of Special Scientific Interest (SSSI) are protected in Scotland.

The Wildlife and Natural Environment (Scotland) Act 2011 provided a new licensing element to the WCA within Scotland, specifically for certain non-avian protected species 'for any other social, economic or environmental purpose'. This licensing purpose is qualified by two constraints; "*that undertaking the conduct authorised by the licence will give rise to, or contribute towards the achievement of, a significant social, economic or environmental benefit; and that there is no other satisfactory solution*".

7.2.4 Ecological Impact Assessment Guidance

The Chartered Institute of Ecology and Environmental Management (CIEEM) provide Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018); these have been utilised in the development of the methodology discussed in Section 7.5.

7.3 Designations

Designated protected areas represent the very best of Europe's landscapes, plants and animals, rocks, fossils and landforms. Their protection and management will help to ensure that they remain in good health for all to enjoy, both now and for future generations. They may be designated to meet the needs of international directives and treaties, national legislation and policies, or more local needs and interests.

7.3.1 International Designations

7.3.1.1 Natura Sites

Natura Sites include those which make up the Natura 2000 network as part of the Habitats Directive and Birds Directive. Sites included in the Natura 2000 network are Special Protected Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites, although the latter are included as part of SPAs or SACs in Scotland.

SACs are internationally important for threatened habitats and species. They are also selected for several habitats and species, both terrestrial and marine, listed in the Habitats Directive. Where a potential site to be designated as a SAC has been identified, and the details of that site have been put out to public consultation, it is referred to as a candidate SAC (cSAC). A cSAC is afforded full legislative protection and will be considered to have equal value as a SAC.

Special Protection Areas (SPAs) are internationally important for threatened habitats and species. They are also selected for a number of rare, threatened, or vulnerable bird species listed in Annex I of the Birds Directive and also for regularly occurring migratory species.

7.3.1.2 Ramsar Sites

Ramsar sites are wetlands of international importance, designated under the Ramsar Convention 1971. Wetlands are defined as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres. There are currently fifty one Ramsar sites designated as internationally important wetlands in Scotland, covering a total area of about 313,000 hectares (NatureScot, 2020). All Ramsar sites in Scotland are also either SPAs or SACs (Natura 2000 sites), and many are also Sites of Special Scientific Interest (SSSIs), although the boundaries of the different designations are not always exactly the same (NatureScot, 2020). It is not surprising that internationally important wetlands are also of European interest for a wide variety of water birds, bogs, lochs, coastal wetlands and other water-dependent habitats and species. Although there is no specific legal framework that safeguards Scottish Ramsar sites, they benefit from the measures required to protect and enhance the Natura sites and SSSIs which overlap them. Nature Scot also includes Ramsar sites in its site condition monitoring programme.

7.3.1.3 OSPAR

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention) is the mechanism by which fifteen Governments of Western Europe work together to protect the marine environment of the North-East Atlantic. OSPAR incorporates a wide range of marine issues, from work on pollution and dumping at sea, to the conservation of marine biodiversity.

In 2003, the government committed to establishing a well-managed, ecologically coherent network of Marine Protected Areas (known as the OSPAR MPA commitment). Marine Special Areas of Conservation (mSAC), designated under the Habitats Directive, have been submitted as the UKs initial contribution to the OSPAR network. Whilst OSPAR covers many different issues, the focus of NatureScot's current work is on delivering the OSPAR MPA commitment. A list of marine habitats and species considered to be under threat or in decline within the North-East Atlantic has been produced by OSPAR (known as the OSPAR Threatened and Declining List). The known distribution of these habitats and species in waters around the UK has been mapped on the National Biodiversity Network website. The habitats and species on the OSPAR Threatened and Declining List have been considered through NatureScot Priority Marine Features (PMFs) work, as discussed in Section 7.2.1. Together with mSAC's and marine Special Protection Areas (mSPA) (also designated under the Habitats Directive) Scotland will achieve the OSPAR commitment of establishing a well-managed, ecologically coherent network of MPAs.

7.3.2 National Designations

National designations cover a range of different types of protected area and are made by various local and national authorities. Some of these designations focus on nature conservation, while others are concerned with special landscapes. The management of multi-functional protected areas (such as our National Parks) seeks to balance the needs of people, landscape, and nature.

7.3.2.1 Sites of Special Scientific Interest

Sites of Special Scientific Interest (SSSI) are those areas of land and water (to the seaward limits of local authority areas) that NatureScot considers to best represent our natural heritage; its diversity of plants, animals and habitats, rocks and landforms, or a combination of such natural features. They are the essential building blocks of Scotland's protected areas for nature conservation. Many are also designated as Natura sites (SPAs and SACs). The national network of SSSIs in Scotland forms part of the wider Great Britain series. NatureScot designates SSSIs under the Nature Conservation (Scotland) Act 2004. SSSIs are protected by law. It is an offence for any person to intentionally or recklessly damage the protected natural features of an SSSI.

7.3.2.2 Marine Protected Areas

Scotland (along with the rest of the UK) has designated a number of MPAs, which include SACs and SSSIs. The term “MPA" can be used for several different types of protected areas within the marine environment. The Marine (Scotland) Act has established a new power for MPAs in the seas around Scotland to recognise features of national importance and meet international commitments for developing a network of MPAs. Where a potential site to be designated as an MPA has been identified, and the details of the site put out to public consultation, it is referred to as a proposed MPA (pMPA); pMPA’s are afforded full legislative protection, and as such will be considered to have equal value as MPA.

7.3.3 Local Designations

Local natural heritage designations identify areas that are important to people, generally in a Council area. Local nature conservation sites and special landscape areas may be known locally by other names, but all are used to direct local planning policies and highlight local sites of interest. Local nature reserves are areas of at least locally important natural heritage value, which local authorities own or manage, to provide opportunities for people to find out about their environment. Local designations are generally made by local authorities, though many are proposed by special interest and conservation groups, such as local Regionally Important Geological Sites (RIGS) Groups or the Scottish Wildlife Trust.

7.4 Habitat Regulation’s Appraisal

When a project may have a likely significant effect on a Natura Site (SPA, SAC) or a Ramsar site, a Habitats Regulation Appraisal (HRA) and, when required, an Appropriate Assessment (AA), needs to be completed by the competent authority. The legislative context for carrying out an HRA is based on the Habitats Directive (92/43/EEC), in particular Article 6(3), and The Conservation (Natural Habitats, &c.) Regulations. Information the competent authority requires in order to carry out an HRA and AA has been provided within this EIAR. Appendix G.1 provides a Habitats Regulations Appraisal Pre-Screening Report, produced to aid the competent authority’s assessment of the designated sites which may have their qualifying interests potentially affected by the proposed Staffin Community Harbour (SCH) development.

7.5 Impact Assessment Methodology

The assessment of the significance of predicted impacts on ecological receptors is based on both the ‘value’ of a receptor and the ‘nature and magnitude’ of the impact that the development will have on it. Effects on biodiversity may be direct (e.g., the loss of species or habitats) or indirect (e.g., effects due to noise, dust or disturbance) on receptors located within or outwith the respective survey area. The Ecological Impact Assessments (EcIA), in principle, followed the assessment methodology outlined in Chapter 3: Methodology, with the specific ecological assessment methods and criteria detailed below.

7.5.1 Evaluation of Ecological Receptors

The evaluation methodology has been adapted from the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018). A key consideration in assessing the effects of any development on flora and fauna is to define the areas of habitat and the species that need to be considered. This requires identifying a potential zone of influence, which is defined as those areas and resources that may be affected by biophysical changes caused by project activities, however remote from the respective survey area.

The approach that has been undertaken throughout the ecological assessments is to identify 'valued ecological receptors' i.e., species and habitats that are both valued in some way and could be affected by the proposed development and separately, to consider legally protected species. Both species populations and habitats have been valued using a broad geographical basis with full details in Table 7.5.1.

The approach taken in these assessments is that a species population or habitat area that is of 'Regional' or greater importance in biodiversity conservation terms is considered to be a valued ecological receptor. Therefore, if a species population is considered to be of High Local value or less, the proposed development is not anticipated to have as great of an effect on the species population as a whole. Exceptions are made if the species population or habitat area has been identified as having a high social or economic value, or if the species is legally protected, for example if they are a Schedule 1 or Schedule 5 species under the 1981 Wildlife and Countryside Act, or an EPS.

Table 7.5.1 Nature Conservation Receptor Evaluation Criteria.

Value	Criteria
International	• An internationally important site or a site proposed for, or considered worthy of designation; • A regularly occurring substantial population of internationally important species (E.G. EPS listed on Annex IV of the Habitats Directive).
National	• A nationally designated site, or a site proposed for, or considered worthy of such designation; • A viable area of habitat type listed in Annex I of the Habitats Directive or of smaller areas of such habitat which are essential to maintain the viability of a larger whole; or • A regularly occurring substantial population of a nationally important species, e.g., listed on Schedule 5 & 8 of the 1981 Wildlife and Countryside Act.
Regional	• Areas of internationally or nationally important habitats which are degraded but are considered readily restored; • Viable habitats or populations of a species identified as a PMF, or smaller areas/populations which are essential to maintain the viability of a larger area/population as a whole; • Regionally important population/assemblage of an EPS, Schedule 1 and/or 5 species. • Regionally important assemblages of other species or habitats.
High Local	• Locally important population/assemblage of an EPS, Schedule 1 and/or 5 species; or • Sites containing viable breeding populations of species known to be county rarities or supplying critical elements of their habitat requirements.
Moderate Local	• Undesignated sites, features or species considered to appreciably enrich the habitat resource within the local context (within 2km radius from the site) and may benefit from mitigation as a good practice measure.
Low Local	• Undesignated sites, features or species considered to appreciably enrich the habitat resource within the immediate environs of the site and may benefit from mitigation as a good practice measure.
Negligible	• Common and widespread or modified habitats or species.
Negative	• Invasive, alien species often scheduled under Section 14, Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

The approach of these assessments is to consider the value of the site for the species under consideration, rather than the nature conservation importance of the species itself, although this is a factor in the evaluation process with the level of use of the site (number of individuals using the site and nature and level of use) taken into consideration. An assessment is then made of the value of the site to that species, based upon a combination of data sources, professional judgment and knowledge of the site and wider area.

7.5.2 Legal Protection of Species

There is a need to identify all legally protected species that could be affected by the proposed development, to ensure that the development complies with all relevant nature conservation legislation. It is, therefore, appropriate to take into full consideration the legal protection of a species within the evaluation process.

7.5.3 Nature and Magnitude of Impact

Impacts can be permanent or temporary; direct or indirect; adverse or beneficial; reversible or irreversible; and may also have a cumulative function with other activities outwith the assessed development. These factors are taken into consideration in the context of the sensitivity of the valued ecological receptor and the range of potential effects. To identify whether impacts are significant or not, it is important to undertake the assessment in terms of the integrity (coherence of the ecological structure and function), and conservation status (ability of the receptor to maintain its distribution and/or extent/size) of the receptor.

Table 7.5.2 provides an overview of the range of impact magnitudes referred to within this assessment. In addition, impacts may also be positive in nature.

Table 7.5.2 Definition of Magnitude of Impact.

Magnitude	Description
Negligible / None	Very slight change from the baseline conditions. Changes barely detectable, approximating to the 'no change' situation. Any effects likely to be reversible within 12 months and not affect the conservation status or integrity of the receptor.
Low	Minor shift away from baseline conditions. Effects will be detectable but unlikely to be of a scale or duration to have a significant effect on the conservation status or integrity of the receptor in the short term (1-5 years). Overall baseline character of site will not alter substantially.
Medium	Clear effect on the conservation status or integrity of the receptor in the short to medium term (6-15 years), although this is likely to be reversible or replaceable in the long-term (15 years plus).
High	Total loss of, or major alteration to conservation status or integrity of a receptor with situation likely to be irreversible, even in the long term. Fundamental alteration to the character and composition of the Site.

7.5.4 Impact Significance

The significance of an effect is a product of the value of the ecological receptor and the magnitude of the impact on it, moderated by professional judgment. Table 7.5.3 illustrates a matrix based on these two parameters which is used for guidance in the assessment of significance. In terms of the EIA Regulations, only effects which are 'moderate' or 'major' are considered significant, the others constituting a non-significant effect. The level of effect has been assessed as either major, moderate, minor, or negligible, or beneficial in accordance with the definitions provided in Chapter 3: Methodology.

Table 7.5.3 Significance of Effects Matrix.

Magnitude of Impact	Value				
	International	National	Regional	Moderate Local/ High Local	Low Local /Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible	Negligible

Key

Significant Effect
Non-Significant

7.6 Summary

The legislation, policy and guidance which are relevant to ecological receptors potentially affected by the SCH development have been briefly stated. The definitions of the designated sites, at international, national and local levels, have been described and the individual designations will be related to the ecological topics. The impact assessment methodology specific to the ecology assessments to take place in Chapters 8 - 11 has been laid out.

7.7 References

CIEEM. (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.

Government, U. K. (1994). *Conservation (Natural Habitats, &c.) Regulations 1994.* Retrieved 04 14, 2021, from https://www.legislation.gov.uk/uksi/1994/2716/regulation/1/made

NatureScot (2020). Ramsar Sites. Retrieved from https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/ramsar-sites

7.8 Glossary

Acronym	Definition
92/43/EEC	European Habitat's Directive
AA	Appropriate Assessment
CIEEM	Chartered Institute for Environmental and Ecological Management
cSAC	Candidate Special Area of Conservation
EcIA	Ecological Impact Assessment
EPS	European Protected Species
HRA	Habitats Regulation Appraisal
JNCC	Joint Nature Conservation Committee
km	Kilometres
MPA	Marine Protected Area
mSAC	Marine Special Area of Conservation
NCSA	Nature Conservation (Scotland) Act
PMF	Priority Marine Feature
pMPA	Proposed Marine Protected Area
RIGS	Regionally Important Geological Sites
SAC	Special Area of Conservation
SCH	Staffin Community Harbour
SPA	Special Protected Area
SSSI	Site of Special Scientific Interest
WCA	Wildlife and Countryside Act

Chapter 8: Benthic Ecology

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Contents

8 Benthic Ecology

8.1 Introduction

This chapter presents the benthic Ecological Impact Assessment (EcIA) for the proposed Staffin Community Harbour (SCH) development. As discussed in Chapter 3: Methodology, it was deemed appropriate to consider benthic receptors as they could be impacted by the proposed SCH development. Benthic Receptors are evaluated in the context of nature conservation legislation and relevant planning policy (see Chapter 4: Statutory Context & Policy, and Chapter 7: Biodiversity). Impacts on receptors are identified and subject to detailed impact assessment. Mitigation is proposed, cumulative impacts are considered, and finally the residual impacts and their significance are assessed.

8.2 Regulations, Guidance and Sources of Information

Regulations and guidance pertaining to ecology and biodiversity are outlined in Chapter 4: Statutory Context & Policy and Chapter 7: Biodiversity. This section specifically details the regulations and guidance to benthic ecology.

8.2.1 Sources of Information

The following sources of information were consulted in the compilation of this benthic ecological impact assessment:

- Guidance on Survey and Monitoring in Relation to Marine Renewables Developments in Scotland. Volume 5: Benthic Habitats (Saunders, Bedford, Trendall, & Sotheran, 2011);
- Guidance on Assigning Benthic Biotopes using EUNIS or the Marine Habitat Classification of Britain and Ireland (JNCC, 2019);
- Epibiota remote monitoring from digital imagery: Interpretation guidelines (Turner et al., 2016)
- International Convention for the Control and Management of Ships' Ballast Water and Sediments (International Maritime Organization, 2004);
- Guidance for Pollution Prevention 5: Works and Maintenance in or Near Water (NIEA, 2017);
- Natural Environment and Rural Communities Act 2006, Section 4.1;
- International Union of Conservation of Nature Red List of Threatened Species (International Union of Conservation of Nature, 2016); and
- Descriptions of Scottish Priority Marine Features (PMFs) (Tyler-Walters et al., 2016).

8.3 Method of Assessment

8.3.1 Baseline Methodology

8.3.1.1 Data Review

The aim of the assessment was to inform the project as to whether a benthic survey was warranted. This included:

- Protected site information;
- Broadscale habitat (BSH) map from EMODnet (EMODnet, 2019);
- Broadscale habitat map from 'Maps NMPI' Marine Scotland portal (Marine Scotland, 2016);
- SEPA Infaunal Quality Index data for the Minches and West of Scotland (used as a proxy for Water Framework Directive status assessment for the proposed SCH development), (SEPA, 2015); and
- National Biodiversity Network (NBN) Atlas.

Biotopes identified are classified in accordance with the JNCC Marine Habitat Classification system and the European Nature Information System (EUNIS).

8.3.1.2 Benthic Survey

As the features of interest potentially occurring within the consenting area (e.g. kelp beds) can be easily detected by visual inspection, the survey took the form of seabed video transects with still image capture, as well as aerial imagery obtained using an Unmanned Aerial Vehicle (UAV) to cover the intertidal portion of the proposed SCH development.

Atlantic Diving Services carried out the benthic dive survey on the 4th March 2021. This was completed prior to the wave modelling being completed. This gave rise to the development being moved further east, as discussed in Chapter 2: Project Description.

Five video transects were completed where the development was originally expected to be constructed to the western reaches of the design of the proposed SCH development, and taken forward to consultation. The video transects resulted in over 74 minutes of high-definition video footage. Figure 8.3.1 shows the locations of the transects completed (Please refer to Figure 1 in Appendix H.1 for full size drawing). Logs of the benthic dive survey operations are provided in Appendix H.1 with a summary of the survey methods outlined below.

Underwater video transects were completed by divers using a hand-held rig containing a Go Pro 7. A concrete weight was dropped at offshore locations and a leaded line with marker tags every 5m was laid back to shore from the block. Two of the transects were shorter than planned due to a northeast swell pushing the diver towards the rock shelf and making it unsafe to proceed any further. All dives were started on the offshore transect points except for the transect located next to the slipway which was started inshore. Video footage was collected over heterogenous habitat types, at the interface between different habitats, over PMFs and of any notable features.

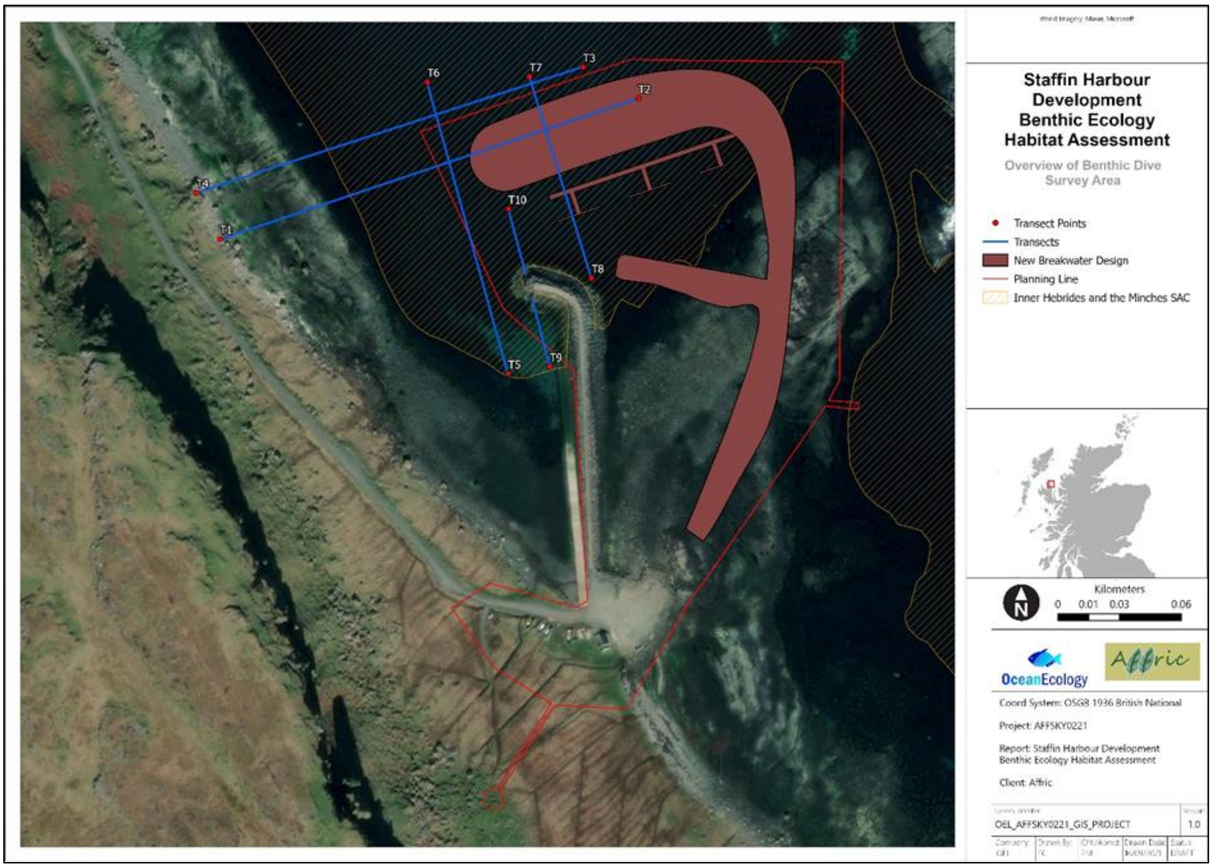

Figure 8.3.1: Benthic Dive Sample Transects for the Proposed SCH Development

Analysis was undertaken using the Bio-Image Indexing and Graphical Labelling Environment (BIIGLE) annotation platform by experienced marine ecologists (Langenkämper et al., 2017). Results were recorded and identified biotopes and biotope complexes mapped in accordance with the EUNIS.

To ensure that appropriate baseline data was gathered for the full footprint of the development area, an additional survey was undertaken. Tracks Ecology conducted the UAV survey on the 6th July 2021 over a 48-minute period around low water. Figure 8.3.2 shows the extent and location of the area covered by the UAV flights (Refer to Figure 2 in Appendix H.1 for full extent drawing). Full details of the UAV survey are provided in Appendix H.2.

The UAV mapping was conducted by Tracks Ecology Ltd in accordance with the Civil Aviation Authority (CAA) regulations. Tracks Ecology Ltd holds a Certificate of Competency for flights within the A2 subcategory and a General Visual Line of Sight Certificate. The UAV used was a DJI Phantom 4 Professional. Two flights were necessary to adequately cover the survey area to the appropriate resolution and were pre-planned using the Pix4DmapperPro software to achieve an orthomosaic Ground-Sampling Distance (GSD) of 1-5 cm/px. Appendix H.2 includes the full UAV survey report.

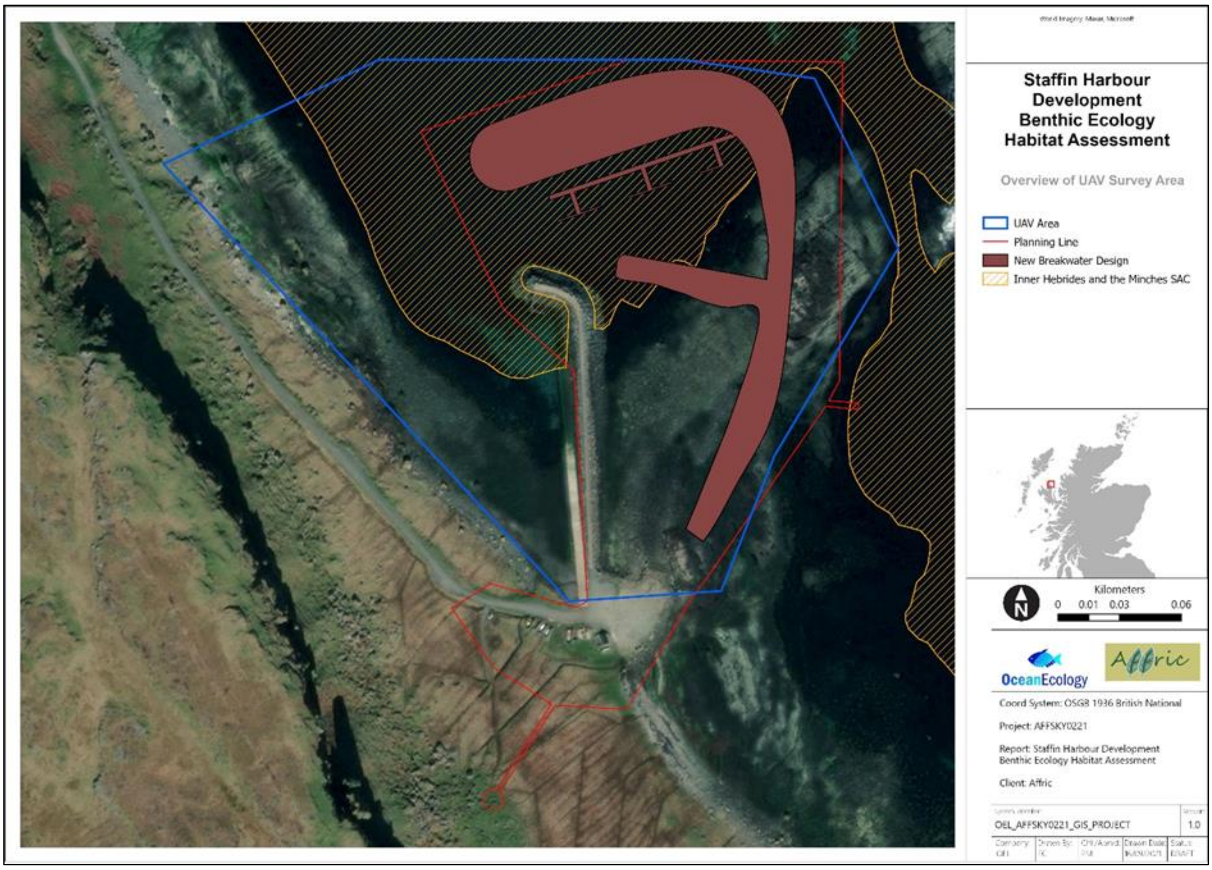

Figure 8.3.2: UAV Survey Area for the Proposed SCH Development Method of Assessment

The methodology utilised to assess the potential effects resulting from the development on the benthic ecology of the area is described in Chapter 7: Biodiversity. Note the values of High Local to Low Local as defined in Table 7.5.1 have not been utilised as it is not practicable to sub-divide receptor value to this level. It is recognised that utilising Table 7.5.3 High Local to Low Local give rise to the same overall effect significances.

8.4 Baseline

8.4.1 Statutory Designated Sites

No designated sites selected specifically for benthic features were identified within the proposed development area. However, the proposed SCH development falls within the boundaries of the Inner Hebrides and the Minches SAC covering about 13,814 km^2 and designated to protect the harbour porpoise *Phocoena phocoena* (see Chapter 10: Marine Mammals).

8.4.2 Environment

The proposed survey area lies within Staffin Harbour waters on the northeaster coastline of the Isle of Skye. Depths within the survey area are very shallow (approximately -1 m Chart Datum (CD)) with depths increasing outwith the bay.

No predictive EMODnet mapping exists for the proposed SCH development area; however, rock, and hard substrates are expected to be present to the east and northeast of the Development.

8.4.3 Benthic Survey Results

Full details of the benthic dive and UAV surveys are provided in the Ocean Ecology Staffin Harbour Development Benthic Ecology Habitat Assessment Report, attached as Appendix H.1, in Volume 3 of the Environmental Impact Assessment Report (EIAR). A summary of results are presented here.

Video transect analysis carried out by Ocean Ecology Limited (OEL) identified the EUNIS biotope A3.214 - *Laminaria hyperborea* and foliose red seaweeds on moderately exposed infralittoral rock[1] to be the most frequently observed across the survey area (Note: part of the survey area covered by the dive transects lies outside the consenting area for the proposed SCH development, as this was redefined at a later stage following the completion of a wave modelling exercise). The EUNIS biotope A5.52 - Kelp and seaweed communities on sublittoral sediment[2] was the second most common biotope identified across the survey area. A patch of A5.521 - *Laminaria saccharina* and red seaweeds on infralittoral sediments[3] were observed in the middle of the survey area, while a patch of A5.23 – Infralittoral fine sand[4] was identified in the southeast reaches of the survey area. Additionally, a small area of coarse sediment representing EUNIS habitat A5.13 – Infralittoral coarse sediment[5] was observed within the area of fine sand. No evidence of seagrass or maerl beds were observed across the proposed SCH development, despite being common PMFs on the west coast of Scotland and in the Hebrides (Tyler-Walters *et al*., 2016). The PMF broad habitats 'Kelp and seaweed communities on sublittoral sediment' (EUNIS A5.52) and 'Kelp beds' (EUNIS A3.214) were confirmed to be present within the proposed SCH development by the analysis of the video transect footage. These covered a combined area of 19,010 m^2. Mapped biotopes are shown in Figure 8.4.1 (See

[1] Marine habitat classification of Britain and Northern Ireland code: IR.MIR.KR.Lhyp.Ft
[2] Marine habitat classification of Britain and Northern Ireland code: SS.SMp.KSwSS
[3] Marine habitat classification of Britain and Northern Ireland code: SS.SMp.KSwSS.LsacR
[4] Marine habitat classification of Britain and Northern Ireland code: SS.SSa.IFiSa
[5] Marine habitat classification of Britain and Northern Ireland code: SS.SCS.ICS

Figure 5 in Appendix H.1 for full size drawing) and Figure 8.4.2; logs of the benthic dive survey are provided in Appendix H.1.

Fauna across the survey area included echinoderms such as the starfish *Asteria rubens* and *Marthasterias glacialis* and the common sea urchin *Echinus esculentus,* observed on hard substrates, and gastropods such as *Calliostoma zizyphinum* and *Gibbula* sp. attached to kelp and seaweeds. Other taxa observed across the survey area were sea anemones (*Sagartia* sp.), encrusting sponges and bryozoans, and crabs (*Cancer pagurus* and *Maja* sp.).

None of these species are of conservation importance.

No invasive non-native marine species (INNMS) were recorded during the benthic dive survey within the areas of the proposed development.

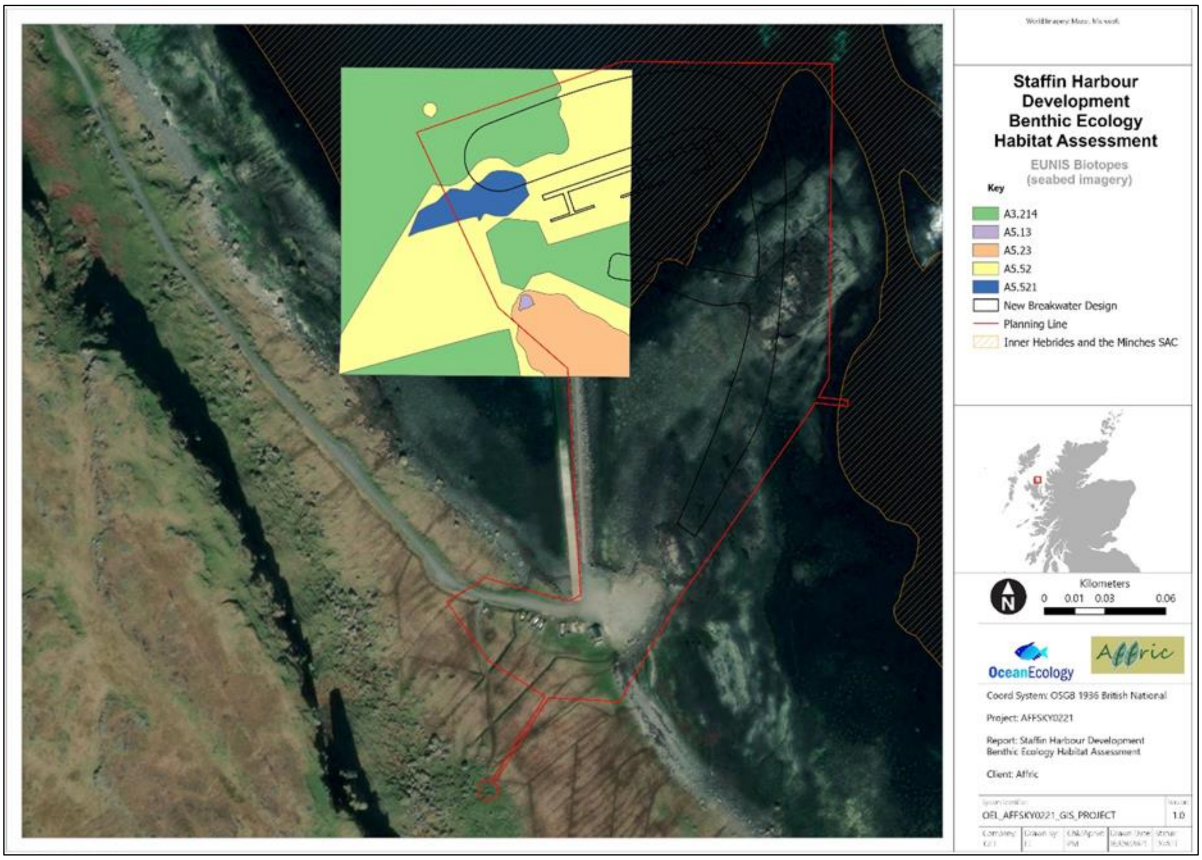

Figure 8.4.1: Predicted EUNIS habitats/biotopes across the Proposed SCH Development survey area based on video footage data

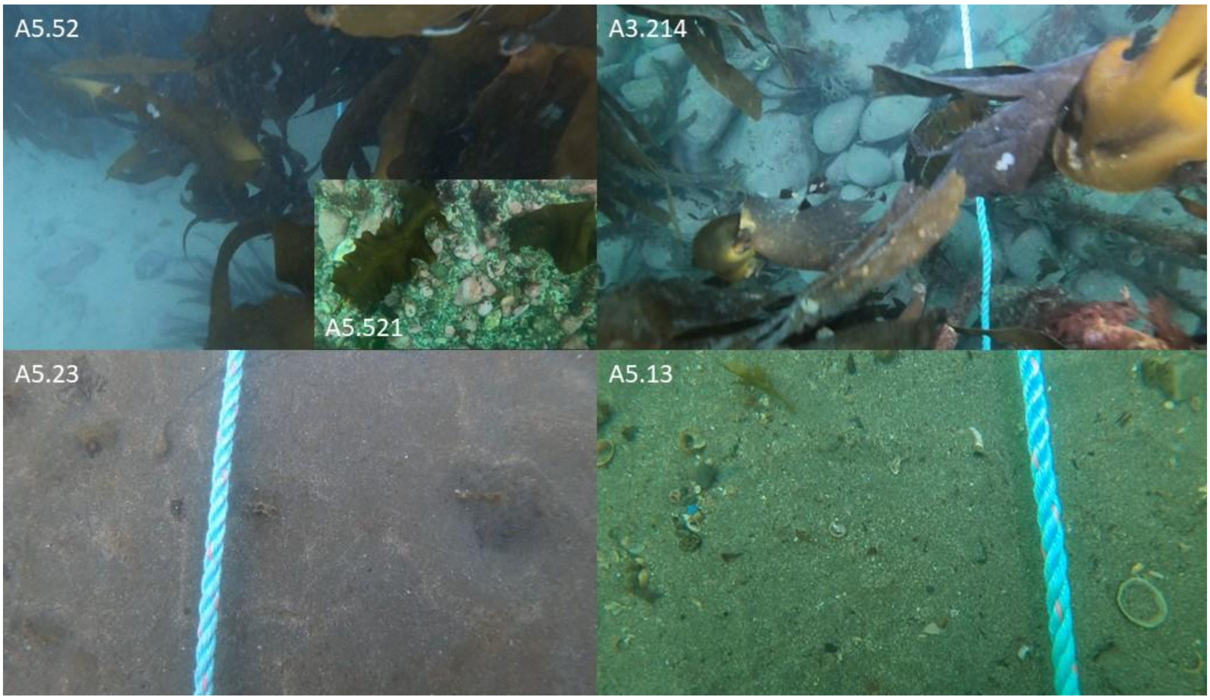

Figure 8.4.2: Still images of the five EUNIS habitats captured from video transect footage across the Proposed SCH Development survey area (Ocean Ecology, 2021)

From an analysis of the UAV imagery, OEL identified 16 unique biotopes and biotope complexes (EUNIS level 4 or above) from 10 BSHs (EUNIS level 3) (Table 8.4.1) observed across the survey area, as mapped in Figure 8.4.3 (Full map provided as Figure 6 in Appendix H.1). To note that the UAV survey area covered a much larger extent than that of the proposed SCH development; this allowed for the assessment of potential impacts the project could have on adjacent habitats and biotopes. The designation status of each habitat and biotope is set out in Table 8.4.1.

High to moderate energy rocky habitats (A1.1 and A1.2) were encountered in the upper and mid shore, both east and west of the existing slipway. These included rocks dominated by barnacles, *Littorina* spp. (A1.1131 and A1.1133) and *Fucus vesiculosus* (A1.1132) as well as areas dominated by only barnacles and fucoids (A1.212 and A1.2141 and A1.2142). Rockpools were scattered across the survey area with both coralline and green algae present (A1.4111 and A1.421). The lower shore was characterised by a mosaic of rocks, from cobbles and boulders to exposed bedrock, covered in *L. hyperborea* (A3.213 and A3.214) and fucoids. A patch of sandy sediments (A5.23) was observed just west of the existing slipway giving way to kelp beds further to the west. The extreme lower shore was characterised by sediments supporting kelp and seaweed communities (A5.52).

All habitats supporting kelp were deemed to be representative of PMFs. Specifically, the PMF 'Kelp beds' covered a total extent of 13,017.07 m^2, while the PMF 'Kelp and seaweed communities on sublittoral sediment' covered a total area of 25,876.63 m^2.

Table 8.4.1: Key EUNIS Classifications Recorded across the Proposed SCH Development Survey Area

EUNIS BSH	EUNIS Code	EUNIS Description	Designation Status
A1.1	A1.1131	*Semibalanus balanoides*, *Patella vulgata* and *Littorina* spp. on exposed to moderately exposed or vertical sheltered eulittoral rock.	None
	A1.1132	*Semibalanus balanoides*, *Fucus vesiculosus* and red seaweeds on exposed to moderately exposed eulittoral rock.	
	A1.1133	*Semibalanus balanoide* and *Littorina* spp. on exposed to moderately exposed eulittoral boulders and cobbles.	
A1.2	A1.2	Moderate energy littoral rock	None
	A1.212	*Fucus spiralis* on full salinity exposed to moderately exposed upper eulittoral rock	
	A1.2141	*Fucus serratus* and red seaweeds on moderately exposed lower eulittoral rock	
	A1.2142	*Fucus serratus* and under-boulder fauna on exposed to moderately exposed lower eulittoral boulders	
A1.4	A1.4111	Coralline crusts and *Corallina officinalis* in shallow eulittoral rockpools	None
	A1.421	Green seaweeds (*Enteromorpha* spp. and *Cladophora* spp.) in shallow upper shore rockpools	
A2.1	A2.11	Shingle (pebble) and gravel shores	None
	A2.111	Barren littoral shingle	
A3.2	A3.213	*Laminaria hyperborea* on tide-swept infralittoral mixed substrata	PMF – Kelp beds
	A3.214	*Laminaria hyperborea* and foliose red seaweeds on moderately exposed infralittoral rock	
A5.1	A5.13	Infralittoral coarse sediment	None
A5.2	A5.23	Infralittoral fine sand	None
A5.5	A5.52	Kelp and seaweed communities on sublittoral sediment	PMF - Kelp and seaweed communities on sublittoral sediment
B3.1	B3.11	Lichens or small green algae on supralittoral and littoral fringe rock	None
J4.5	J4.5	Hard-surfaced areas of ports	None

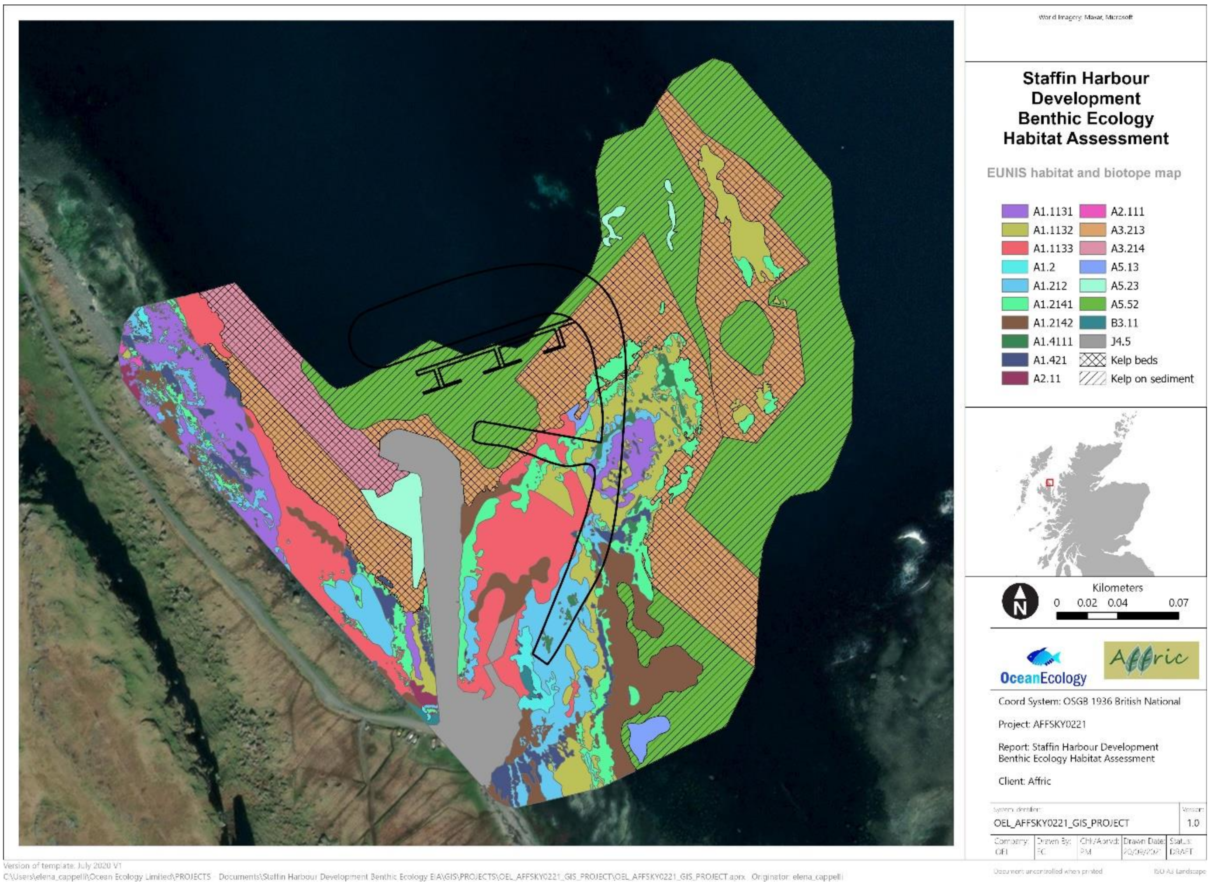

Figure 8.4.3: EUNIS Habitats / Biotopes across the Proposed SCH Development Survey Area based on UAV Imagery

8.4.4 Identification of Receptors

Table 8.4.2 details all receptors taken forward for assessment. The benthic surveys identified multiple biotope complexes within the proposed SCH development survey area including the PMFs kelp beds (R.MIR.KR.Lhyp.Ft; A3.214) and kelp and seaweed communities on sublittoral sediment (SS.SMp.KSwSS, A5.52) which occur across and in proximity of the proposed SCH development area. Potential impacts on benthic habitats and species outwith the proposed SCH development area are not anticipated. Species within the vicinity of the site however may be affected by works during the construction phase, such as those associated with the potential spread of sediment plumes. Therefore, benthic habitats and species in the waters directly adjacent to the proposed survey area are also considered as receptors.

Table 8.4.2: Ecological Value of Receptors Considered

Receptor	Locations	Description	Receptor Value
A5.52, A5.521 SS.SMp.KSwSS, SS.SMp.KSwSS.LsacR	Within the survey area	Kelp and seaweed communities on sublittoral sediment, *Laminaria saccharina* and red seaweeds on infralittoral sediments	PMF Regional (Scotland)
A3.214 R.MIR.KR.Lhyp.Ft	Within the survey area	*Laminaria hyperborea* and foliose red seaweeds on moderately exposed infralittoral rock	PMF Regional (Scotland)
A3.213 IR.MIR.KR.LhypTX	Within the survey area	*Laminaria hyperborea* on tide-swept infralittoral mixed substrata	PMF Regional (Scotland)
A1.1131, A1.1132, A1.1133 LR.HLR.MusB.Sem.Sem LR.HLR.MusB.Sem.FvesR LR.HLR.MusB.Sem.LitX	Within the survey area	Mussel and/or barnacle communities	Low local
A1.212, A1.2141, A1.2142 LR.MLR.BF.FspiB LR.MLR.BF.Fser.R LR.MLR.BF.Fser.Bo	Within the survey area	Barnacles and fucoids on moderately exposed shores	Low local
A1.4111, A1.421 LR.FLR.Rkp.Cor.Cor LR.FLR.Rkp.G	Scattered across the survey area	Rockpool communities	Low local
A2.11, A2.111 S.LCS.Sh S.LCS.Sh.BarSh	Small patches in the upper shore	Shingle (pebble) and gravel shores	Low local
A5.23 SS.SSa.IFiSa	Patch in proximity of the existing slipway	Infralittoral fine sand	Low local
A5.13 SS.SCS.ICS	Small patch within the fine sand patch	Infralittoral coarse sediment	Low local

8.5 Impact Assessment

8.5.1 Construction

Construction activities may result in a potential variety of direct and indirect impacts on the benthic environment within the proposed SCH development area and on the identified receptors in Section 8.4.4. The assessment of these impacts follows the methodology outlined in Chapter 7: Biodiversity and assesses the potential effects resulting from the construction required for the project and operations as outlined in Chapter 2: Project Description.

8.5.1.1 Loss of Habitat

Chapter 2: Project description highlights the requirements to conduct land reclamation of 0.20ha to extend to the north and east the existing hardstanding, as well the activities needed to construct the new breakwater and slipway further east of the existing slipway. The impact of land reclamation and construction of the new features is certain habitat loss to the benthic environment; however, this will be minimal. As detailed in Table 8.5.1, of the 4.03ha of intertidal habitat within the boundaries of the harbour development, only 1.11ha include PMFs, notably 0.56ha of kelp and seaweed communities on sublittoral sediment (SS.SMp.KSwSS; A5.52) and 0.55ha of kelp beds (IR.MIR.KR.LhypTX; A3.213 and R.MIR.KR.Lhyp.Ft; A3.214). The construction footprint covers an area of just under 1ha and of this approximately 20% is covered by kelp habitats identified as PMFs, which means that only the 5% of the consenting area is covered by kelp habitats which could be potentially affected by construction activities. Considering that the UAV survey area covered a much larger extent than that of the SCH development and showed that large areas of kelp beds and kelp on sediments exist outwith the development area, it is understood that kelp beds and kelp on sediments are a common and widespread habitat in the wider region. Additionally, the new breakwater rock armour will provide a new substrate which could potentially aid recolonisation of the area by kelp (and other organisms) after construction.

Table 8.5.1: PMFs and Coverage at the Proposed SCH Development Site

PMFs	UAV Survey Area		Within Development Boundaries	
	Area (ha)	% Total	Area (ha)	% Total
Kelp Beds	1.30	15.9	0.55	6.7
kelp and seaweed communities on sublittoral sediment	2.59	31.6	0.56	6.8
Total Area	8.2	-	4.03	-

Kelp was mapped across most of the survey area, beyond the development boundaries, covering a total area of 5.8ha (UAV and seabed imagery combined), as shown in Figures 8.4.1 and 8.4.3 (please refer to Appendix H.1 for full size drawings). Species within this area like *Saccharina latissima* and *Chorda filum* are noted as opportunistic organisms and have relatively fast growth rates with *Saccharina latissima* being estimated to grow up to 4.87 cm a day and reaching maturity within 15-20 months (Stamp, 2015). A study assessing the resilience of kelp habitats reported a high potential for rapid recovery of kelp habitats following disturbance such as substratum loss. It was also noted that *Saccharina latissima* has shown to be an early coloniser, appearing within two weeks following clearance of the area (Stamp, 2015). It is predicted that there will be a ready supply of zoospores (planktonic reproductive stages of *Saccharina latissima* life cycle capable of swimming) to repopulate the survey area in case of temporary habitat loss. Suitable substrate will still be available and will allow for the settlement and attachment of zoospores and subsequent recolonisation of *Saccharina latissima* and other seaweeds. Furthermore, large populations of loose lying *Saccharina latissima* have previously been recorded on the Isle of Man which showed no signs of ever being attached to substrate. It was concluded aside from the early stages of sporophyte development, attachment to substrate was not essential for the growth of this species (Burrows, 1958). And the new development could potentially provide an additional substrate to facilitate the recovery of kelp habitats.

The direct loss of the biotopes will result in the loss of individuals, habitats, potential spawning, and foraging sites for benthic communities. Whilst there will be a loss of these biotopes within the construction footprint, it will be limited to a small area compared to the wider region where the same PMFs are commonly widespread. Therefore, the localised nature of the habitat loss results in this impact being assessed **permanent** but **low**. It has therefore been assessed that habitat loss in this area will have a **minor: non-significant** effect.

8.5.1.2 Seabed Disturbance

Constructions of the new breakwater and slipway together with land reclamation, as detailed in Chapter 2, have the potential to cause disturbance of the seabed including localised releases of fines and increase sedimentation in the marine environment. Specifically laying and manoeuvring into place of stones and rocks for the breakwater construction (rock armour) and the placement of a shuttering to contain the cement when creating the slipway have the potential to cause seabed disturbance in the immediate vicinity (<5m) of these elements. When sedimentation exceeds natural thresholds, benthic ecology may be completely lost (D. Miller, C. Muir, & O. Hauser, 2002). Heavy deposition rates of sediments can increase the mortality of benthic flora and static fauna through smothering (Affric, 2019) depending upon their resilience (D. C. Miller, C. L. Muir, & O. A. Hauser, 2002). The attenuation of light because of sedimentation can prevent photosynthetic benthic flora from obtaining energy (Pineda et al., 2016). In turn, it can provide a competitive advantage to filter feeding organisms competing with algal species for space (Saunders. G. and Karamita. C., 2015).

The substrate characterising the proposed SCH development is largely made up of shallow sublittoral sediments with cobbles and pebbles, and hard rocky substrates; and only a small area close to the existing slipway is constituted by fine sand (Figures 8.4.1 and 8.4.2; see Appendix H.1 for full size drawings). Materials coarser than 2mm will quickly fall back to the seabed on remobilisation (Becker *et al.*, 2015) and so it is not anticipated that these will disperse and settle on the kelp and seaweed habitats.

Due to the limited extension of the fine sand habitat (SS.SSa.IFiSa; A5.23), any settlement on the adjacent kelp habitats will be minimal. Where some may settle on the adjacent habitats, it has been shown that short-term burial under various sediment types including gravel, sand, silt, and clay has no effect on the physiology and morphology of *Laminaria saccharina* (Roleda, M. Y. and Dethleff, D., 2011), one of the species identified in this biotope. Additionally, Chapter 17: Hydrology, Hydrogeology and Coastal Processes reported low levels of suspended solids within the waters of Staffin Bay (RPS, 2021) and concluded that sediment movements will be of low magnitude during operation activities.

Taking all the above information into account, the magnitude of the impact on kelp PMFs of regional value has therefore been determined as **low** at a regional level and **potentially reversible** over time. The impact of habitat loss from sediment remobilisation therefore results in a **minor: non-significant** effect.

It should be noted that sedimentation is a natural phenomenon in the marine environment and can build up on these habitats during storms. It can therefore be expected that these habitats can tolerate a certain level of sedimentation occurring. Studies have shown that benthic communities can recover following sediment resuspension (Goldberg *et al*., 2014), which is only temporary affecting local habitats, therefore allowing the benthic flora and fauna to recolonise and recover over time across the entirety of the proposed survey area. The potential impact of habitat loss resulting from sediment remobilisation on habitats mapped across the rest of the survey area defined as being of low local value within Table 8.4.1 has been assessed as **low** and **reversible,** resulting in a **minor non-significant** effect. To note that in Chapter 17: Hydrology, Hydrogeology and Coastal Processes, a possible northward displacement of the clockwise gyre has been considered as a possible impact resulting from the construction of the new breakwater, which in turn could affect local sedimentation dynamics, however this was deemed unlikely, and the overall effect assessed as **negligible: non-significant**.

8.5.1.3 Water Quality

Pollution incidents are the most likely source of water quality issues during construction. The accidental release of hydrocarbons and other hazardous substances in the event of a loss of containment during the construction works may result in contamination of the marine environment with the potential of disrupting benthic ecosystems (Main *et al.*, 2015). As detailed in Table 17.4.1 in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, there are several potential sources of loss of containment events during the construction of the SCH development, including from plant and fuel stores. The assessment assumes that all vehicles and equipment are well maintained, operated by suitably trained personnel and with standard pollution prevention procedures.

Impacts of a release of hazardous substances on benthic flora and fauna can be acute, with high levels of contamination increasing mortality rates rapidly following a loss of containment

(Daly *et al.*, 2016). Alternatively, contamination events may be chronic, where organisms are affected by a slow release of a hazardous substance over extended periods (Moreno *et al.*, 2013). Chronic impacts may allow the contaminants to move through the ecosystem and cause changes in morphology in benthic organisms (Lee & Lin, 2013; Main et al., 2015). Contamination can also affect primary production, oxygen availability, alter the microbial communities, and suppress microalga production (Lee & Lin, 2013).

In Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the effect of contamination from hazardous substances on water quality is identified as negligible to minor. The source of any spill is expected to be localised and the concentration of the hazardous substance will reduce rapidly with distance as it disperses in the marine environment. The adoption of primary and tertiary mitigation measures and standard industry best practice techniques for pollution prevention identified in Chapter 17 significantly reduces or removes the risk of a spillage event occurring and reaching the sea. As such, it is unlikely that release of hazardous materials of a scale with the potential to impact negatively on the PMF habitats will occur. The same applies for all other habitats and biotopes encountered across the proposed SCH development as detailed in Table 8.4.1. Therefore, the potential impact is assessed as **negligible,** resulting in a **minor: non-significant** effect.

It is also acknowledged that litter, including plastics, can have a detrimental effect on the benthic environment. As discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the volume of litter generated by the construction phase of the development with the potential to enter the sea is anticipated to be very small. However, even this small volume would contribute to the wider issue of marine litter and thus every effort will be made to avoid this occurring. Hence, primary, and tertiary mitigation has been identified in Chapter 17 to reduce the likelihood of litter escaping into the marine environment. The potential effect for all benthic ecology receptors is assessed as **negligible**, **long-term**, and **permanent**, and the resulting effect is **negligible** to **minor: non-significant**.

8.5.1.4 Introduction of Invasive Non-Native Marine Species

Invasive non-native marine species (INNMS) are flora and fauna which have been introduced either accidentally or intentionally beyond their natural marine range (Nall *et al.*, 2015). Such species may establish themselves within a habitat without impairing the integrity of the ecosystem. However, some can drastically degrade habitats, destabilise ecosystems and decimate local biodiversity (Bax *et al.*, 2003; Groenveld *et al.*, 2018). As discussed in Chapter 2: Project Description, construction activities will only require the use of small boats which will likely be sourced locally and launched from the existing Staffin slipway or other local harbour, thus not acting as a potential source of INNMS. Another potential source of INNMS could come from the equipment via sediment trapped in it from previous deployments. As detailed in Chapter 17: Hydrology, Hydrogeology and Coastal Processes, best practice including cleaning and inspection of all equipment prior to mobilisation on site will reduce if not remove the risk of introducing INNMS into the proposed SCH development. Additionally, no INNMS were recorded during the benthic dive survey (Ocean Ecology, 2021). It is not considered that INNMS will pose a threat to the kelp and seaweed habitats. As such it is considered extremely unlikely that the construction works could lead to the introduction of INNMS. The potential impact on benthic communities is therefore assessed as **negligible**, resulting in a **negligible: non-significant** effect.

8.5.2 Operation

8.5.2.1 Water Quality

The construction of a new slipway and breakwater will enable berthing of more vessels each year. The only foreseeable impacts on benthic ecology during the operational phase of the SCH development may arise from water quality issues caused by the release of hazardous materials or litter into the marine environment. The accidental release of hydrocarbons and other hazardous substances in the event of a loss of containment during operations may result in contamination of the marine environment, potentially affecting benthic ecology. As detailed in Section 17.4.2.5 of Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, there are several potential sources of loss of containment events during operations at the SCH development, including from fuel storage and the refuelling of vessels. The assessment assumes that all vehicles and equipment are well maintained, operated by suitably trained personnel and with standard pollution prevention procedures.

As previously mentioned, the primary and tertiary mitigation outlined in Chapter 17: Hydrology, Hydrogeology and Coastal Processes will greatly reduce the risk of a spill event occurring and reaching the marine environment. As such it is considered extremely unlikely that operations could lead to a significant pollution event. The potential impact on benthic communities is therefore assessed as **negligible**, resulting in a **negligible**: **non-significant** effects on all benthic receptors.

As discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the volume of litter generated by the operational phase of the development with the potential to enter the sea is anticipated to be very small. However, even this small volume would contribute to the wider issue of marine litter and thus every effort will be made to avoid this occurring. Hence, primary, and tertiary mitigation has been identified in Chapter 17 to reduce the likelihood of litter escaping into the marine environment. The potential effect for all benthic receptors is therefore assessed as **negligible**, **long-term**, and **reversible**, and the resulting effect is **negligible** to **minor: non-significant**.

8.5.2.2 Introduction of Invasive Non-Native Marne Species

As detailed above in section 8.5.1.4, INNMS can have a negative impact on marine ecosystems. The adoption of mitigation measures outlined in Chapter 17: Hydrology, Hydrogeology and Coastal Processes, including cleaning and inspection of all plant, equipment and vessels brought to site prior to arrival/use, significantly reduces or removes the risk of INNMS being introduced. The potential impact on benthic communities is therefore assessed as **negligible**, resulting in **negligible: non-significant** effects on all benthic receptors.

8.6 Mitigation Measures

No specific mitigation measures were required.

8.7 Cumulative Impacts

As detailed in Chapter 3 no cumulative effects are predicted.

8.8 Residual Impacts

Potential impacts on benthic ecology have not been assessed to have a significant effect hence it is not necessary to assess the residual effects.

8.9 Summary

The potential environmental effects on the proposed SCH development on benthic ecology were assessed in this chapter. Several benthic receptors were identified within, and in the vicinity of the proposed development, see section 8.4.4. Potential impacts were identified as a result of the construction and operations of the development, however, as detailed in Table 8.9.1 none of the impacts were assessed to be significant. This was due to the localised nature of the impacts, the quality and value of the receptors, together with the implementation of existing mitigation identified to preserve water quality during the construction operation of the development. Table 8.9.1 provides a summary of impacts, mitigation, and residual effects.

Table 8.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction							
A5.52, A5.521, SS.SMp.KSwSS, SS.SMp.KSwSS.LsacR	Habitat loss due to land reclamation and construction of new breakwater and slipway	Regional (PMF)	Low Adverse Permanent	Minor: Non-significant Adverse	No specific mitigation required	Low Adverse Permanent	Minor: Non-significant Adverse
A3.213, A3.214 IR.MIR.KR.LhypTX IR.MIR.KR.Lhyp.Ft							
Biotopes included under BSH A1.1, A1.2 and A1.4 in Table 8.4.1		Low Local	Low Adverse Permanent	Minor: Non-significant Adverse		Low Adverse Permanent	Minor: Non-significant Adverse
A5.52, A5.521 SS.SMp.KSwSS, SS.SMp.KSwSS.LsacR	Habitat impacts through sedimentation	Regional (PMF)	Low Adverse Reversible	Minor: Non-significant Adverse	No specific mitigation required	Low Adverse Reversible	Minor: Non-significant Adverse
A3.213, A3.214 IR.MIR.KR.LhypTX R.MIR.KR.Lhyp.Ft							
A5.23 SS.SSa.IFiSa		Low Local	Low Adverse Reversible	Minor: Non-significant Adverse		Low Adverse Reversible	Minor: Non-significant Adverse
A5.13 SS.SCS.ICS							
A5.52, A5.521 SS.SMp.KSwSS, SS.SMp.KSwSS.LsacR	Impacts from introduction of Invasive Non-Native Species	Regional (PMF)	Negligible Adverse Reversible	Minor: Non-significant Adverse	No specific mitigation required	Negligible Adverse Reversible	Minor: Non-significant Adverse
A3.214, A3.213 R.MIR.KR.Lhyp.Ft IR.MIR.KR.LhypTX							

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
A5.23 SS.SSa.IFiSa	Impacts from introduction of Invasive Non-Native Species	Low Local	Negligible Adverse Reversible	Negligible: Non-significant Adverse	No specific mitigation required	Negligible Adverse Reversible	Negligible: Non-significant Adverse
Biotopes included under BSH A1.1, A1.2 and A1.4 in Table 8.4.1							
A5.13 SS.SCS.ICS							
A5.52, A5.521 SS.SMp.KSwSS, SS.SMp.KSwSS.LsacR	Impacts from release of hazardous substances (Water Quality)	Regional (PMF)	Negligible Adverse Reversible	Minor: Non-significant Adverse	No specific mitigation required	Negligible Adverse Reversible	Minor: Non-significant Adverse
A3.214 R.MIR.KR.Lhyp.Ft							
A5.23 SS.SSa.IFiSa		Low Local	Negligible Adverse Reversible	Minor: Non-significant Adverse		Negligible Adverse Reversible	Minor: Non-significant Adverse
A5.13 SS.SCS.ICS							
Biotopes included under BSH A1.1, A1.2 and A1.4 in Table 8.4.1							
Operation							
A5.52, A5.521 SS.SMp.KSwSS, SS.SMp.KSwSS.LsacR	Impacts from introduction of Invasive Non-Native Species	Regional (PMF)	Negligible Adverse Reversible	Negligible: Non-significant Adverse	No specific mitigation required	Negligible Adverse Reversible	Negligible: Non-significant Adverse
A3.214 R.MIR.KR.Lhyp.Ft							

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
A5.23 SS.SSa.IFiSa		Low Local	Negligible Adverse Reversible	Negligible: Non-significant Adverse		Negligible Adverse Reversible	Negligible: Non-significant Adverse
A5.13 SS.SCS.ICS			Negligible Adverse Reversible	Negligible: Non-significant Adverse		Negligible Adverse Reversible	Negligible: Non-significant Adverse
A5.52, A5.521 SS.SMp.KSwSS, SS.SMp.KSwSS.LsacR	Impacts from release of hazardous substances (Water Quality)	Regional (PMF)	Negligible Adverse Reversible	Negligible: Non-significant Adverse	No specific mitigation required	Negligible Adverse Reversible	Negligible: Non-significant Adverse
A3.214 R.MIR.KR.Lhyp.Ft							
A5.23 SS.SSa.IFiSa		Low Local	Negligible Adverse Reversible	Negligible: Non-significant Adverse		Negligible Adverse Reversible	Negligible: Non-significant Adverse
A5.13 SS.SCS.ICS							

Key

Significant Effect
Non-Significant

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8.11 Glossary

Acronym	Definition
CD	Chart Datum
EcIA	Ecological Impact Assessment
EUNIS	European Nature Information System
GEN	General Planning Principles
GIS	Geographic Information System
INNMS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee
km	kilometres
m	metres
MHWS	Mean High Water Spring
MPA	Marine Protected Areas
NBN	National Biodiversity Network
NMP	National Marine Plan
NS	NatureScot
PMF	Priority Marine Feature
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SPA	Special Protection Areas
STW	Scottish Territorial Waters
VERs	Valued Ecological Receptors
SCH	Staffin Community Harbour
UAV	Unmanned Aerial Vehicle
BSH	Broad Scale Habitats

Chapter 9: Fish Ecology

Document Control

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Contents

9 Fish Ecology

9.1 Introduction

This chapter presents the Ecological Impact Assessment (EcIA) for fish species during the construction of the proposed Staffin Community Harbour (SCH). Fish receptors are considered in this chapter and are evaluated in the context of nature conservation legislation and relevant planning policy (see Chapter 4: Statutory Context & Planning, and Chapter 7: Biodiversity). Impacts on receptors are identified and subject to detailed impact assessment. Mitigation is proposed, cumulative impacts are considered, and finally the residual impacts and their significance are assessed.

Due to the coastal nature of the proposed development, there is potential for the construction works to result in negative impacts on fish species that spend all or part of their lifecycle in marine waters. As such the scope of this EcIA will only include relevant species which are provided legislative protection for their conservation importance. This chapter only considers the potential impacts of construction works at the harbour development site, as potential impacts of works at the borrow pit on fish receptors were previously scoped out of the EIA process.

9.2 Regulations, Guidance and Sources of Information

Regulations and guidance pertaining to ecology and biodiversity are outlined in Chapter 7: Biodiversity. This section specifically details the regulations and guidance relevant to fish ecology.

9.2.1 European and International Regulations

Species listed in Annex II of the Habitats Directive which are native to the UK should be conserved through the designation of Special Areas of Conservation (SACs). Atlantic salmon, (*Salmo salar*) present in UK waters, are listed in Annex II. Atlantic salmon are also listed in Annex V of the Habitats Directive. As such they are also defined as a species of community interest.

Following the drastic decline in European eel (*Anguilla angeuilla*) populations, the European Commission (EC) Regulation 1100/2007 was developed and adopted in 2010. The EC Regulations aims to restore European eel stocks to healthy levels. In 2010 Scotland published its own Eel Management Plan (DEFRA, 2010) under the EC Regulations.

9.2.2 National Legislation

The Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations) provide protection to SACs, including the qualifying features of these sites. Atlantic salmon associated with a SAC designation are therefore protected under the Habitats Regulations.

The Wildlife and Countryside Act 1981, and Nature Conservation (Scotland) Act 2004 provide further protection to certain fish species in Scotland. Basking sharks (*Cetorhinus maximus*) are afforded full protection under Schedule 5 of the Wildlife and Countryside Act 1981, which prohibits their deliberate killing, injuring or disturbance. The Nature Conservation (Scotland) Act 2004 makes amendments to the Wildlife and Countryside Act in Scottish waters, including the addition of 'reckless' acts to offences against protected species, which include basking sharks, making it an offence to intentionally or recklessly kill, injure, harass, or disturb the relevant species.

The Salmon and Freshwater Fisheries Act 1975 (as amended) makes it an offence to knowingly take, kill or injure, or attempt to take, kill, or injure, any salmon, trout, or freshwater fish, which is unclean or immature. The Act also makes it an offence to cause or knowingly permit to flow, or put or knowingly permit to be put, into any waters containing fish or into any tributaries of waters containing fish, any liquid or solid matter to such an extent as to cause the waters to be poisonous or injurious to fish or the spawning grounds, spawn, or food of fish.

9.2.3 Other Guidance

As discussed in Chapter 7: Biodiversity, the Joint Nature Conservation Committee (JNCC) and NatureScot have produced a list of Priority Marine Features (PMFs) to ensure Scotland's seas are managed sustainably as required by the Marine (Scotland) Act 2010. The PMF list includes multiple diadromous, elasmobranch, marine demersal and pelagic fish species, some of which are anticipated within the waters surrounding the proposed development. As detailed in Section 9.4.3, these include Atlantic salmon, sea trout (*Salmo trutta* morpha *trutta*), European eel and basking shark. Inclusion in the PMF list does not provide any additional legal protection, however due consideration must be provided in Impact Assessments, and as such all relevant PMFs are considered sensitive for the purpose of this assessment. Further guidance for sensitive species was sought from the latest Biodiversity Action Plans (BAPs).

Guidance is also provided by NatureScot's Scottish Marine Wildlife Watching Code (SNH, 2017) regarding possible mitigation measures to reduce impacts on basking sharks.

9.3 Method of Assessment

9.3.1 Baseline Methodology

To allow the identification of relevant fish receptors, and thus assess potential impacts arising from the project, the baseline environment had to be established. A desk-based review of published literature was undertaken. Sources of information consulted included:

- NatureScot interactive map facility at SiteLink (NatureScot, 2021a);
- The UK PMF list (Tyler-Walters et al., 2016);
- National Marine Plan Interactive (Marine Scotland, 2021a);
- The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) List of Threatened and/or Declining Species and Habitats (OSPAR Commission, 2017b);
- OSPAR Intermediate Assessment 2017 (OSPAR Commission, 2017a);
- Scotland's Aquaculture (Marine Scotland, 2021b)
- Scotland's Marine Atlas: Information for the National Marine Plan (Baxter et al., 2011);
- Publications and catch data from the relevant fisheries trusts; and
- Various scientific reports and journal articles regarding marine fish distribution and movements in the northeast Atlantic region.

9.3.2 Method of Assessment

The evaluation of receptors, magnitude of impact and significance evaluation follows the methodology laid out in Section 7.5 of Chapter 7: Biodiversity.

9.4 Baseline

9.4.1 Statutory Designated Sites

There are several designated sites in the Inner and Outer Hebrides that may be relevant to the proposed development area. The sites relevant to fish are shown in Table 9.4.1, along with their fish qualifying features. A description of the sites and reasons why they were or were not taken forward for assessment are provided in the remainder of this section. Volume 4: Drawing 73.09.01 shows the location of the designated sites for fish species relative to the SCH development.

Table 9.4.1: Designated Sites Relevant to Fish Interests

Site	Direction and Distance by Sea	Value	Fish Feature(s)	Taken Forward for Assessment?
Red Rocks and Longay urgent MPA	39km SW	National	Flapper skate (*Dipturus intermedius*)	Yes
Sea of the Hebrides MPA	46km SW	National	Basking shark (*Cetorhinus maximus*)	Yes
North East Lewis MPA	52km SE	National	Raitt's sandeel (*Ammodytes marinus)*	No
Little Gruinard River SAC	63km NW	International	Atlantic salmon (*Salmo salar*)	No
North Harris SAC	85km NW	International	Atlantic salmon (*Salmo salar*)	No
Langavat SAC	140km NW	International	Atlantic salmon (*Salmo salar*)	No

Red Rocks and Longay Urgent MPA

Red Rocks and Longay Urgent Marine Protected Area (MPA) was designated on the 17th of March 2021 due to its importance to the critically endangered flapper skate (*Dipterus intermedius*). A ban on all fishing and construction is now in place and it is currently Scotland's largest no-take zone. The designation will initially remain in place for 12 months, whilst a full stakeholder engagement process, public consultation and impact assessment is conducted to decide if the MPA should be made permanent. The site, in the Inner Sound of Skye around 39km from the proposed development, is the first example of a high-density egg-laying zone for the species recorded in Scotland. Surveys have shown particularly high numbers of egg cases in the areas of boulder and cobble fields that rise from the silty substrate. It is believed that flapper skate have a high level of site fidelity and relatively small ranges of only a few kilometres (Wearmouth and Sims, 2009). Adults of the species are known to primarily inhabit muddy benthic environments in waters over 100m in depth (NatureScot, 2021b). However, very little is currently understood of the species' reproductive biology, as well as the ecology and dispersal dynamics of juveniles. As such, there is the potential for some connectivity between this site of national value and the proposed development, and the site is therefore taken forward for assessment.

Sea of the Hebrides MPA

The Sea of the Hebrides MPA, designated in part for basking sharks, is located approximately 46km by sea from the proposed development. It has been shown that densities of basking sharks within the site are consistently high, but particularly in the south and east of the MPA (SNH, 2014). Basking sharks, however, are known to travel considerable distances while foraging, exceeding several hundred kilometres (Sims, 2008), and as such it is possible the qualifying features of this site may be present in the vicinity of the development. Therefore, there is potential connectivity between this site of national value, and the proposed development, so it is taken forward for assessment.

North East Lewis MPA

The North East Lewis MPA encompasses a former Raitt's sandeel fishing ground that supports an important component of a larger, patchy sandeel population on the west coast. The aim of the MPA is to aid the recovery of an otherwise declining population of Raitt's sandeels due to overfishing. More importantly, sandeels are highly nutritious and are an important component of food webs in the North Atlantic. They are the preferred prey of many seabirds, including black-legged kittiwakes and puffins, as well as certain species of seals, whales and dolphins. The well-flushed sandy seabed substrates preferred by the sandeels also form part of an internationally important assemblage of geodiversity interests present in this part of the Minch. Sandeels are largely stationary after they have settled as larvae and do not exhibit migratory behaviour. The North East Lewis MPA lies approximately 52km away by sea and so it is not anticipated that there will be any connectivity between the proposed development and the fish receptors of this designated site. It is therefore not taken forward for assessment.

Little Gruinard River SAC

The Little Gruinard River SAC is designated under the European Habitats Directive for its high-quality population of Atlantic salmon. The species has not exhibited the same level of decline here as in other river systems in the west Highlands. A catch and release scheme coupled with riparian enhancement initiatives along the river are both thought to have contributed to the health of the salmon population it supports. The river drains a serious of lochs, primarily Fionn Loch, and enters the sea in Gruinard Bay around 63km from the proposed development. It is therefore considered unlikely that salmon migrating to or from the SAC will be present in the waters surrounding the SCH construction site. As such, no connectivity is anticipated between the qualifying fish features of this site and the marine works at Staffin, and hence this site is not taken forward for assessment.

North Harris SAC

The North Harris SAC is designated in part due to its importance to Atlantic salmon, under the European Habitats Directive. Located on the west coast of Harris, the site contains numerous rivers and streams which provide spawning habitat for Atlantic salmon. However, the rivers and streams within this site all feed into the west coast of Harris, which is approximately 85km by sea from the proposed development. It is considered extremely unlikely that salmon migrating to or from the rivers within this site will be present in the waters surrounding the SCH development, on the east coast of Skye. As such, no connectivity is anticipated between the qualifying fish features of this site and the marine works at Staffin, and hence this site is not taken forward for assessment.

Langavat SAC

The Langavat SAC is designated for the conservation of Atlantic salmon and its network of rivers and lochs provides valuable spawning habitat for the species. However, this site meets the marine environment at Loch Ceann Hùlabhaig, on the west coast of Lewis. This is approximately 140km by sea from the proposed development, and on the opposite side of the Outer Hebrides. It is therefore, considered extremely unlikely that salmon migrating to or from the Langavat SAC will be present in the waters surrounding the proposed development. As such, no connectivity is anticipated between the qualifying fish features of this site and the marine works at Staffin, and hence this site is not taken forward for assessment.

9.4.2 Habitat

The proposed construction of the SCH is situated on the coastline within Òb nan Ron, located on the north-east of the Trotternish Peninsula. Òb Nan Ron itself is a small shallow bay, to the immediate south-east of Staffin Bay, which meets the southern portion of The Minch on the north-eastern coast of the Isle of Skye. The water within the bay is shallow with maximum water depths of -3.3m Chart Datum (CD). Within the vicinity of the existing slipway, water depths rarely exceed 1m. The most notable habitat features near the proposed development, with the potential to support fish receptors, are the two watercourses that flow into Staffin Bay.

The Stenscholl River, also known as the Kilmartin River, is the primary watercourse that flows into Staffin Bay, the mouth of which is located approximately 1.1km north-west along the coastline from the proposed development. The main stem of the river is approximately 13.5km in length, with numerous smaller tributaries and a succession of pools providing spawning sites for salmon and sea trout. The river is listed as a major salmon and sea trout fishery by the Skye District Salmon Board and is also recognised as such on Marine Scotland's database of Scottish Salmon Rivers (Marine Scotland, 2021a). The water classification for this watercourse is good overall, with a good overall ecology and high fish and fish barrier classifications (SEPA, 2021). A high overall fish barrier classification means that <1% of the system is inaccessible due to manmade structures and can allow for the migration of fish.

The River Brogaig is a smaller river that also flows into Staffin Bay, the mouth of which is approximately 1.8km north-west along the coastline from the proposed development. Although the river is not listed as a major fishery for either species by the Skye District Salmon Board, sea trout and the occasional salmon are known to be present, and it is included on Marine Scotland's database of Scottish Salmon Rivers (Marine Scotland, 2021a). The main stem of the river is approximately 6.7km in length and passes through several pools suitable for spawning. Although the overall water classification and overall ecology are classified as moderate, the river has high fish and fish barrier classifications (SEPA, 2021).

There are two additional Scottish Salmon Rivers identified on Marine Scotland's database that reach the sea on the north-east coast of Skye (Marine Scotland, 2021a). The River Kilmaluag enters the Minch around 9.1km north of the proposed development and is known to support runs of sea trout and occasional salmon. The River Lealt is one of the shortest known salmon rivers in Scotland, with only the first 500m of the river being accessible to migratory fish before it reaches an impassable waterfall system in Lealt Gorge. This river enters the Sound of Raasay around 9.4km south of the proposed harbour development.

9.4.3 Species Accounts

The desk-based literature review provided some data on the specific fish species inhabiting the marine waters surrounding the SCH development. It was identified that the relevant protected receptors that should be considered by this assessment include:

- Diadromous Fish, including Atlantic salmon, sea trout, and European eel; and
- Basking sharks.

Diadromous Fish Species

There are two categories of diadromous fish, anadromous and catadromous: anadromous fish (Atlantic salmon, sea trout) reproduce in freshwater rivers but spend the rest of their adult lives in salt water, while catadromous fish (European eel) reproduce in saltwater and spend the rest of their lifecycle in freshwater.

9.4.3.1.1 Atlantic Salmon

Atlantic salmon are found across temperate and Arctic regions of the northern hemisphere and are widely distributed in Scotland's river systems. Salmon are anadromous, hatching and developing through their juvenile life stages of alevin, fry and parr in freshwater, before migrating to sea as smolts. Smolts begin to leave river systems in the late spring, with most having reached the sea by June (NatureScot, 2021c). When they have undergone smoltification and reached the marine environment they are referred to as post-smolts. Once sexual maturity is reached, they return to their native rivers to spawn (Godfrey et al., 2014). Migratory routes of Atlantic salmon to spawning sites are poorly understood, since returns to the Scottish coast occur from a range of directions. However, the greatest returns are expected from northerly and westerly marine waters, given the distribution of marine feeding areas (Malcolm, Godfrey & Youngson, 2010).

In line with the trend across much of the West Highlands, stocks of salmonids experienced a dramatic decline during the 1980s and 90s (SFT, 2010). Stocks have rebounded somewhat since this low and have undergone a sustained recovery, although rod catch data for Skye's rivers shows that this growth appears to have levelled off in the last decade and may have started to reverse somewhat (SWRFT, 2020). The results of surveys undertaken as part of Marine Scotland Science's National Electrofishing Programme of Scotland were used to establish the distribution and relative abundance of juvenile salmonids in the rivers around Skye. Atlantic salmon are known to return to the Stenscholl River annually, and all five of the survey sites chosen to best represent the entirety of this river system were found to have fry and parr present (SWRFT, 2020). The relatively high densities of juveniles found here suggests that this river retains its own discrete wild salmon population and therefore represents one of the most important salmon spawning grounds on the island. Salmon fry and/or parr were not identified in the River Brogaig during this survey, and it was noted that due to the watercourse filtering through the cobble beach, diadromous fish may have difficulty entering the river except during high spate flows.

Due to the presence of salmon fry and/or parr, the shores to the east of Staffin Bay, including Òb nan Ron, may provide a migratory route for salmon to return to spawning sites situated in the Stenscholl River and River Brogaig. However, the exact routes of returning salmon to rivers systems around Skye are unknown. The adult Atlantic salmon spawning season usually occurs between November to December, but in larger river systems it may extend from October to late February (NatureScot, 2021c). Data from 2004 to 2019 indicates that less than 50% of returning salmon are grilse, which spend only one year at sea and are therefore smaller and lighter than those that spend multiple years feeding before returning to their natal river systems (SWRFT, 2020).

Knowledge of the swimming depth of adult Atlantic salmon in Scottish waters is limited, but it is suggested extended periods are spent at shallow depth between 0 - 40m (Malcolm, Godfrey & Youngson, 2010). Studies in Norwegian fjords identified that in general, migrating post-smolts utilise water depths which are predominantly <10m (Finstad et al., 2005). This is supported by a further study in Norwegian waters that indicated 49-99% of swimming time was at 1-3 m depth during the day (Davidsen et al., 2008). No data for post-smolt diving depth in Scottish waters exists, although it is assumed to be similar to the individuals studied in Norwegian waters (Malcolm et al., 2010).

9.4.3.1.2 Sea Trout

Like Atlantic salmon, sea trout may spend a variable number of years in freshwater habitats prior to migrating. Sea trout post-smolts may stay within estuaries for extended periods of time, prior to moving into the wider sea (Malcolm et al., 2010). Research on the west coast of Scotland concluded sea trout post-smolts move from rivers to sea lochs/estuaries between April and early June, prior to moving to the open sea in late June to July, eventually returning in August to September (Pemberton, 1976). This study, however, was very localised with overall knowledge of post-smolt migratory movement limited (Johnstone et al., 1995; Middlemas et al., 2009; NatureScot, 2021d). There is some evidence that sea trout smolt migration is somewhat synchronised with that of salmon, as they are thought to respond to the same environmental cues (Harvey et al., 2020). Sea trout post-smolts in a Norwegian fjord system were found to prefer relatively shallow waters during the early marine phase of their lifecycle (Lyse, Stefansson and Ferno, 1998). Another study from the Loch Ewe identified that most fish swam within 10m of the surface waters, although dives to 20m were also observed (Malcolm et al., 2010).

Immature sea trout, regionally called finnock, are young sea trout that return to freshwater after only one year at the sea. These are common in Scottish estuaries, where they move in and out with the tides to feed. Finnock may move to large freshwater bodies to over-winter, prior to returning to sea during the spring months (Malcolm et al., 2010). Proportions of sea trout returning as finnock to Skye varies between years, but has on average, been just under 50% over the last decade (SWRFT, 2020). Rod catch data from rivers in Skye and the Small Isles shows that reported sea trout numbers from 2016 to 2019 were the lowest on record over a sustained period (SWRFT, 2020).

The movement of the adult fish into rivers is expected to occur with high tide and returns to sea in autumn during ebb tide, but no conclusive data is available (Malcolm et al., 2010). The mean swimming depth of adult sea trout depend on season, water temperature, habitat and time of day. However, research in Norwegian fjords concluded a mean swimming depth of mature sea trout to be 1.7m below the surface. Lower swimming depths generally occurred during night-time (Eldøy et al., 2017). Knowledge of swimming depth in Scottish waters is limited but estimated to be at <3m below surface (Malcolm et al., 2010). Knowledge of overall swimming routes within estuaries in Scottish waters is poorly understood (Malcolm et al., 2010).

9.4.3.1.3 European Eel

The European eel is a critically endangered catadromous fish which is widely distributed across European freshwater and estuarine habitats (Daverat et al., 2006). The lifecycle consists of 4 stages: glass eel, elver (juveniles), yellow eel and silver eel (adults). Upon reaching sexual maturity, adults undertake an oceanic migration to the Sargasso Sea, a gyre in the north Atlantic off the coast of North America (Righton et al., 2016). The adults die once they have spawned, and it is thought that the fertilised eggs then drift eastwards in the Gulf Stream. The larvae hatch during this period and subsequently metamorphose into glass eels upon reaching the European continental shelf (NatureScot, 2021e). The juveniles then make their way through estuarine habitats before returning to freshwater river systems where they mature.

Very little is understood about the exact route taken by adults during their outward migration from Europe to the Sargasso Sea. In northern mainland Europe, adult eel migratory peak rates are reported from August to October (Malcolm et al., 2010). In Scotland, data from the River Dee shows adults beginning to leave freshwaters in June, peaking in August or September, but continuing to October (Malcolm et al., 2010). However, wide variations in migratory timings are recorded, possibly due to temperature (Vøllestad et al., 1986), rainfall or lunar cycles (Lowe, 1952; Malcolm et al., 2010).

Juveniles are expected to arrive in Europe earliest in the north and west, arriving in September off Shetland and the Western Isles. The migration continues for several months after the mid-winter peak, although glass eels may arrive throughout the year (Tesch, Westerberg & Karlsson, 1990). Upon arrival, some individuals may enter the freshwater systems within their first year of arrival, while some stay within coastal and estuarine waters until matured (Daverat et al., 2006). Their movement to freshwater systems appears to be seasonal, possibly driven by water temperature; with temperatures rising between 12-14°C increasing upstream movement (Acou et al., 2009), though river flow also influences migration (Edeline et al., 2006).

Since the 1970s, the population of European eel has declined up to 99% in some parts of its distribution range (Correia et al., 2018). No data is available on the presence of eels in the previously mentioned river systems close to the SCH development. However, large numbers of elvers were found during electrofishing surveys at rivers around Skye, including at the Kilmaluag River, which reaches the sea at Kilmaluag Bay around 9.3km north-west of Staffin harbour (SWRFT, 2020) It is therefore likely that at least small numbers of the species utilise the rivers opening into Staffin Bay and therefore may also be present in the marine environment around the harbour during migration.

Swimming depth of juvenile and adult eels in Scotland are uncertain. In the North Sea, studies suggest swimming depths of 1-17m (10m average) below the surface. The study identified that eels rarely spend time in deeper parts of the water column due to it being too cold (Palstra & van den Thillart, 2010). No data regarding swimming depth for juvenile eels is available.

Basking Shark

The basking shark is the largest coastal-pelagic shark found within Scottish waters, growing to over 11 meters in length and weighing around 4 tonnes (Sims, 2008). The species is a ‘ram filter-feeding shark’ and feeds in areas of high plankton concentrations. Basking sharks are also selective zooplankton feeders, with research showing a preference for high energy calanoid copepods such as *Calanus finmarchicus* (Sims, Fox, & Merrett, 2005). Feeding generally occurs from surface waters to depths of 320m (Skomal, Wood, & Caloyianis, 2004). Monitoring of the species feeding behaviour shows that basking sharks aggregate in coastal waters of continental shelfs dominated by transitional waters, where steep bathymetry combined with strong ocean currents result in areas of high phytoplankton and zooplankton density (Drewery, 2012).

In Scottish waters, basking sharks are particularly prevalent on the west coast during summer months, with highest densities observed in the Sea of the Hebrides (Paxton, Scott, & Rexstad, 2014). Although not expected to be present in very high numbers, the species also utilises the habitats of the Minch to the north and the Sound of Raasay and Inner Sound to the east of Skye (Marine Scotland, 2021c). There have been some sightings in the coastal waters within 5km of the proposed harbour development, including a very small number in Staffin Bay (NBN, 2021). However, the relatively shallow waters around the Harbour do not provide ideal habitat for the species, and it is considered unlikely that basking shark will be present in the immediate vicinity of the SCH development.

Seasonal oceanic cycles cause fluctuating phytoplankton and zooplankton densities in Scottish waters. These variations in phytoplankton and zooplankton availability make basking sharks a highly migratory animal, with no resident populations in UK waters (Sims et al., 2003). Therefore, populations of basking sharks are not anticipated near Skye during the winter when phytoplankton and zooplankton levels are low (Drewery, 2012). No population estimates for basking sharks in Scotland exist and wider aspects of their ecology including reproduction in Scottish territories is relatively unknown (Drewery, 2012). However, research by NatureScot and recent recordings of potential courtship behaviour indicates basking sharks may gather in large numbers of Scotland's Western coast to potentially mate, though data is still insufficient to fully conclude mating behaviour in basking sharks in Scottish waters (Hawkes et al., 2020).

9.4.4 Aquaculture

Two major aquaculture developments are present off the north-east coast of Skye (Marine Scotland, 2021b). Culnacnoc Salmon Farm and Invertote Salmon Farm, both operated by Organic Sea Harvest Ltd, are located approximately 8km and 11km respectively by sea to the south of the proposed SCH development. The first harvest of the organic Atlantic salmon from the farms was due in the spring of 2021.

The immobile nature of the fish receptors associated with these aquaculture developments and the geographic separation from the development site make it unlikely that they will be affected by construction activities and as such they will not be considered as a receptor. However, it is anticipated that the overall project will deliver positive socio-economic effects for aquaculture due to the increased capacity and ease of access to the marine environment it will confer, as discussed in Chapter 18: Population and Socio-Economics.

9.4.5 Shellfish

As discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, there are five shellfish water protected areas on the Isle of Skye, designated under The Water Environment (Shellfish Water Protected Areas: Designation) (Scotland) Order 2013. These areas are used for commercial shellfish cultivation and their water quality is regularly monitored by SEPA. However, as discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, these are not taken forward as receptors due to the lack of potential connectivity with the SCH development because of their geographic separation. There are no other statutory designated sites protected for their shellfish features with potential connectivity to the development. As detailed in Chapter 8: Benthic Ecology, the benthic surveys did not find evidence of any shellfish species of conservation importance within the immediate area of the SCH development.

9.4.6 Identification of Receptors

Table 9.4.2 provides a summary of the fish receptors relevant to the proposed development which are taken forward for assessment, together with their assigned ecological value as described in Table 7.5.1 within Chapter 7: Biodiversity.

Table 9.4.2: Summary of Identified Fish Ecology Receptors and their Ecological Value

Receptor	Ecological Receptor Value	Justification
Red Rocks and Longay urgent MPA	National	National designation under the Marine (Scotland) Act (2010)
Sea of the Hebrides MPA	National	National designation under the Marine (Scotland) Act (2010)
Atlantic Salmon (*Salmo salar)*	International	Protected species under the Habitats Directive Annex II Species, Priority Marine Feature (PMF)
Sea Trout (*Salmo trutta* morpha *trutta*)	National	Priority Marine Feature (PMF)
European Eel (*Anguilla angeuilla*)	International	IUCN Red List "Critically Endangered" species, Priority Marine Feature (PMF)
Basking Shark *(Cetorhinus maximus*)	National	Protected under the Wildlife and Countryside Act 1981 Schedule 5, Priority Marine Feature (PMF)

9.5 Impact Assessment

9.5.1 Construction

The SCH development may result in a potential variety of direct and indirect impacts on the identified fish receptors. The assessment of the impacts follows the methodology outlined in Chapter 7: Biodiversity and assesses the potential impacts resulting from the construction and operational phases of the project as outlined in Chapter 2: Project Description. Underwater noise resulting from construction activities is a common potential impact on fish receptors in harbour developments. No construction activities known to generate significant noise levels, such as piling, dredging, rock breaking or underwater drilling, will take place in the marine environment during the construction of the SCH. As such, noise impacts have not been considered further.

9.5.1.1 Obstruction of Migration

The design of the SCH development includes a new breakwater which will extend approximately 175m from the shore at its furthest point. The existing breakwater reaches approximately 65m from the shore, and so the new development will result in an additional 110m of structure extending into Òb nan Ron. As discussed in Section 9.4.3, Òb nan Ron may lie in the migratory pathways of diadromous fish, principally Atlantic salmon, sea trout and European eel. There is therefore, the potential that the new breakwater could present an obstacle to diadromous fish migration in the marine environment.

Adult Atlantic salmon, sea trout and European eel are all known to swim at greater depths than juveniles, and so it is not anticipated the new breakwater will present a major obstacle to their migratory routes. Juveniles of these species are known to swim through shallow waters during parts of the marine stage of their migration. Shoreline modifications, including piers and seawall armouring have been found to have a negative impact on the presence and feeding of juvenile salmonid species (Munsh et al., 2014). These impacts are understood to be felt more acutely along heavily developed stretches of coastline (Bulleri and Chapman, 2010). Given the distribution of their marine feeding grounds it is assumed that Atlantic salmon and sea trout post-smolts will head in northerly and westerly directions when leaving Scottish rivers, with adults returning along largely the same routes. As such, it is anticipated that individuals leaving the Stenscholl River and River Brogaig into Staffin Bay may not travel south-east along the coastline past the SCH and instead head north to the waters of the Minch. The proximity of the river mouths to the development and lack of clear understanding of migratory pathways means there is still the potential for migrating post-smolts to be present around the SCH. In addition, those migrating to northern feeding grounds from watercourses to the south of the development, such as the River Lealt, may also pass through Òb nan Ron along their journey.

The new breakwater will be largely constructed on a rocky outcrop that juts out into Òb nan Ron, which already forms a natural obstacle to fish movement along the coast. An approximately 30m wide section in the centre of the outcrop is submerged at higher tide states, which may allow the passage of a small numbers of individuals between Òb nan Ron and Breun Phort (see Volume 4: Drawing A5378). This passage is unlikely to form the principal route for fish migrating through Òb nan Ron, due to its tidal nature, the high level of wave action and the surrounding coastal topography. In addition, the rocky outcrop of Rubha Garbaig extends into the sea to the south-east and is expected to force any post-smolts travelling from the south further out to sea away from Breun Phort and this shallow tidal passage. It is therefore anticipated that post-smolts primarily utilise the shallow, approximately 80m wide, passage between the Rubha Garbaig outcrop and another area of exposed rock to the north-east. There is also a width of shallower water on the north-east side of this exposed rock before the sea floor drops sharply. Neither of these routes will be directly blocked by the development.

The seaward arm of the new breakwater hooks around to the west and could potentially act to divert any post-smolts travelling from the north into the Harbour area rather than continue south down the coastline. However, this is not anticipated to effect large numbers of individuals, as the water remains at a depth of <10m until around 330m from the shore and it would only be those individuals swimming within around 80m of the coast that would have a high chance of entering the mouth of the Harbour. It is also not expected that fish would get stuck within the harbour for extended periods of time, as it is most likely they would follow the inner edge of the breakwater around until they either reached the shore or the tip of the breakwater, allowing them to continue their migration. Telemetry studies of smolts migrating down the River Dee have shown that mortality is generally very low in the harbour area compared with the upper reaches of the river, despite the presence of several docks that terminate in dead-ends (The River Dee, 2020). The majority of smolts passed through the harbour areas relatively quickly, indicating they are capable of navigating around or out of such anthropogenic structures during their migration. The existing breakwater in Òb nan Ron also has a westerly-curved tip, albeit on a smaller scale and closer to the shore, which migrating diadromous fish may already have to navigate around. The potential detours taken by post-smolts navigating past the development will be of a relatively short distance and thus are not anticipated to have a major energetic impact on individuals.

Studies have shown that post-smolts in the marine environment rely partly on coastal currents to aid the early marine phase of their migration to foraging grounds (Thorstad et al., 2012). The results of the hydraulic modelling assessment, see Volume 3: Appendix P.1, show that there will be very little change in the speed and direction of the currents in and around Òb nan Ron as a result of the development, and so should not impact on the ability of post-smolts to pass through the area. The results also revealed that the currents close to shore where the harbour mouth would be situated are not particularly strong due to the coastal topography to the north and south. This will also limit the potential for juvenile fish entering and getting blocked in the Harbour during their migration.

The shallow water depth, availability of alternative routes and low energetic cost of entering the harbour area mean the SCH development is unlikely to pose a major obstacle to migrating fish. In addition, the relatively undeveloped nature of the coastline around the SCH development site means it will not be adding to any existing pressures or obstructions to the migration pathways of diadromous fish species. Therefore, the potential effect is assessed as **negligible** and **permanent**, and the resulting effect on Atlantic salmon and European eel of **International** value is **minor: non-significant**. The effect on sea trout of **National** value is **negligible: non-significant**.

As previously discussed, it is extremely unlikely basking shark or flapper skate will be present in the vicinity of the development due to the shallow water depths, and so it is not anticipated it will bear any impact on the movement pattens of either species. As such, the potential for the development to impact on movements of basking shark, the areas of Sea of the Hebrides MPA designated for basking shark and on Red Rocks and Longay urgent MPA is assessed as **no change**.

Water Quality

Pollution incidents are the most likely source of water quality issues during construction. The accidental release of hydrocarbons and other hazardous substances in the event of a loss of containment during the construction works may result in contamination of the marine environment, potentially affecting fish. As detailed in Table 17.5.1 in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, there are several potential sources of loss of containment events during the construction of the SCH development, including from plant and fuel stores. The assessment assumes that all vehicles and equipment are well maintained, operated by suitably trained personnel and with standard pollution prevention procedures.

Spills or pollution events involving high volumes or concentrations of hazardous substances can lead to acute impacts on fish receptors over short time periods, including mortality (Hutchinson et al., 2013; Wenger et al., 2017). Alternatively, spill events may cause chronic impacts, where pollutants affect species physiology over extended periods while accumulating in organic tissue. This may allow contamination to pass through the wider ecosystem and impact multiple trophic levels (Hamilton et al., 2017; Oleksiak, 2008). Effects including physiological harm, behavioural disturbance, reduced fertility, and increased mortality in fish have been reported after both short and long-term exposure to contaminants following a pollution event. The studies also found that the juveniles of many species are more vulnerable to pollution events than adults, requiring lower dosages for effects to occur (Costa et al., 2011; Limburg & Waldman, 2009; Wenger et al., 2017).

In Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the effect of contamination from hazardous substances on water quality is identified as negligible to minor. The source of any spill is expected to be localised and the concentration of the hazardous substance will reduce rapidly with distance as it disperses in the marine environment. The adoption of the primary and tertiary mitigation measures and standard industry best practice techniques for pollution prevention identified in Chapter 17 significantly reduces or removes the risk of a spillage event occurring and reaching the sea.

As discussed in Section 9.4.3, juvenile diadromous fish, and occasionally adults, may be found in the shallow waters in the immediate vicinity of the SCH development when migrating. Whilst the impact of a spillage event is very unlikely to give rise to any negative effects at the population-level, individuals that are present in the immediate vicinity following a spill have the potential to be exposed to high concentrations of hazardous substances. Atlantic salmon and European eel are of **International** value. The potential effect on these species is assessed as **low, short-term**, and **reversible**, and the resulting effect is **moderate: significant**.

As detailed in Section 9.4.3, basking shark and flapper skate are understood to inhabit areas that are significantly deeper than the very shallow waters present at Òb nan Ron surrounding the SCH development. It is therefore considered extremely unlikely that these species will be negatively impacted by water quality issues following a spill, as the concentration of the hazardous substance will have reduced sufficiently in concentration by the time it reaches these deeper waters further offshore. Red Rocks and Longay Urgent MPA, basking shark and Sea of the Hebrides MPA are of **National** value. The potential effect is therefore assessed as **negligible**, **short-term**, and **reversible**, and the resulting effect is **negligible: non-significant**.

It is acknowledged that litter, including plastics, can have a detrimental effect on the feeding, mobility and growth of fish if ingested or if they become entangled (Markic et al., 2019; Sigler, 2014). As discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the volume of litter generated by the construction phase of the development with the potential to enter the sea is anticipated to be very small. However, even this small volume would contribute to the wider issue of marine litter and thus every effort will be made to avoid this occurring. Hence, primary and tertiary mitigation has been identified in Chapter 17 to reduce the likelihood of litter escaping into the marine environment. The potential effect for all fish receptors is assessed as **negligible** and **permanent**, and the resulting effect is **negligible** to **minor: non-significant**.

9.5.2 Operations

The only foreseeable impacts on fish receptors during the operational phase of the SCH development may arise from water quality issues caused by the release of hazardous materials or litter into the marine environment. The accidental release of hydrocarbons and other hazardous substances in the event of a loss of containment during operations may result in contamination of the marine environment, potentially affecting fish. As detailed in Section 17.5.2.6 of Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, there are several potential sources of loss of containment events during operations at the SCH development, including from fuel storage and the refuelling of vessels. The assessment assumes that all vehicles and equipment are well maintained, operated by suitably trained personnel and with standard pollution prevention procedures.

As discussed in Section 9.4.3, juvenile diadromous fish, and occasionally adults, may be found in the shallow waters in the immediate vicinity of the SCH development when migrating. Whilst the impact of a spillage event is very unlikely to give rise to any negative effects at the population-level, individuals that are present in the immediate vicinity following a spill have the potential to be exposed to high concentrations of hazardous substances. As previously mentioned, the primary and tertiary mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will greatly reduce the risk of a spill event occurring and reaching the marine environment. Atlantic salmon and European eel are of **International** value. The potential effect on these species is assessed as **low, short-term**, and **reversible**, and the resulting effect is **moderate: significant**.

As detailed in Section 9.4.3, basking shark and flapper skate are understood to inhabit areas that are significantly deeper than the very shallow waters present at Òb nan Ron surrounding the SCH development. It is therefore considered extremely unlikely that these species will be negatively impacted by water quality issues following a spill, as the concentration of the hazardous substance will have reduced sufficiently in concentration by the time it reaches these deeper waters further offshore. Red Rocks and Longay Urgent MPA, basking shark and Sea of the Hebrides MPA are of **National** value. The potential effect is therefore assessed as **negligible**, **short-term**, and **reversible**, and the resulting effect is **negligible: non-significant**.

As discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the volume of litter generated by the operational phase of the development with the potential to enter the sea is anticipated to be very small. However, even this small volume would contribute to the wider issue of marine litter and thus every effort will be made to avoid this occurring. Hence, primary, and tertiary mitigation has been identified in Chapter 17 to reduce the likelihood of litter escaping into the marine environment. The potential effect for all fish receptors is therefore assessed as **negligible** and **permanent**, and the resulting effect is **negligible** to **minor: non-significant**.

9.6 Mitigation Measures

Mitigation measures aim to prevent or reduce any negative effects on the ecological receptors identified. As detailed in Chapter 3: Methodology, standard construction practices such as Guidance on Pollution Prevention are assumed to be applied. Even where the overall impact significance is minor in EIA terms, mitigation should still be implemented to minimise negative effects and maintain high environmental working standards.

Potential significant impacts were identified for fish resulting from water quality issues associated with the loss of containment of hazardous substances. Secondary mitigation measures outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes address the prevention of spillages and the prompt administration of spillage procedures. With this mitigation in place, the extent of a spillage event and the risk of one occurring will be substantially reduced.

9.7 Cumulative Impacts

As detailed in Chapter 3: Methodology, three offshore projects which have potential cumulative effects on fish species were scoped into the assessment. There is the potential that the construction phases of each of these projects may overlap with that of the SCH. However, it is not anticipated that any of the effects associated with the potential impacts identified in Section 9.5 will increase as a result of cumulative impacts.

Diadromous fish species in the marine environment around the SCH are not anticipated to utilise the stretches of coastline around any of the other developments during their migrations. As such, there will be no additive pressure on their migratory routes caused by multiple developments. There will be a slight increase in the risk of loss of containment or pollution incidents impacting fish receptors during the construction phases of each of the projects. However, as discussed in Section 9.5.2 any potential impacts associated with the SCH are expected to be very localised, and due to the large distances between the projects it is very unlikely the same fish receptors would be impacted by water quality issues arising from another development. Therefore, the cumulative impact is assessed as **negligible** to **minor: non-significant**.

9.8 Residual Effects

Impacts on fish arising from water quality issues associated with the spillage of hazardous substances into the marine environment during operations or construction may be significant. The implementation of secondary mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will reduce the impact magnitude on fish from **low** to **negligible** giving rise to a **minor: non-significant** effect.

9.9 Summary

In total, two significant effects on fish receptors were identified from the construction phase of the SCH development, and two during the operational phase. All of these were associated with the potential for water quality impacts as a result of spillage events. Through the adoption of effective and proportional secondary mitigation during the construction and operation of the development, all effects are reduced to non-significant.

Table 9.9.1 summarises the effects assessed for fish receptors, the mitigation measures identified to control them and the significance of residual effects. Significant effects are highlighted in yellow.

Table 9.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction							
Red Rocks and Longay urgent MPA	Disruption of migration or movement patterns caused by the new breakwater extending into Òb nan Ron.	National	None	No Change	No additional mitigation required	None	No Change
	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.		Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse
Sea of the Hebrides MPA	Disruption of migration or movement patterns caused by the new breakwater extending into Òb nan Ron.	National	None	No Change	No additional mitigation required	None	No Change
	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.		Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Atlantic Salmon	Disruption of migration or movement patterns caused by the new breakwater extending into Òb nan Ron.	International	Negligible Adverse Permanent	Minor: Non-Significant Adverse	No additional mitigation required	Negligible Adverse Permanent	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.		Low Adverse Short-term Reversible	Moderate: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
Sea Trout	Disruption of migration or movement patterns caused by the new breakwater extending into Òb nan Ron.	National	Negligible Adverse Permanent	Negligible: Non-Significant Adverse	No additional mitigation required	Negligible Adverse Permanent	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.		Low Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse
European Eel	Disruption of migration or movement patterns caused	International	Negligible Adverse Permanent	Minor: Non-Significant Adverse	No additional mitigation required	Negligible Adverse Permanent	Minor: Non-Significant

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
	by the new breakwater extending into Òb nan Ron.						
	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.		Low Adverse Short-term Reversible	Moderate: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
Basking Shark	Disruption of migration or movement patterns caused by the new breakwater extending into Òb nan Ron.	National	None	No Change	No additional mitigation required	None	No Change
	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.		Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Operations							
Red Rocks and Longay urgent MPA	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.	National	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse
Sea of the Hebrides MPA	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.	National	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse
Atlantic Salmon	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Sea Trout	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.	National	Low Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse
European Eel	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
Basking Shark	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.	National	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter.		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse

Key

	Significant Effect
	Non-Significant Effect

9.10 References

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9.11 Glossary

Acronym	Definition
BAP	Biodiversity Action Plan
CD	Chart Datum
EC	European Commission
EcIA	Ecological Impact Assessment
EIAR	Environmental Impact Assessment Report
GEN	General Planning Principle
JNCC	Joint Nature Conservation Committee
km	Kilometres
m	Metres
MHWS	Mean High Water Springs
MPA	Marine Protected Area
NMP	National Marine Plan
PMF	Priority Marine Feature
SAC	Special Area of Conservation
SCH	Staffin Community Harbour

Chapter 10: Marine Mammals

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Contents

10 Marine Mammals

10.1 Introduction

This chapter presents the marine mammal Ecological Impact Assessment (EcIA) for the construction and operational phases of the proposed Staffin Community Harbour (SCH) development. Marine mammal receptors are considered in this chapter and are evaluated in the context of nature conservation legislation and relevant planning policy (see Chapter 4: Statutory Context & Planning and Chapter 7: Biodiversity). Impacts on receptors are identified and subject to detailed impact assessment. Mitigation is proposed, cumulative impacts are considered, and finally the residual impacts and their significance are assessed.

10.2 Regulations, Guidance and Sources of Information

As discussed in Chapter 7, international and national legislation assists in identifying sensitive marine mammal species whose presence on a site should be given greater consideration during assessment. This legislation also allows for designation of sites for marine mammal interests.

10.2.1 European and International Regulations

All species of cetacean occurring in UK waters are listed in Annex IV of the Habitats Directive as European Protected Species (EPS), where the deliberate killing, disturbance or the destruction of these species or their habitat is prohibited.

Species listed in Annex II of the Habitats Directive and which are native to the UK, should be conserved through the designation of Special Areas of Conservation (SACs). Two species of cetacean present in UK waters are listed in Annex II; the bottlenose dolphin (*Tursiops truncatus*) and the harbour porpoise (*Phocoena phocoena*) along with two species of pinniped: the grey (*Halichoerus grypus*), and common (*Phoca vitulina*) seals. Since 1994, all SACs in combination with Special Protection Areas (SPAs), comprise the UK contribution to the Natura 2000 ecological network of protected sites.

Although not afforded the strict protection of EPS through the Habitats Directive, pinniped species occurring in UK waters are listed in Annex V of the Habitats Directive, and as such are defined as species of community interest.

10.2.2 National Legislation

All cetaceans are listed under Schedule 2 of the Habitats Regulations, meaning it is an offence to:

- Deliberately capture or kill a wild animal of a European protected species;
- Deliberately disturb any such animal;
- Deliberately take or destroy the eggs of such an animal; or
- To damage or destroy a breeding site or resting place of such an animal.

The Wildlife and Countryside Act 1981 and Nature Conservation (Scotland) Act 2004 provide further protection to marine mammals. Cetaceans are listed in Schedule 5 of the Wildlife and Countryside Act 1981, which prohibits their deliberate killing, injuring or disturbance. The Nature Conservation (Scotland) Act 2004 makes amendments to the Wildlife and Countryside Act in Scottish waters, including the addition of 'reckless' acts, to offences against species protection. This makes it an offence to intentionally, or recklessly disturb a cetacean.

The Marine (Scotland) Act 2010 makes it an offence to disturb seals at any designated haul out location and to kill, injure or take seals anywhere, regardless of whether there is a designation or not. Exemptions may be made under licence or for welfare reasons.

10.2.3 Other Guidance

As discussed in Chapter 7: Biodiversity, the Joint Nature Conservation Committee (JNCC) and NatureScot have produced a list of Priority Marine Features (PMFs) to ensure Scotland's seas are managed sustainably, as required by the Marine (Scotland) Act 2010. Thirteen cetacean species, and both grey and common seals are included in the PMF list (Tyler-Walters et al., 2016). Although inclusion in the PMF list does not provide any additional legal protection, consideration to PMFs must be provided in Impact Assessments, and as such all PMFs are considered sensitive for the purpose of this assessment.

Guidance is provided by NatureScot regarding possible mitigation measures to reduce impacts on marine mammal species in their Scottish Marine Wildlife Watching Code (SNH, Undated). Marine Scotland's The Protection of Marine EPSs from Injury and Disturbance: Guidance for Scottish Inshore Waters (Marine Scotland, 2020) was also considered when conducting this impact assessment.

10.3 Assessment Methodology

10.3.1 Baseline Methodology

A desk-based literature search was undertaken to inform the characterisation of the existing marine mammal baseline conditions. The following data sources were consulted to aid in identifying and assessing the marine mammals which may be utilising the proposed development area, and surrounding waters, including gaining information on population sizes, seasonal trends, foraging characteristics, and associated designated sites:

- NatureScot interactive map facility at SiteLink (NatureScot, 2021);
- Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters (Marine Scotland Science, 2020);
- The UK PMF list (Tyler-Walters et al., 2016);
- National Marine Plan Interactive (Marine Scotland, 2021);
- Management Units for cetaceans in UK waters (IAMMWG, 2015);
- Scientific Advice on Matters Related to the Management of Seal Populations: 2017& 2020 (SCOS, 2017; 2020)
- Atlas of Cetacean Distribution in North-West European Waters (Reid, Evans, & Northridge, 2003); and
- Various scientific reports and journal articles regarding marine mammal distribution and movements in the north-east Atlantic region.

Following anecdotal accounts of seals utilising the area, it was decided to watch for seals in conjunction with the vantage point otter surveys carried out at the Harbour development site (Volume 3: Appendix K2). These were conducted by a suitably experienced ecologist and consisted of four dawn and four dusk watches, each approximately 2 hours long. Any sightings of individuals hauling out and those at sea in the waters adjacent to the development site were noted.

10.3.2 Method of Assessment

The evaluation of receptors, magnitude of impact and significance evaluation follows the methodology laid out in Chapter 7: Biodiversity, Section 7.5.

10.4 Baseline

10.4.1 Statutory Designated Sites

There are several designated sites in the Inner and Outer Hebrides that may be relevant to the proposed development area. The sites relevant to marine mammals are shown in Table 10.4.1, along with their marine mammal qualifying features. A description of the sites and reasons why they were or were not taken forward for assessment are provided in the remainder of this section. Volume 4: Drawing 73.09.01 shows the location of the designated sites for marine mammal species relative to the SCH development.

Table 10.4.1: Designated Sites Relevant to Marine Mammal Interests

Site	Direction and Distance by Sea	Value	Marine Mammal Qualifying Feature(s)	Taken Forward for Assessment?
Inner Hebrides & the Minches SAC	Development overlaps site	International	• Harbour porpoise (*Phocoena phocoena*)	Yes
Ascrib, Isay, & Dunvegan SAC	29km W	International	• Common seal (*Phoca vitulina*)	Yes
Sea of the Hebrides MPA	46km SW	National	• Minke whale (*Balaenoptera acutorostrata*)	Yes
North East Lewis MPA	52km N	National	• Risso's dolphin (*Grampus griseus*)	Yes
Monach Islands SAC	102km W	International	• Grey seal (*Halichoerus grypus*)	Yes
Sound of Barra SAC	104km SW	International	• Common seal (*Phoca vitulina*)	No
Treshnish Isles SAC	150km S	International	• Grey seal (*Halichoerus grypus*)	No
North Rona SAC	165km NNE	International	• Grey seal (*Halichoerus grypus*)	No
South East Islay Skerries SAC	262km S	International	• Common seal (*Phoca vitulina*)	No

10.4.1.1 Inner Hebrides & the Minches SAC

The Inner Hebrides & the Minches SAC is designated for the conservation of harbour porpoise, under the European Habitats Directive. The area is of key importance to the UK as part of the harbour porpoise management unit. The Inner Hebrides & the Minches SAC is estimated to support approximately 5,438 individuals for at least part of the year, equating to approximately 32% of the management unit (SNH, 2016). It is suggested that these areas, relative to the rest of the continental shelf, include the best habitat for harbour porpoises, and have been used consistently by the species over the last two decades (SNH, 2016). The Inner Sound, west of Mull, the Sea of the Hebrides and the Sound of Sleat were identified by Embling et al. (2010) as areas with the highest predicted density of harbour porpoises in the seas around western Scotland. Marubini et al. (2009) confirmed these findings and found that the marine areas around the Small Isles, in the Inner Sound and north of Skye as have the highest modelled density of harbour porpoises. Further details on harbour porpoises are provided in Section 10.4.2.1.

The new breakwater associated with the proposed development will partly extend into this protected site. Hence, there is potential for construction activities and operations to impact on the designated features of the SAC and the site has therefore been taken forward for assessment

10.4.1.2 Ascrib, Islay, & Dunvegan SAC

The Ascrib, Isay, & Dunvegan SAC is designated in part due to its importance to the UK common seal (*Phoca vitulina*) population, under the European Habitats Directive. The complex of skerries, islets, undisturbed mainland shores and offshore islands in the north-west of Skye consistently support a breeding colony of the common seal which represents one of the larger discrete colonies in the UK, holding around 2% of the UK population (JNCC, 2018).

All three groups of islets that make up this site are within 50km by sea of the SCH development site, which is the known foraging range of common seals (SCOS, 2017). The Ascrib islands to the west of the Trotternish peninsula are the closest group, at around 29km from the development by sea. This site is therefore taken forward for assessment as it is determined there is potential for connectivity. Further details on common seals are provided in Section 10.4.2.2.

10.4.1.3 Sea of the Hebrides MPA

The Sea of The Hebrides MPA is designated for the protection of minke whales. The MPA covers the Sea of the Hebrides between the east coast of the Outer Hebrides and the west coasts of Skye, Mull and the Ardnamurchan Peninsula, incorporating waters around the islands of Rum, Eigg, Muck, Coll and Tiree (SNH, 2014). Minke whale have been recorded most frequently in the north-west boundary of the Sea of The Hebrides MPA and along the coast of the Outer Hebrides, with greatest densities on the east coast of South Uist (SNH, 2014).

Minke whales are known to be transient species and often take up long migratory routes for feeding and breeding purposes. Individual minke whales have been identified on both the east and west coasts of Scotland, as well as travelling as far as Iceland (Baumgartner, 2008).

The Sea of The Hebrides MPA and the SCH development are around 46km from one another, and so there is the potential for connectivity between the construction operations and the designated features of this MPA due to the large distances minke whales are known to travel. Further details on minke whales are provided in Section 10.4.2.1.

10.4.1.4 North East Lewis MPA

The North East Lewis MPA is designated for the protection of Risso's dolphins. This site was taken forward for consultation in 2019 and officially designated in December 2020. The area is highlighted as a key area of importance to the UK as it is one of only two places in the UK where high numbers of Risso's dolphins are recorded and thought to be resident, the other being Bardsey Island, Wales. Risso's dolphins normally favour deeper offshore waters where the continental shelf slopes off quickly, but around the Isle of Lewis they gather close to shore in water depths ranging from 20 - 200m. Sightings of Risso's dolphins have been most prominent on the eastern and northern coasts of the Isle of Lewis, with the Eye Peninsula and Butt of Lewis acting as 'hotspots', particularly during the summer months (Scottish Government, SNH, & Conservation, 2014). Due to the presence of Risso's dolphins all year-round around the Isle of Lewis, and the continued re-sighting of particular individuals, it is suggested that the area is an important site for feeding (Weir et al., 2019).

Dedicated research efforts by Whale and Dolphin Conservation between 2010 and 2017 focussing on the North East Lewis MPA area produced relative abundance values of 0.554 to 6.647 individuals per km^2 (Weir et al., 2019) with the southern coastline of the Eye Peninsula achieving the greatest relative abundance. As of 2017, a total of 113 individual Risso's dolphins have been identified in the North East Lewis MPA (Weir et al., 2019). A study during the late 1990's identified 142 individuals, the identification of more individuals may be attributed to greater samples of photographs taken over a longer duration of time and hence, does nothing to suggest there has been a decline in the number of individuals present here (Atkinson, Gill, & Evans, 1999).

The site is located 52km from the proposed development, and there is potential for connectivity between the construction operations and the designated features of the MPA. As such, this site has been taken forward for assessment. Further details on Risso's dolphins are provided in Section 10.4.2.1.

10.4.1.5 Monach Islands SAC

The Monach Islands SAC is designated in part due to its importance as a grey seal breeding colony, under the European Habitats Directive. Located to the west of North Uist, the site offers a wide area of largely undisturbed habitat for breeding grey seals and there is easy access to the grassy swards and dune systems. These islands hold the largest breeding colony in the UK, contributing over 20% of annual UK pup production (JNCC, 2018). Grey seals are known to forage in the open sea but return to land regularly at haul out sites either to rest, moult, or feed. Grey seal foraging ranges can often extend as far as 100km (SCOS, 2018). The upper limits of the foraging range of grey seals are comparative to the distance between the Monach Islands SAC and the SCH development, presenting the possibility that they could be present within the vicinity of the SCH development. There is therefore the potential for impacts on the designated features of the SAC and as such this site has been taken forward for assessment. Further details on grey seals are provided in Section 10.4.2.2.

10.4.1.6 Sound of Barra SAC

The Sound of Barra SAC is designated in part due to its importance to common seals, under the European Habitats Directive. The site comprises a mixture of islands, extensive rocky reefs, sandbanks and shallow channels in a broad stretch between the southern end of South Uist and the north coast of Barra in the Outer Hebrides (JNCC, 2018). The site is primarily designated due to the presence of the Annex I habitats including reefs and sandbanks, however, common seals are included as a designated feature, since the area is considered to support a significant presence of this species (JNCC, 2018). Given the relatively short lengths of common seal foraging trips, (~50 km) (SCOS, 2017) and the distance of around 104km from the site to the SCH development, it is considered unlikely that common seals from the Sound of Barra SAC will be in the vicinity of the SCH. This SAC will therefore not be considered further, but further details on common seals are provided in Section 10.4.2.2.

10.4.1.7 Treshnish Isles SAC

The Treshnish Isles SAC is designated primarily due to its importance to breeding grey seals, under the European Habitats Directive. The site comprises a chain of remote, uninhabited islands and skerries to the north-west of the Isle of Mull. The islands and skerries support a breeding grey seal colony which is estimated to contribute just under 3% of the annual UK pup production (JNCC, 2018). As detailed in Section 10.4.2.2.2, grey seals are only rarely present in the waters surrounding the SCH development. As the upper limits of grey seal foraging ranges (~100 km) (SCOS, 2017) are noticeably less than that of the distance between the Treshnish Isles SAC and the SCH development it is unlikely that impacts on the designated features of this SAC will occur, so this site will not be considered further.

10.4.1.8 North Rona SAC

The North Rona SAC is designated as a grey seal breeding colony, under the European Habitats Directive. Located off the north-west tip of mainland Scotland, North Rona is a remote island in the North Atlantic and remains undisturbed by humans for much of the year. Grey seals utilise much of the island, which supports the third largest breeding grey seal colony in the UK, contributing approximately 5% to the UK pup production (JNCC, 2018). As detailed in Section 10.4.2.2.2, grey seals are only rarely present in the waters surrounding the SCH development. As the upper limits of grey seal foraging ranges (~100 km) (SCOS, 2017) are noticeably less than that of the distance between the North Rona SAC and the SCH development it is unlikely that impacts on the designated features of this SAC will occur, so this site will not be considered further.

10.4.1.9 South East Islay Skerries SAC

The South East Islay Skerries SAC is designated due to its support of a nationally important common seal population, under the European Habitats Directive. The uninhabited skerries and islands of the SAC are extensively used as pupping, moulting, and haul-out sites by the common seals, which are estimated to represent between 1.5-2% of the UK population (JNCC, 2018). Given the relatively short distances of common seal foraging trips, (~50 km) (SCOS, 2017), it is considered unlikely that common seals from this SAC will be in the vicinity of the SCH development, so the SAC will not be considered further.

10.4.2 Species Accounts

Staffin is located on the north-east coast of the Isle of Skye, on the southern shore of the Minch. The Minch is a strait in the north-east Atlantic, which is bounded to the west by the Outer Hebrides, and to the east by north-west mainland Scotland. The area comprises of a fairly shallow basin, averaging 120m in depth, but with some areas approximately 200m deep. Strong ocean currents in the waters surrounding the Minch cause turbulence, bringing nutrients to the surface, which results in enhanced productivity of plankton in the area. This in turn leads to aggregations of cephalopods and fish, providing a key food source for marine mammals, making the Minch an important region for several cetacean and pinniped species (Reid et al., 2003). Cetaceans preferentially inhabit the deeper areas of the Minch hence, are not anticipated to be present in large numbers in the shallow waters of Òb nan Ron and Staffin Bay adjacent to the SCH development.

10.4.2.1 Cetaceans

Eight species of cetacean are regularly recorded in the Minch (Reid et al., 2003). Five of these species are considered to occur commonly or be resident in the area, including harbour porpoises, white beaked dolphins, Risso's dolphins, killer whales, and minke whales.

10.4.2.1.1 Harbour Porpoise

Harbour porpoise are distributed throughout temperate and subarctic waters of the North Pacific and North Atlantic oceans and are the most abundant cetacean to occur in north-west European shelf waters (Evans, Anderwald, & Baines, 2003). The most recent assessment of harbour porpoise in UK waters concluded that the overall population trend was unknown and thus, the Conservation Status of the species is also unknown (Marine Scotland, 2021). Despite there being insufficient data to establish the conservation status of harbour porpoise in UK waters, abundance estimates for harbour porpoise in West Scotland are ~24,370 individuals (Marine Scotland Science, 2020).

Increased numbers of harbour porpoise in West Scotland have been reported during July – September, with sightings predominantly inshore (Baxter et al., 2011; Waggitt et al., 2020; Marine Scotland Science, 2020). In addition, harbour porpoise were more commonly detected acoustically in regions close to shore, in water between 50-150 m deep, and between 1-20 km from land, showing a strong inshore distribution (Booth et al., 2013; Marine Scotland Science 2020). Despite these trends, there is a lack of understanding of porpoise movement and range over finer resolutions, thus, it is unknown if there are vulnerable sub-populations that need to special consideration in impact assessments.

10.4.2.1.2 White-beaked dolphins

Scottish shelf waters are considered to be the main stronghold of white-beaked dolphin (*Lagenorhynchus albirostris*) (Northridge et al., 1995; Reid et al., 2003). Reports suggest that the distribution of the species is fairly widespread and that they tend to occupy offshore waters during the winter months and move closer to shore over the summer. Although white-beaked dolphins are known to be present in the central and northern North Sea and around northwest of Scotland, no abundance estimates are present for these specific locations (Marine Scotland Science, 2020).

Current abundance estimates are available for broader regions however, suggesting that there are ~15,895 white-beaked dolphin individuals in the Celtic and Greater North Seas and ~ 20,453 in the North Sea (Marine Scotland Science, 2020). Although sighting rates for white-beaked dolphins are particularly high during the summer months and abundance estimates over broad scales have been made, assessments of the population are unable to provide an overall population trend. As such, the conservation status for white-beaked dolphins in the UK is unknown (Marine Scotland Science, 2020).

The most recent aerial surveys suggest that survey blocks north of the Hebrides and along the east coast of Scotland provided the greatest densities of white-beaked dolphins per km^2. The survey block which included the Isle of Skye had the lowest density estimates per km^2 (Hammond et al., 2017; Marine Scotland Science, 2020). In addition, surveys by the Hebridean Whale and Dolphin Trust between 2003 – 2019 noted that white-beaked dolphins had not been sighted along the east coast of the Isle of Skye, including in the Staffin area (Hebridean Whale and Dolphin Trust, 2020; Marine Scotland Science, 2020).

10.4.2.1.3 Risso's dolphin

The Risso's dolphins found in the UK are predominantly a coastal ecotype, with a widespread distribution and are resident year-round in Scottish waters. The most recent assessment for Risso's dolphins in the UK however had insufficient data to be able to establish any population trends. As such, their conservation status is unknown (Marine Scotland Science, 2020).

Evidence suggests that there may be changes in the seasonal distribution of this species with sea surface temperature (Marine Scotland Science, 2020; Reid et al. 2003). Risso's dolphin sightings have been predominantly made during the summer months (Reid et al., 2003; Paxton et al., 2014; Marine Scotland Science, 2020) along open coasts, straits and sounds, sea lochs and offshore with a preference for areas with steep sloping seabed (Marine Scotland Science, 2020).

Survey data suggests that the Isles of Lewis and Harris in particular have higher than average densities of Risso's dolphins, which led to the designation of the North East Lewis MPA. Further details on this species within the North East Lewis MPA can be found in Section 10.4.1.4: North East Lewis MPA.

10.4.2.1.4 Minke whale

The minke whale is the most common baleen species recorded in British shelf waters, and high densities are present off the west coast of Scotland, particularly in the Minch (G. P. Hammond & Jones, 2008; Reid et al., 2003). Insufficient data on population size, however, has made it difficult to establish the conservation status of minke whales. As such, their conservation status is unknown (Marine Scotland Science, 2020).

Minke whale sightings are widely distributed, with sightings occurring between January and October with a peak between June and August, though minke whales are present in coastal UK waters year-round (Evans et al. 2011, Marine Scotland Science, 2020). They are considered to be a coastal species, preferentially occurring in areas closer to the coast than approximately 7km (Macleod et al., 2004; Reid et al., 2003). They feed mainly in deep coastal waters (<200m deep) over the continental shelf, rather than out in the open ocean. Densities of minke whale are found to be greatest in Scottish seas during the summer months, between May to September, although there is evidence to suggest that some individuals remain in Scottish waters all year round (Macleod et al., 2004). Minke whale density predictions per km^2 had lower densities predicted on the west coast, around the Hebrides, and the Fair Isle channel when compared with the east coast of Scotland (Hammond et al, 2017).

10.4.2.1.5 Killer whales

Killer whales (*Orcinus orca*) are present all year-round throughout Scottish waters, although they are primarily recorded in coastal waters during the summer months (P.G.H. Evans, Pierce, & S., 2010). Sightings of killer whales in Scotland are likely to be from two different assemblages. Firstly, transient visitors from pods based in Iceland, the Faroe Islands, and Norway (Evans et al., 2010); and secondly the 'West Coast Community' which range around Britain and Ireland (Marine Scotland Science, 2020). Individuals/pods of transient killer whales are unlikely to be sighted in the Inner and Outer Hebrides, as they likely belong to the North Atlantic community of killer whales which are predominantly sighted around the Northern Isles (Foote et al., 2010; Marine Scotland Science, 2020).

The West Coast Community is most frequently sighted in the Sea of the Hebrides, to the south of the development area. However, individuals from this group are also known to forage in the Minch (Hebridean Whale and Dolphin Trust, 2019). Comprised of eight individuals, no calves have ever been recorded within the West Coast Community, thus suggesting that this population is likely in decline (Beck et al., 2014; Hebridean Whale and Dolphin Trust, 2019).

10.4.2.1.6 Other cetacean species

There are three species of cetacean that are regular visitors to the Minch, but less common and not thought to be resident. These are bottlenose dolphins, short beaked common dolphins (*Delphinus delphis*), and Atlantic white sided dolphins (*Lagenorhynchus acutus*) (Reid et al., 2003). In addition, a low number of humpback whales (*Megaptera novaeangliae*) are believed to be resident in Scottish waters and sightings have been increasing in the Minch in recent years (WDC, 2018).

10.4.2.2 Pinnipeds

Two species of pinniped are resident in the Minch and the surrounding waters. The common and grey seal both use coastal sites for breeding/pupping and hauling out, and feed in inshore and offshore waters.

10.4.2.2.1 Common Seal

In UK waters, common seals are widespread around the west coast of Scotland, throughout the Hebrides and Northern Isles. Common seal haul outs are generally situated in sheltered waters, on tidal sandbanks and rocky skerries. The UK common seal count population estimate for 2018 was 33,000 (SCOS, 2020).

Common seals in the UK are divided into seal management units (SMUs); the SCH development is situated within the West Scotland SMU, where the population is currently estimated to be at least 15,600 individuals, as of 2018 (SCOS, 2020). Due to its large geographic extent, this SMU is broken down into three sub-units and the proposed development is within the central region. This area contains almost half of the population of the SMU, with 7,447 individuals as of 2018 (SCOS, 2020). Common seal survey counts for this sub-region of the West Scotland SMU indicates the area has been experiencing a 4% population increase per annum since the early 1990s (SCOS, 2020). Common seals present in the vicinity of the development may also be members of the smaller Western Isles management unit, which has an estimated population of 3,533 (SCOS, 2020).

Common seals are present in UK waters year-round. Pups are born during the summer in June and July. During this period, females spend a high proportion of time ashore with their pups (Hammond et al., 2004; SCOS, 2017). Common seals moult in August (SCOS, 2017) and numbers at haul out sites are highest at this time.

There are two designated common seal haul-out sites within 25km (by sea) from the SCH development. The first is known as Loch a' Bhraige and is approximately 14km south-east of the development, on the northern tip of Rona in the Sound of Raasay. The second, Fladda-chuain, is composed of a small group of islands off the north-west coast of Skye. It is around 18km from the development and is designated for both its common seal and grey seal haul-outs.

The Scottish Government commissioned a study to combine seal tracking telemetry data with haul out specific population estimates to generate predicted at sea usage maps for both grey and common seals. This resulted in maps of predicted at-sea common seal densities in 5x5km cells in Scottish waters (Russel et al., 2017). This showed that common seal habitat utilisation in the north-west of Scotland is concentrated to the south-east of the Outer Hebrides, with the highest usage observed in the Sea of Hebrides. Predicted common seal usage of the southern Minch is comparatively low, with densities of 5 – 10 seals per 5x5km cell anticipated in the immediate vicinity of the SCH development. However, there are at-sea usage hotspots around 15km south-east of the proposed development in the Sound of Raasay, where the predicted densities are as high as 50-100 seals per cell (Russel et al., 2017).

The watches for seals conducted at the site of the SCH development during the otter survey found no evidence of common seals utilising the area (Volume 3: Appendix K2).

10.4.2.2.2 Grey Seal

Grey seals occur only in the north Atlantic and Barents and Baltic Seas, with their main concentrations located along the Canadian and US eastern seaboards and in northeast Europe (SCOS, 2020). The UK contains around 38% of the total world breeding population of grey seals and 88% of those, breed in Scotland, with major concentrations in the Outer Hebrides and Orkney (SCOS, 2020). In 2018, the total UK population of grey seals was estimated to be 152,800 individuals, with pup production estimated to be around ~54,750 in Scotland (SCOS, 2020).

The SCH development is situated within the West Scotland grey seal SMU, where the population count was estimated to be 40% higher (SCOS, 2018) than the previous estimate of 15,691 individuals (SCOS, 2017). Grey seals present in the vicinity of the development may also be members of the smaller Western Isles SMU.

Grey seals haul-outs are generally located on remote uninhabited stretches of coast, and often in more exposed areas compared to common seals (SCOS, 2020). Breeding occurs in the autumn, with peak pupping between August and December (SCOS, 2020) although in northern Scotland most pupping occurs between October and late November (Hammond et al., 2004). Moulting occurs between December and April (Hammond et al., 2004; SCOS, 2020). Designated breeding grey seal haul out sites are concentrated in the Northern Isles, Orkney and Shetland, and in the Outer Hebrides. Non-breeding haul-out sites are also concentrated at these locations, in addition to various sites along the west coast of Scotland. There is one designated breeding grey seal haul-out and two non-breeding sites within 25km of the proposed development. The breeding site at Trodday, off the northern tip of the Trotternish peninsula, is around 11km by sea north-west from the development. The non-breeding grey seal haul-outs at Sgeir nam Maol and Fladda-chuain are both around 18km north-west of the harbour development.

The at-sea grey seal usage maps commissioned by Marine Scotland show that grey seal activity in the north-west of Scotland is concentrated to the west of the Outer Hebrides, particularly around the Monach Islands (Russel et al., 2017). Grey seal densities in the Minch and Sea of the Hebrides are comparatively low when compared to common seal densities (Russel et al., 2017). The at-sea density of grey seals was found to be 5-10 individuals in the 5x5km cell covering the immediate area surrounding the proposed development.

The watches for seals conducted at the site of the SCH development during the otter survey found no evidence of grey seals utilising the area (Volume 3: Appendix K2).

10.5 Impact Assessment

The SCH development may result in a potential variety of direct and indirect impacts on the identified marine mammal receptors. The assessment of the impacts follows the methodology outlined in Chapter 7: Biodiversity and assesses the potential impacts resulting from the construction and operational phases of the project as outlined in Chapter 2: Project Description. Underwater noise resulting from construction activities is a common potential impact on marine mammal receptors in harbour developments. However, no construction activities known to generate significant noise levels, such as piling, dredging, rock breaking or underwater drilling, will take place in the marine environment during the construction of the SCH. As such, noise impacts have not been considered further.

10.5.1 Construction

10.5.1.1 Water Quality

Pollution incidents are the most likely source of water quality issues during construction. The accidental release of hydrocarbons and other hazardous substances in the event of a loss of containment during the construction works may result in contamination of the marine environment, potentially affecting marine mammals. As detailed in Table 17.5.1 in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, there are several potential sources of loss of containment events during the construction of the SCH development, including from plant and fuel stores. The assessment assumes that all vehicles and equipment are well maintained, operated by suitably trained personnel and with standard pollution prevention procedures.

Exposure to oil following a spill event has been recorded to give rise to poor body condition, organ damage, reduced fertility, and increased mortality in marine mammals (Williams et al., 2011; Godard-Codding and Collier, 2018). Exposure can be direct through inhalation and/or ingestion, or by ingesting contaminated prey. Spills may cause chronic impacts, where pollutants may affect a species' physiology over extended periods while accumulating in tissue. These impacts may be felt particularly acutely in cetaceans and pinnipeds, which can be subject to bioaccumulation effects due to their position at higher trophic levels in the marine ecosystem. Through the consumption of contaminated prey, the concentration of toxins in their tissues may reach such a level that it results in chronic impacts (Tanabe, 2002).

In Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the effect of contamination from hazardous substances on water quality is identified as negligible to minor. The source of any spill is expected to be localised and the concentration of the hazardous substance will reduce rapidly with distance as it disperses in the marine environment. The adoption of the primary and tertiary mitigation measures and standard industry best practice techniques for pollution prevention identified in Chapter 17 significantly reduces or removes the risk of a spillage event occurring and reaching the sea.

As detailed in Section 10.4.2, cetaceans preferentially inhabit areas that are significantly deeper than the very shallow waters present at Òb nan Ron surrounding the SCH development. It is therefore considered extremely unlikely that cetaceans will be negatively impacted by water quality issues following a spill, as the concentration of the hazardous substance will have reduced sufficiently in concentration by the time it reaches these deeper waters further offshore. All cetacean species and the Inner Hebrides & the Minches SAC are of **International** value, whilst the Sea of the Hebrides MPA and North East Lewis MPA are of **National** value. The potential effect is therefore assessed as **negligible**, **short-term**, and **reversible**, and the resulting effect is **negligible** to **minor: non-significant**.

As previously discussed, pinnipeds are more likely to be present in the shallow waters in the immediate vicinity of the SCH development than cetaceans. Whilst the impact of a spillage event is very unlikely to give rise to any negative effects at the population-level, individuals that are present in the immediate vicinity following a spill have the potential to be exposed to high concentrations of hazardous substances. As previously mentioned, the primary and tertiary mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will greatly reduce the risk of a spill event occurring and reaching the marine environment. Pinnipeds and the statutory sites designated for pinnipeds, Ascrib, Isay & Dunvegan SAC and Monach Islands SAC, are of **International** value. The potential effect on pinnipeds is assessed as **low, short-term**, and **reversible**, and the resulting effect is **moderate: significant**. As the number of pinnipeds affected is likely to be very small the effect on the SAC's is assessed as **negligible**, **short-term**, and **reversible**, and the resulting effect is **negligible** to **minor: non-significant**.

It is acknowledged that litter, including plastics, can have a detrimental effect on the survival, fecundity and fitness of marine mammals if ingested in sufficient quantities or if they become entangled (Bravo Rebolledo et al., 2013; Donnelly-Greenan et al., 2019). As discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the volume of litter generated by the construction phase of the development with the potential to enter the sea is anticipated to be very small. However, even this small volume would contribute to the wider issue of marine litter and thus every effort will be made to avoid this occurring. Hence, primary and tertiary mitigation has been identified in Chapter 17 to reduce the likelihood of litter escaping into the marine environment. The potential effect for all marine mammal receptors is assessed as **negligible** and **permanent**, and the resulting effect is **negligible** to **minor: non-significant**.

10.5.1.2 Physical Injury and Disturbance

The shallow waters in the immediate vicinity of the SCH make it extremely unlikely that a cetacean would enter an area where it is at risk of being injured through a direct interaction with site equipment or construction activities. As there are no significantly noisy activities planned then disturbance of cetaceans due to the work is also unlikely.

There is the potential that pinnipeds could be present in the waters and coastal habitats immediately surrounding the SCH. Therefore, there is a potential for pinnipeds to be physically injured by moving plant or works such as rock armour placement.

The increased levels of human activity and plant movement in the vicinity of construction will cause a level of disturbance which will reduce the chance that a seal would enter an area where it is at risk of being injured. The probability of a seal being injured during construction works is therefore extremely low and it is unlikely an animal would be injured in this way. This potential effect is hence not anticipated to affect the conservation status of pinniped receptors of **International** value. The magnitude of the impact on pinnipeds and the statutory sites designated for pinnipeds, Ascrib, Isay & Dunvegan SAC and Monach Islands SAC, is assessed as **negligible, short-term**, and **reversible,** and the resulting effect is **minor: non-significant**.

Disturbance effects due to the presence of human activity will potentially displace seals, however, as discussed in section 10.4.2.2 the area is not a designated haul out and the vantage point surveys did not identify any seals utilising the area in the vicinity of the SCH development. Hence, avoidance of the area by seals is unlikely to cause a noticeable effect on individuals and will certainly not have an effect at a population level. The magnitude of impact is assessed as **negligible, short-term** and **reversible**, resulting in a **minor: non-significant effect.**

10.5.2 Operations

10.5.2.1 Water Quality

The only foreseeable impacts on marine mammal receptors during the operational phase of the SCH development may arise from water quality issues caused by the release of hazardous materials or litter into the marine environment. The accidental release of hydrocarbons and other hazardous substances in the event of a loss of containment during operations may result in contamination of the marine environment, potentially affecting marine mammals. As detailed in Section 17.5.2.6 of Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, there are several potential sources of loss of containment events during operations at the SCH development, including from fuel storage and the refuelling of vessels. The assessment assumes that all vehicles and equipment are well maintained, operated by suitably trained personnel and with standard pollution prevention procedures.

As detailed in Section 10.4.2, cetaceans preferentially inhabit areas that are significantly deeper than the very shallow waters present at Òb nan Ron surrounding the SCH development. It is therefore considered extremely unlikely that cetaceans will be negatively impacted by water quality issues following a spill, as the concentration of the hazardous substance will have reduced sufficiently in concentration by the time it reaches these deeper waters further offshore. All cetacean species and the Inner Hebrides & the Minches SAC are of **International** value, whilst the Sea of the Hebrides MPA and North East Lewis MPA are of **National** value. The potential effect is therefore assessed as **negligible**, **short-term**, and **reversible**, and the resulting effect is **negligible** to **minor: non-significant**.

As previously discussed, pinnipeds are more likely to be present in the shallow waters in the immediate vicinity of the SCH development than cetaceans. Whilst the impact of a spillage event is very unlikely to give rise to any negative effects at the population-level, individuals that are present in the immediate vicinity following a spill have the potential to be exposed to high concentrations of hazardous substances. As previously mentioned, the primary and tertiary mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will greatly reduce the risk of a spill event occurring and reaching the marine environment. Pinnipeds and the statutory sites designated for pinnipeds, Ascrib, Isay & Dunvegan SAC and Monach Islands SAC, are of **International** value. The potential effect on pinnipeds is assessed as **low, short-term**, and **reversible**, and the resulting effect is **moderate: significant**. As the number of pinnipeds affected is likely to be very small the effect on the SAC's is assessed as **negligible**, **short-term**, and **reversible**, and the resulting effect is **negligible** to **minor: non-significant**.

As discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the volume of litter generated by the operational phase of the development with the potential to enter the sea is anticipated to be very small. However, even this small volume would contribute to the wider issue of marine litter and thus every effort will be made to avoid this occurring. Hence, primary, and tertiary mitigation has been identified in Chapter 17 to reduce the likelihood of litter escaping into the marine environment. The potential effect for all marine mammal receptors is therefore assessed as **negligible and permanent**, and the resulting effect is **negligible** to **minor: non-significant**.

10.6 Mitigation Measures

Mitigation measures aim to prevent or reduce any negative effects on the ecological receptors identified. As detailed in Chapter 3: Methodology, standard construction practices such as Guidance on Pollution Prevention are assumed to be applied. Even where the overall impact significance is minor in EIA terms, mitigation should still be implemented to minimise negative effects and maintain high environmental working standards.

Potential significant impacts were identified for pinnipeds resulting from water quality issues associated with the loss of containment of hazardous substances. Secondary mitigation measures outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes address the prevention of spillages and the prompt administration of spillage procedures. With this mitigation in place, the extent of a spillage event and the risk of one occurring will be substantially reduced.

To minimise the risk of direct physical injury to marine mammals, particularly pinnipeds, construction staff will be briefed to look for pinnipeds in the vicinity of the works, especially at the start of the day or after a break when they are most likely to be present. Activities will not start or will be stopped if individuals approach closer than 50m to the works. The works will cease until such a time that the individuals have moved further than 50m away.

10.7 Cumulative Impacts

As detailed in Chapter 3: Methodology, three offshore projects which have potential cumulative effects on marine mammals were scoped into the assessment. There is the potential that the construction phases of each of these projects may overlap with that of the SCH. However, it is not anticipated that any of the effects associated with the potential impacts identified in Section 10.5 will increase as a result of cumulative impacts.

There will be a slight increase in the risk of loss of containment or pollution incidents impacting marine mammal receptors during the construction phases of each of the projects. However, as discussed in Section 10.5.1 any potential impacts associated with the SCH are expected to be very localised, and due to the large distances between the projects it is unlikely the same marine mammal receptors would be impacted by water quality issues arising from another development. Therefore, the cumulative impact is assessed as **negligible** to **minor: non-significant**.

10.8 Residual Effects

The construction and operational phases of the proposed development resulted in significant effects on pinnipeds.

Impacts on pinnipeds included those arising from water quality issues associated with the spillage of hazardous substances into the marine environment. Through the implementation of secondary mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the impact magnitude on pinnipeds decreased from **low** to **negligible** giving rise to a **minor: non-significant** effect.

The potential impacts on cetacean receptors are not assessed as significant, and no specific mitigation has been proposed, subsequently it is not necessary to assess residual effects. However, the mitigation outlined in Section 10.6 and in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will further reduce the likelihood of negative impacts to marine mammal receptors occurring as a result of the construction and operational phases of the SCH development.

10.9 Summary

In total, two significant effects on marine mammal receptors were identified from the construction phase of the SCH development, and two during the operational phase. All of these were associated with the potential for water quality impacts as a result of spillage events. Through the adoption of effective and proportional secondary mitigation during the construction and operation of the development, all effects are reduced to non-significant.

Table 10.9.1 summarises the effects assessed for marine mammal receptors, the mitigation measures identified to control them and the significance of residual effects. Significant effects are highlighted in yellow.

Table 10.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction							
Inner Hebrides & the Minches SAC	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
Ascrib, Isay, & Dunvegan SAC	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
	Disturbance or direct physical injury of qualifying feature from site equipment or construction activities		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	If seal(s) approach closer than 50m to ongoing works, then works should cease until such time that the seal(s) has moved further than 50m away	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Sea of the Hebrides MPA	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	National	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse
North East Lewis MPA	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	National	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse
Monach Islands SAC	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
	entanglement of marine litter						
	Disturbance or direct physical injury of qualifying feature from site equipment or construction activities		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	If seal(s) approach closer than 50m to ongoing works, then works should cease until such time that the seal(s) has moved further than 50m away	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
Cetaceans	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
Common Seal	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
	Disturbance or direct physical injury of individuals from site equipment or construction activities		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	If seal(s) approach closer than 50m to ongoing works, then works should cease until such time that the seal(s) has moved further than 50m away	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
Grey Seal	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
	Disturbance or direct physical injury of individuals from site equipment or construction activities		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	If seal(s) approach closer than 50m to ongoing works, then works should cease until such time that the seal(s) has moved further than 50m away	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
Operations							
Inner Hebrides & the Minches SAC	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
	entanglement of marine litter						
Ascrib, Isay, & Dunvegan SAC	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
Sea of the Hebrides MPA	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	National	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse
North East Lewis MPA	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	National	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Negligible: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Negligible: Non-Significant Adverse		Negligible Adverse Permanent	Negligible: Non-Significant Adverse
Monach Islands SAC	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
Cetaceans	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
Common Seal	Mortality and reduced productivity resulting from water quality issues	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
	caused by the release of hazardous substances						
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse
Grey Seal	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances	International	Low Adverse Short-term Reversible	Medium: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
	Mortality and reduced productivity resulting from ingestion or entanglement of marine litter		Negligible Adverse Permanent	Minor: Non-Significant Adverse		Negligible Adverse Permanent	Minor: Non-Significant Adverse

Key

(orange)	**Significant Effect**
(grey)	**Non-Significant Effect**

10.10 References

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10.11 Glossary

Acronym	Definition
BAP	Biodiversity Action Plan
EcIA	Ecological Impact Assessment
EIAR	Environmental Impact Assessment Report
EPS	European Protected Species
GEN	General Planning Principle
JNCC	Joint Nature Conservation Committee
km	Kilometre(s)
m	Metre(s)
MHWS	Mean High Water Springs
MPA	Marine Protected Area
NMP	National Marine Plan
PMF	Priority Marine Feature
SAC	Special Area of Conservation
SCH	Staffin Community Harbour
SMU	Seal Management Unit
SPA	Special Protection Area

Chapter 11: Terrestrial Ecology

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Contents

11 Terrestrial Ecology

11.1 Introduction

This chapter presents the Ecological Impact Assessment (EcIA) for terrestrial species. The potential impacts of the construction phase of the proposed development on vegetation and habitats, otters *Lutra lutra* and ornithological receptors were scoped in to the EIAR.

Impacts on terrestrial ecology have been evaluated in the context of nature conservation legislation and relevant planning policy (see Chapter 4: Statutory Context & Planning and Chapter 7: Biodiversity). Mitigation is proposed, cumulative impacts are considered, and finally the residual impacts and their significance are assessed.

11.2 Regulations and Guidance

Regulations and guidance pertaining to ecology and biodiversity are outlined in Chapter 7: Biodiversity. This section details the regulations and guidance specific to terrestrial ecology.

11.2.1 European and International Regulations

Otters are listed under Annex II of the Habitats Directive. Annex II species, which are native to the UK should be conserved through the designation of Special Areas of Conservation (SAC). Since 1994, all SACs, in combination with Special Protection Areas (SPAs) comprise the UK contribution to the Natura 2000 ecological network of protected sites.

Otter are also listed in Annex IV of the Habitats Directive as European Protected Species (EPS) where the deliberate killing, disturbance or the destruction of these species or their habitat is banned. This is transcribed into British legislation through the Conservation (Natural Habitats, &c.) Regulations 1994.

Otter are included in Schedule 2 of the Habitats Regulations, meaning it is an offence to:

- Deliberately or recklessly capture, injure, or kill, harness, damage or destroy a breeding site or resting place of an EPS or a group of EPS;
- Disturb an EPS while it is occupying a structure or place which it uses for shelter or protection;
- Disturb an EPS while it is rearing or otherwise caring for its young;
- Obstruct access by an EPS to a breeding or resting place;
- Disturb an EPS in a manner that is, or circumstances which are, likely to significantly affect the local distribution or abundance of that species; and
- To disturb an EPS in a manner that is, or in circumstances which are likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

11.2.2 National Legislation

Schedule 5 of the Wildlife and Countryside Act 1981 (WCA) (UK Parliament, 1981) provides special protection to selected animal species other than birds, through section 9(4) of the Act, against damage to "*any structure or place which [any wild animal included in the schedule] uses for shelter and protection*", and against disturbance whilst in such places. Otter are afforded protection under Schedule 5 of the WCA.

The WCA and the Nature Conservation (Natural Scotland) Act 2004 (Scottish Parliament, 2004) protect all wild birds. Wild birds may not be taken, injured, or killed without a licence at any time (with specific exceptions). Additionally, nests are protected from damage or destruction while in use and eggs may not be taken or destroyed without a licence. For certain species, listed on Schedule 1 of the Act, special protection is provided, and it is an offence to disturb those species at their nest site while it is in use.

Section 13 of the WCA identifies the protection measures for wild plants. It "*prohibits the unauthorised intentional uprooting of any wild plant species and forbids any picking, uprooting or destruction of plants*" listed on Schedule 8.

Habitats identified as potential Ground Water Dependent Terrestrial Ecosystems (GWDTE), are protected under the Water Framework Directive (Directive 2000/60/EC) (European Commission, 2000) and transposed into Scottish law through the Water Environment and Water Services (Scotland) (WEWS) Act 2003. This means any disturbance to the groundwater resource on which a particular GWDTE relies, would be a breach of legislation.

11.2.3 Other Guidance

In addition, to the general guidance outlined in Chapter 7, the following guidance relevant to assessment and management of terrestrial ecology was consulted:

- Scottish Biodiversity List, which comes under Section 2 (4) of the NCSA (Scottish Government, 2013);
- PAN 60: Planning for Natural Heritage (Scottish Government, 2008);
- Guidelines for Ecological Impact Assessment in the United Kingdom, (CIEEM, 2016);
- Handbook for Phase 1 Habitat Survey – a technique for Environmental Audit (JNCC, 2010); and
- WFD95: A Functional Wetland Typology for Scotland Report (SNIFFER, 2009).

11.3 Assessment Methodology

11.3.1 Baseline

A desk study during the scoping stage identified the potential for terrestrial ecology receptors that have the potential to be impacted during the construction stage at the sites of the proposed SCH development and Borrow Pit. Several ecological surveys were therefore commissioned and have been carried out by Tracks Ecology (see Volume 3: Appendices K1, K2 and K3).

11.3.1.1 Phase 1 Mapping

Phase 1 mapping is a standardised method of recording habitat types and characteristic vegetation, as set out in the Handbook for Phase 1 Habitat Survey – A technique for Environmental Audit (JNCC, 2010).

The standard Phase I methodology was extended to include an initial evaluation of habitats in accordance with those listed in the WFD95: A Functional Wetland Typology for Scotland Report (SNIFFER 2009) and through the recording of specific features indicating the presence, or likely presence, of protected species or other species of nature conservation significance. Descriptive "target notes" were recorded for characteristic habitats, features of ecological interest, or any other features which require note to aid ecologically sensitive design or mitigation. Floral nomenclature follows New Flora of the British Isles (Stace 2010) and Mosses and Liverworts of Britain and Ireland a field guide (Atherton, Bosanquet & Lawley 2010).

The extended Phase I habitat survey was undertaken across the survey areas around the Harbour and Borrow Pit (Chapter 4: Drawings 73.11.01 & 73.11.02). The survey areas include a buffer of approximately 200m around the development footprint at each site. Although it does not represent a full protected species or botanical survey, the extended Phase I method allows a suitably experienced ecologist to provide a baseline assessment of the ecology of the survey area so that it is possible either:

- To confirm the conservation significance of the Survey Area and assess the potential for impacts on habitats/species likely to represent a material consideration; or
- To ascertain that further surveys of some aspect(s) of the Survey Area's ecology will be required before such confirmation can be made.

It should be noted that the extended Phase 1 habitat survey did not cover all of the laybys that will be lengthened and widened during the improvement works to the access road. Only the areas of vegetation around laybys 12, 13, 14 and 15 were formally surveyed.

11.3.1.2 Otter Survey

Field Sign Survey

The otter field survey was undertaken in broad accordance with the approach detailed by Scottish Natural Heritage "Otters and Development" guidance document (Scottish Natural Heritage, 2010) and Chanin (Chanin, 2003) and was completed by an ecologist experienced in otter surveys. The surveyed area included a buffer of approximately 200m around the development footprints of the proposed SCH development and Borrow Pit. Particular survey effort was given to the watercourses and shoreline present within the survey areas and included a thorough check for otter resting places including holts and couches.

Due to the often elusive nature of otter, surveys predominantly rely on the interpretation of field signs rather than direct observation of the animals themselves however, in remote locations where human disturbance is low, direct observations may be possible. During the survey the following field signs were sought, with those which can be regarded as definitive, i.e. they provide certain confirmation of the presence of this species, marked with an asterisk:

- otter spraint (faeces)*;
- otter holt (den);
- footprint*;
- ouch (resting place above ground); and
- pathways and slides into water.

Camera Trapping

In addition, to field signs surveys, three camera traps were deployed at three different locations targeting the gully to the east of the Borrow Pit, identified as highly suitable habitat with evidence of historic use and of which is likely to be affected by the proposed recommencement of extractive operations. The cameras were deployed for different periods (two for approximately 1 month and one for approximately 2 months) with the survey being impacted upon by water ingress to one camera. Browning Dark Ops HD Pro camera traps were used for the purpose which support an invisible infrared flash.

The Harbour area was not subject to camera trapping due to the likelihood of cameras being discovered and removed by members of the public and due to extensive sheep grazing likely to inadvertently trigger the cameras.

Vantage Point Surveys

Due to the issues with deploying camera traps within the Harbour area, four watches were undertaken between the 27th April and 7th May from a vantage point above the Harbour (NG 49440 67950), giving a good view of both the Harbour and the cliffs to gain additional information on use of the survey area by otter. These surveys involved an experienced surveyor undertaking a watch using binoculars. Each watch was undertaken at dusk or dawn and continued for approximately 2 hours.

11.3.1.3 Ornithological Surveys

Surveys for raptors and breeding birds were carried out by Tracks Ecology across both sites. To gather further detail on the ornithological baseline at the site the RSPB was also approached for data on species records within the vicinity of the proposed development.

Raptor Survey

Visits were made on 30th April, 3rd June and 5th July 2021 to survey for breeding raptor species at both the Harbour and Borrow Pit sites. Within each survey area vantage point watches (approximately 2hrs in length) were made over potentially suitable nesting habitat. Vantage points included viewpoints along the cliffs from the quarry, from a waterfall viewpoint looking east down river near the quarry, from the Harbour slipway looking back towards the cliff and from the slipway carpark at the Harbour looking south/southwest. Watches included moving slowly through the survey area with regular stops to assess activity.

Breeding Bird Survey

The methodology broadly followed the British Trust for Ornithology (BTO) Breeding Bird Survey (BBS) guidance and comprised of two visits to each of the survey areas. For each survey area a survey route was designed to ensure that all areas of the survey areas were visited to within approximately 100m where practicable and safe with the topography of the landscape.

BBS bird counts were undertaken on 29th April and 4th June at the Borrow Pit and 28th April and 5th June at the Harbour. During the survey the location and behaviour of all birds encountered was recorded using standard BTO notation as defined in Bibby et al. (2000). All registrations were mapped on 1:10,000 scale maps in the field. Visits were made at the appropriate time of year, during daylight hours and under acceptable weather conditions to ensure good visibility and to maximise sighting opportunity.

11.3.2 Impact Assessment Methodology

The evaluation of receptors, magnitude of impact and significance evaluation follows the methodology laid out in Chapter 7: Biodiversity, Section 7.5.

11.4 Baseline

11.4.1 Designated Sites

A review of the NatureScot SiteLink Portal confirmed that there are no statutory designated sites protected for their terrestrial ecology features within the immediate area of the proposed development or the Borrow Pit. Two such designated sites were identified within 10km of the proposed SCH development and two within 10km of the Borrow Pit (see Volume 4: Drawings 73.11.03 and 73.11.04). The sites within 10km of the development areas are shown in Table 11.4.1 along with their qualifying features. No Scottish Wildlife Trust reserves or Local Nature Conservation Sites were identified within the site or within a 10km buffer of either the proposed SCH development or the Borrow Pit. There is a very small area of woodland of semi-natural origin identified on the Ancient Woodland Inventory (AWI) 9.1km north-west of the proposed SCH development. No such areas are located within a 10km zone surrounding the Borrow Pit.

Table 11.4.1: Statutory Nature Designated Sites relevant to the Harbour Development and Borrow Pit.

Site	Direction and Distance	Value	Terrestrial Ecology Feature(s)	Taken Forward for Assessment?
Trotternish Ridge SSSI/SAC	Proposed SCH Development: 2.2km NW Borrow Pit: 3.9km SW	National	Designated for its bryophyte assemblage, upland assemblage, vascular plant assemblage, alpine and subalpine calcareous grasslands, base-rich scree, dry heaths, high-altitude plant communities associated with areas of water seepage, montane acid grasslands, plants in crevices on base-rich rocks, species-rich grasslands with mat-grass in upland areas and its tall herb communities.	No
Rubha Hunish SSSI	Proposed SCH Development: 9.1km NW	National	Designated for its maritime cliff habitats	No
Rigg – Bile SSSI/SAC	Borrow Pit: 4.7km S	National	Designated for maritime cliffs, upland mixed ash woodland, mixed woodland on base-rich soils associated with rocky slopes and vegetated sea cliffs.	No

11.4.1.1 Trotternish Ridge SSSI/SAC

Trotternish Ridge SSSI/SAC encompasses a long basalt escarpment running in a north-south direction through the centre of the Trotternish Peninsula and covers an area of over 3700 ha.

The site's calcareous minerology supports a rich diversity of montane vegetation, and it is primarily designated for its suite of Annex 1 upland habitats. Areas of moist, basaltic scree support rarities such as the Iceland purslane, *Koenigia islandica*, with Trotternish Ridge being one of only two localities it is known to be found in the UK (Meatyard, 2001). There is also a very high bryophytic diversity throughout the site, particularly on the basalt cliffs and montane heaths. Rare species of note include *Orthothecium rufescens*, *Didymodon icmadophilus* and *Eremonotus myriocarpus*. It is one of five sites on the west coast of Scotland representing species rich *Nardus* grasslands and has the most extensive area of this habitat type in the UK. Many arctic-alpine species scarce in the rest of the country are found in these habitats. Large areas of dry heath, blanket bog and wet flush habitats are also present throughout the site, although the best examples of the latter can be found towards the south around the Storr. Due to the non-mobile nature of the designated features of this site and the distance from the development, it is not anticipated that there will be any connectivity between these potential receptors and the proposed SCH development or Borrow Pit. It is therefore not taken forward for assessment.

11.4.1.2 Rubha Hunish SSSI

Rubha Hunish SSSI covers an area of 237 ha and encompasses a series of north-facing basalt cliffs at the very tip of the Trotternish peninsula. It has a varied flora, with many salt-tolerant species being found here such as sea spleenwort (*Asplenium marinum*), and Scots lovage (*Ligusticum scoticum*). Although it is not designated for such features, large numbers of seabirds nest here such as European shags (*Phalacrocorax aristotelis*) and razorbills (*Alca torda)*, and northern gannets (*Morus bassanus*) regularly visit the area. However, due to the non-mobile nature of the designated features of this site and the distance from the development, it is not anticipated that there will be any connectivity between these potential receptors and the proposed SCH development or Borrow Pit. It is therefore not taken forward for assessment.

11.4.1.3 Rigg – Bile SSSI/SAC

Rigg – Bile SSSI/SAC stretches along an 11.5km length of coastline in the south-east of the Trotternish peninsula. The site covers an area of almost 500 ha and includes some of the best examples of vegetated sea cliff habitats in the whole of the UK. These limestone cliffs support vascular species including mountain avens (*Dryas octopetala*), hairy rock-cress (*Arabis hirsuta*), and melancholy thistle (*Cirsium heterophyllum*), as well as rupestral bryophytes such as *Schistidium robustum*. In many places, this coastal flora naturally transitions to a woodland dominated by hazel, birch, and willow further inland. Due to the non-mobile nature of the designated features of this site and the distance from the development, it is not anticipated that there will be any connectivity between these potential receptors and the proposed SCH development or Borrow Pit. It is therefore not taken forward for assessment.

11.4.2 Phase 1 Habitats

On completion of the Phase 1 survey, total coverage areas for each habitat were calculated and habitat maps produced (Chapter 4: Drawings 73.11.01 & 73.11.02). It should be noted that during the surveys no invasive plant species were found at either of the sites.

11.4.2.1 Proposed SCH Development

The results of the Phase 1 habitat classifications and total areas of the terrestrial habitats from the proposed SCH development survey area are summarised in Table 11.4.2. Although intertidal habitats constitute a Phase 1 classification, and were recorded during the survey, the impacts of the development on this habitat type are instead considered in Chapter 8: Benthic Ecology. The intertidal zone has thus not been included in the total area or percentage calculations below.

Table 11.4.2: Phase 1 Habitats and Coverage at the Proposed SCH Development Site

Phase 1 Habitat Type	SCH Survey Area		Within Development Boundary	
	Area (ha)	% Total	Area (ha)	% Total
Marsh/marshy grassland	3.07	39.2	0.20	44.4
Calcareous grassland - unimproved	0.05	0.6	-	-
Bracken - continuous	0.99	12.6	-	-
Wet heath/marshy grassland	0.55	7.0	-	-
Buildings and gardens	0.03	0.4	0.03	6.7
Acid/neutral grassland	0.69	8.8	-	-
Road	0.38	4.8	0.15	33.3
Inland rock	0.26	3.3	-	-
Acid grassland – unimproved	0.99	12.6	0.07	15.6
Acid/neutral grassland/Scattered bracken	0.76	9.7	-	-
Scree	<0.01	<0.1	-	-
Scree/Acid grassland	0.07	0.9	-	-
Intertidal: boulders and rocks	*1.72*	*NA*	*0.43*	*NA*
Total	**7.84**	**100**	**0.45**	**100**

Dominant Habitats

As shown in Volume 4: Drawing 73.11.01, marsh/marshy grassland is the dominant terrestrial habitat identified within the boundary of the proposed SCH development. Continuous bracken and unimproved acid grassland are also dominant in the wider surveyed area. As detailed in Section 11.3.1.1, the vegetation around laybys 1-11 along the access road was not covered during the Phase 1 habitat survey. However, it is understood that the improvement works will largely the extend into existing road verges. These areas typically support heavily grazed, semi-improved grassland communities that are most likely acidic and neutral in nature with a low species diversity.

Marsh/Marshy Grassland

Marshy grasslands are abundant, covering over 39.2% of the total SCH survey area and 44.4% of the terrestrial habitats within the development boundary. In many cases it consists of transitional to acid and neutral grasslands, as well as wet heath communities. Here, soft rush

Juncus effusus, lesser spearwort *Ranunculus flammula* and sharp-flowered rush *Juncus articulatus* can dominate with yellow-flag *Iris pseudacorus* and black bog-rush *Schoenus nigricans* locally abundant. Ragged robin *Silene flos-cuculi*, marsh violet *Viola palustris*, meadow buttercup *Ranunculus acris*, marsh bedstraw *Galium palustre*, heath rush, common cotton-grass, common sorrel *Rumex acetosa* and marsh willowherb *Epilobium palustre* are also occasional in the sward. Marshy grassland comprised the majority of the lower slopes within the Harbour survey area. These areas support a diverse mix of rush pasture communities. In addition, these areas occasionally support more heathy sections with a mix of wet heath and drier grassland.

Unimproved Acid Grassland

On the rocky steep slopes at the base of the cliffs within the survey area large regions of unimproved acid grassland are present amongst the large boulders and close to the existing harbour buildings. This habitat type covers 12.6% of the total SCH survey area and makes up 15.6% of the terrestrial habitats within the development boundary. This habitat is dominated by a mosaic of grassland sub-communities. The small area behind the Harbour buildings has an increased presence of wetter grassland communities, possibly as a result of the Harbour infrastructure resulting in ground and surface flow being affected to some degree. Where areas of scree are present beneath the cliff within the survey area, acid grassland communities with rush-pasture are present colonising the thin soils.

Continuous Bracken

Bracken covers 12.6% of the SCH survey area, although is not found within the development footprint. Where present it is often continuous and found in dense swathes. It is predominantly found on the steep ground at the base of the cliffs, with a particularly large patch present in the north of the survey area between the cliffs and access road.

Intertidal – Boulders/Rocks

The intertidal zone within the Harbour survey area and is dominated by exposed bedrock with areas of gravels and cobble. Strand-line vegetation is generally not present and restricted to very few plants of thrift *Armeria maritima*. The impacts of the development on the intertidal zone are considered in Chapter 8: Benthic Ecology.

Other Habitats

Within the north of the survey area the strip of grassland becomes narrow between the cliffs and the public road. This area supports a more neutral assemblage of grassland communities with a mosaic of grassland and rush-pasture. Also within these areas are localised acidic communities as well as localised calcicolous communities. These areas all support a relatively short sward with the presence of heavy sheep grazing. Although CG10 *Festuca ovina-Agrostis capillaris-Thymus polytrichus* grassland is identified as a component of the Annex 1 habitat, species-rich *Nardus* grassland, on siliceous substrates in mountain areas as well as being within the UKBAP habitat Upland calcareous grassland. Many of these grassland communities support areas of scattered bracken along with areas of denser bracken although even at these locations the species coverage rarely exceeded 80%).

Wet heath habitats are found in mosaics with marshy grassland and rush-pasture sub-communities. The main areas of wet heath/marshy grassland is on the low ground in the south of the survey area. The patchy M23a *Juncus effusus/acutiflorus-Galium palustre* rush-pasture habitats are recognised as being within the upland slushes, fens, and swamps UK BAP habitat.

In addition, the wet heath is recognised as a component of the Northern Atlantic wet heaths with *Erica tetralix* habitat which is an Annex 1 habitat within the Habitat Regulations.

Scree, typically large boulders but occasionally smaller patches of smaller boulders and gravels, and exposed rock cliffs are present along the steep ground and crags to the west of the survey area. Small built-up areas are also present at the site, including buildings, roads, and paths.

11.4.2.2 Borrow Pit

The results of the Phase 1 habitat classifications and total areas of the terrestrial habitats from the Borrow Pit survey area are summarised in Table 11.4.3. As the intertidal habitats in the vicinity of the Borrow Pit are not directly affected by the development, they have not been considered within Chapter 8: Benthic Ecology hence they have been included here.

Table 11.4.3: Phase 1 Habitats and Coverage at the Borrow Pit Site

Phase 1 Habitat Type	Survey Area		Within Development Boundary	
	Area (ha)	% Total	Area (ha)	% Total
Marsh/marshy grassland	1.33	5.9	-	-
Calcareous grassland - unimproved	4.00	17.7	-	-
Wet heath/acid grassland mosaic	3.40	15.0	-	-
Bracken - continuous	1.98	8.7	0.07	2.7
Wet modified bog	2.68	11.8	-	-
Wet heath/marshy grassland	1.65	7.3	-	-
Intertidal: boulders and rocks	0.25	1.1	-	-
Acid/neutral grassland	1.06	4.7	0.17	6.6
Road	0.91	4.0	<0.01	<0.1
Inland rock	0.80	3.5	-	-
Bare ground/short-perennial	0.89	3.9	0.85	33.2
Neutral grassland – semi-improved	0.82	3.6	0.60	23.4
Scattered trees - broadleaved	0.55	2.4	<0.01	<0.1
Tall herb and fern - ruderal	0.51	2.3	-	-
Bare ground	0.44	1.9	0.30	11.7
Broadleaved woodland – semi-natural	0.42	1.8	-	-
Bare ground/neutral grassland	0.36	1.6	0.36	14.1
Calcareous/neutral grassland	0.25	1.1	0.18	7.0
Scree	0.15	0.7	<0.01	<0.1
Calcareous grassland/Scattered bracken	0.12	0.5	-	-
Buildings and gardens	0.03	0.1	-	-
Calcareous grassland/Scree	0.06	0.3	-	-
Scrub - continuous*	0.02	0.1	0.02	0.8
Scattered trees/Scattered bracken	<0.01	<0.1	-	-
Total	**22.66**	**100**	**2.56**	**100**

Dominant Habitats

As shown in Volume 4: Drawing 73.11.02, the dominant habitats identified within the survey area include unimproved calcareous grassland, wet heath/acid grassland mosaic and wet modified bog. The habitats within the development boundary of the borrow pit largely consist of bare ground with patches of short-perennial and neutral grassland vegetation.

Unimproved Calcareous Grassland

Calcareous grasslands are most common on the eastern side of the Borrow Pit survey area, being present across much of the steeper slopes above the shoreline, and dominated by crested dog's-tail, thyme, bird's-foot trefoil, yarrow, and mat-grass. These habitats cover 17.7% of the survey area but do not extend into the development boundary. The very steep slopes around the cliffs support extensive areas of calcicolous grassland with a mixture of sub-communities. These areas are often inaccessible due to the extreme topography but are still heavily influenced by grazing sheep creating a short sward with many areas dominated by thyme. Calcareous grassland is also found within areas of scree located on the steep slopes.

Wet Heath / Acid Grassland Mosaic

This habitat covers 15.0% of the survey area and is formed from a mosaic of wet heath and acid grassland communities. It does not extend into the development boundary of the borrow pit. The habitat dominates the more semi-natural areas of the survey area in the north which is particularly impacted upon by sheep grazing. M15 *Trichophorum germanicum-Erica tetralix* wet heath is recognised as an Annex 1 habitat within the Habitat Regulations and is a UK Biodiversity Action Plan priority habitat within the upland heathland classification. The grassland component of this mosaic is dominated by rush-pasture and is a generally widespread habitat.

Wet Modified Bog

An area of wet modified bog formed by a near uniform cover of blanket mire is present to the west of the Borrow Pit, covering almost 11.8% of the survey area. These are heavily modified by peat-cutting, drainage and livestock grazing. These habitats are likely located on deep peat (greater than 0.5m) although no peat depth survey points were taken. Small areas of wet modified bog are also present in the areas of wet heath, but these were generally very limited in size.

Other Habitats

Along the eastern side of the public road an area of semi-improved neutral grassland formed by a sward dominated by *Cynosurus cristatus / Lolium perenne* ley is present. Despite only covering 3.6% of the total surveyed area, this habitat type comprises 23.4% of the terrestrial habitats found within the development footprint of the borrow pit. Historical disturbance and enrichment from the road construction and land management has resulted in the presence of pockets of other neutral grassland communities. The survey area also supports areas of acid/neutral grassland predominantly located around the quarry. These areas are a mosaic of different communities and have been subject to disturbance from quarrying activities and sheep grazing. Within and around the quarry, areas of bare ground are present from historic quarry workings and associated infrastructure. Many of these areas support some colonisation from neutral grassland communities.

A significant area of the survey area in the west is dominated by marshy grassland with swards almost uniformly comprised *Holcus lanatus/Juncus effusus* rush-pasture. This area is either side of the unclassified road leading west along the Lealt River. The area is impacted on by sheep grazing, vehicle movements and drainage. A large area of wet heath habitat is again found in a mosaic with marshy grassland, in the west of the survey area. This comprises a mixture of various rush-pasture and wet heath communities.

The Borrow Pit survey area also supported areas of acid/neutral grassland predominantly located around the existing quarry area. These areas are a mosaic of grassland and ley communities and were subject to disturbance from quarrying activities and sheep grazing.

A large area of the upper slopes to the east of the quarry is grassland with less of a calcareous influence supporting a mosaic of grassland sub-communities. Many of these grassland communities support areas of scattered bracken along with areas of denser bracken although even at these locations the species coverage rarely exceeded 80%.

There is well-developed woodland cover in the crags at Lealt gorge that contains mature sessile oak, sycamore, downy birch, rowan, alder, and hazel. The understorey contains mostly bracken, grasses and occasional great woodrush, blaeberry, hard fern and honeysuckle. This type of woodland is recognised as an Annex 1 habitat under European Union Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora which in Scotland, is translated into legal obligations by the Conservation (Natural Habitats, &c.) Regulations 1994 (Habitat Regulations). In addition, the woodland habitat is recognised as a UK Biodiversity Action Plan priority habitat within the old sessile oak woods with *Ilex* and *Blechnum* habitat.

Along the banks of the public road in the southern section of the survey area scattered trees are present with bracken often dominating the ground flora. These areas are on damp to wet soils in many places. Tree density within the areas is low and scattered and influenced by land drainage associated with the public road. Nonetheless they do offer some value as a sparse version of wet woodland, a UK BAP priority habitat. Scrub is limited to a small patch within the edge of the existing quarry. This habitat is dominated by gorse and blackberry and supports the usual sparse and species-poor assemblage. Areas of bracken are present in the survey area and where present it is often continuous and found in dense swathes. It is predominantly found on the steep ground and at the base of the cliffs.

Other communities present are restricted to habitats of ephemeral/perennial and ruderal species, with larger patches of common nettle, creeping thistle, rosebay willowherb present along roadsides and disturbed ground. Short-perennial vegetation is present at low abundance within bare ground areas of the quarry and car park. Scree, typically large boulders but occasionally smaller patches of smaller boulders and gravels, and exposed rock cliffs are present along and below crag-lines. The small area of intertidal zone in the survey area is dominated by exposed bedrock with areas of gravels and cobble. The impacts of the development on the intertidal zone are considered in Chapter 8: Benthic Ecology. Areas of buildings, roads and paths are also present.

Other than the main watercourse of the Lealt River which is located outwith the Borrow Pit survey area, a single small watercourse and a number of wet and dry ditches are present. The ditches are all in relation to the drainage of the road corridor and are generally simple cut off drains along with sections of concreted channels. The small watercourse is located adjacent to the quarry with its source located on the edge of the area of semi-natural heath and bog to the north of the survey area. This watercourse runs beneath some of the large boulder scree along the eastern edge of the quarry before dropping down the steep slope past the remnants of industrial buildings.

11.4.3 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

11.4.3.1 Proposed SCH Development

A number of habitats were identified within the survey area that have the potential to support GWDTE (see Volume 3: Appendix K1, Figure 3b). Highly dependent habitats include the areas supporting M23 *Juncus effusus/acutiflorus - Galium palustre* rush-pasture. This habitat is potentially highly dependent on groundwater and was present within the survey area in association with MG10 *Holcus lanatus - Juncus effusus* rush-pasture which is potentially moderately dependent on groundwater. Mosaics dominated by these habitats are present along much of the flatter ground beneath the high cliffs within the survey area and the habitats extend up to the existing public road and between the road and the shore. Extensive drainage ditches have been dug across this area and it is likely that groundwater remains a significant influence in the area. The groundwater is likely to be significantly influenced by the dramatic topography, although specific detail of the geohydrology is not known.

In addition, a number of habitats are potentially moderately dependent on groundwater, including calcareous grassland habitats dominated by CG10 *Festuca ovina-Agrostis capillaris - Thymus polytrichus* grassland communities, wet heath/marshy grassland mosaics with M15 *Trichophorum germanicum-Erica tetralix* wet heath and MG10 *Holcus lanatus-Juncus effusus* rush-pasture communities as well as more uniform stands of MG10 rush-pasture. Where these habitats are in close mosaics the potential dependency has been recognised as moderate to high reflecting their constituent communities. These habitats are located in the south of the survey area.

A spring is located 80m to the southwest of the Harbour at the foot of a crag and scree where there is a break in the slope. This spring is piped for private water supply and the overspill feeds the drainage ditches downslope. This presents a small area of habitat highly dependent on groundwater and feeds some of the other GWDTE downslope.

11.4.3.2 Borrow Pit

The habitats within the survey area around the Borrow Pit have more limited potential to support GWDTE. No highly dependent habitat types were found in the survey area, although the areas of calcareous grasslands and wet heath/marshy grassland mosaics have a moderate potential (see Volume 3: Appendix K1, Figure 3a). These are located on almost all areas of steep ground within the survey area and in the flatter ground to the west of the public road opposite the quarry.

11.4.4 Otters

[redacted]

11.4.4.1 Proposed SCH Development

Within the proposed SCH development survey area, extensive opportunities exist for otters to use the area as a place of shelter. Despite extensive searches over several days, no definitive evidence of otter using the area on a regular basis was recorded. [redacted]

Based on the survey results there is no evidence that the rock armour associated with the existing breakwater is used by otters, however low use of the feature may occur with little or no evidence. In addition, the lack of activity within the Harbour during the many vantage point watches suggest that the Harbour waters do not constitute a significant resource for the species. Field sign surveys identified historic and fresh sprainting from otter north of the survey area along Staffin Bay and in particular at the mouth of the Stenscholl River. [redacted]

It should be recognised that Staffin Harbour is an active place with use of the Harbour by small commercial and recreational boats as well as the adjacent coastline being heavily used by tourists including overnight presence from campervans both at the Harbour and further north along the minor public road. The disturbance caused by human presence is likely to have some impact on the extent of otter activity along this section of the coast

11.4.4.2 Borrow Pit

[redacted] However, the evidence for use as a couch was not strong enough from the field surveys. Other habitat features included extensive good opportunities for use as a place of shelter along the gully and within the boulder scree, although no further evidence of the presence of otter was observed.

Along the lower sections of the Lealt River no evidence of otter being present was identified which was somewhat surprising considering the suitability of the pool beneath the falls for hunting. Very few opportunities for a place of shelter to be located along this section were identified but additional opportunities were present within boulders located along the foot of the cliffs in the east of the survey area and to a lesser extent, in and around the derelict industrial buildings from the late 1800s situated on the shore. None of the three camera traps that were deployed within the Borrow Pit survey area recorded any images of otters utilising the area.

11.4.5 Ornithology

No Annex 1 (EU Birds Directive) or Schedule 1 (Wildlife and Countryside Act 1981) were recorded within either of the survey areas. A number of red and amber species from the Birds of Conservation Concern (BoCC) List along with several also listed on the Scottish Biodiversity List (SBL) were present in relatively low numbers representing a typical distribution of bird species for the area and habitats present. Very few raptors were observed during the raptor surveys as well as the Breeding Bird Surveys.

11.4.5.1 Proposed SCH Development

The proposed SCH development survey area supported a small number of observations of buzzard *Buteo buteo* which were observed passing through the site above the cliffs on all three raptor surveys. Hunting kestrels *Falco tinnunculus* were observed the June and July survey visits. Observations of the kestrel included hunting activity around the cliffs at Cadha Riach at the southern end of the survey area.

During the course of the breeding bird survey at the proposed SCH development, skylark *Alauda arvensis* and meadow pipit *Anthus pratensis* were the most common bird species recorded (Table 11.4.4). Oystercatcher *Haematopus ostralegus*, wheatear *Oenanthe oenanthe* and rock pipit *Anthus petrosus* were also commonly observed across the survey area. Other species, including blackbird *Tudus merula* and great skua *Stercorarius skua* were recorded more sporadically. The nature of the sightings indicates possible breeding records of skylark and meadow pipit within the grassland of the survey area. It is probable that wheatear and snipe *Gallinago gallinago* are also breeding in the common grazing area, whilst oystercatcher are breeding along the coastline of the survey area, as shown in Volume 3: Appendix K3, Figure 4b.

Table 11.4.4: Species Recorded During BBS at the Proposed SCH Development

Species	UK BoCC List	SBL	No. of Records	
			Visit 1	Visit 2
Barn swallow *Hirundo rustica*	Amber	No	0	1
Blackbird *Tudus merula*	Green	No	0	1
Buzzard *Buteo buteo*	Green	No	1	0
Great black backed gull *Larus mainus*	Amber	No	0	1
Great skua *Stercorarius skua*	Amber	No	1	0
Herring gull *Larus argentatus*	Red	Yes	2	0
Hooded crow *Corvus corone*	Green	Yes	0	3
Jackdaw *Corvus monedula*	Green	No	1	1
Kestrel *Falco tinnunculus*	Amber	Yes	0	1
Meadow pipit *Anthus pratensis*	Amber	No	4	2
Oystercatcher *Haematopus ostralegus*	Amber	No	2	3
Pied wagtail *Motacilla alba*	Green	No	1	1
Redshank *Tringa tetanus*	Amber	No	1	0
Rock dove *Columba livia*	Green	No	2	3
Rock pipit *Anthus petrosus*	Green	No	3	2
Skylark *Alauda arvensis*	Red	Yes	6	5
Snipe *Gallinago gallinago*	Amber	No	1	1
Wheatear *Oenanthe oenanthe*	Green	No	1	3
Wren *Troglodytes troglodytes*	Green	No	2	0

11.4.5.2 Borrow Pit

During the three raptor surveys no observations of raptors were recorded within the Borrow Pit survey area, which included the area around Lealt Gorge.

During the course of the breeding bird survey at the Borrow Pit, skylark and meadow pipit were the most common bird species recorded (Table 11.4.5). Chaffinch *Fringilla coelebs*, stonechat *Saxicola rubicola* and wren *Troglodytes troglodytes* were also commonly observed across the survey area. Other species, including golden plover *Pluvialis apricaria* and hooded crow *Corvus corone* were recorded more sporadically. The nature of the sightings indicates possible breeding records of skylark and meadow pipit across the entire survey area, including within the boundary of the Borrow Pit. Golden plover and snipe are also possibly breeding in the wet heath and marshy grassland habitats to the west of the A855, whilst oystercatcher may be breeding on the coastline. It is probable that willow warbler *Phylloscopus trochilus* , song thrush *Turdus philomelos* and wheatear are breeding in the wooded gorge and cliffs to the south of the Borrow Pit, as shown in Volume 3: Appendix K3, Figure 4a.

Table 11.4.5: Species Recorded During BBS at Borrow Pit

Species	UK BoCC List	SBL	No. of Records	
			Visit 1	Visit 2
Barn swallow *Hirundo rustica*	Amber	No	0	2
Blackbird *Tudus merula*	Green	No	0	1
Blue tit *Cyanistes caeruleus*	Green	No	0	1
Chaffinch *Fringilla coelebs*	Green	No	6	5
Golden plover *Pluvialis apricaria*	Amber	Yes	1	0
Great tit *Parus major*	Green	No	1	2
Hooded crow *Corvus corone*	Green	Yes	1	2
Meadow pipit *Anthus pratensis*	Amber	No	18	20
Oystercatcher *Haematopus ostralegus*	Amber	No	0	1
Pied wagtail *Motacilla alba*	Green	No	1	2
Robin *Erithacus rubecula*	Green	No	2	3
Rock dove *Columba livia*	Green	No	2	2
Rock pipit *Anthus petrosus*	Green	No	1	3
Skylark *Alauda arvensis*	Red	Yes	14	12
Snipe *Gallinago gallinago*	Amber	No	1	0
Song thrush *Turdus philomelos*	Red	Yes	1	1
Stonechat *Saxicola rubicola*	Green	No	3	3
Wheatear *Oenanthe oenanthe*	Green	No	3	3
Willow warbler *Phylloscopus trochilus*	Amber	No	0	2
Wren *Troglodytes troglodytes*	Green	No	4	2

11.4.6 Identification of Receptors

Table 11.4.6 details the ecological receptors associated with the proposed SCH development and Borrow Pit sites and their receptor values.

Table 11.4.6: Evaluation of Ecological Receptors

Receptor	Evaluation Rationale	Receptor Value
Flora: Dominant Habitats		
Marsh/marshy grassland	Areas of marshy grassland should be considered to be groundwater dependent however, areas identified are likely to be influenced by historical drainage systems and overgrazing.	Moderate Local
Intertidal boulder/rocks	The intertidal zone within the surveyed areas is dominated by exposed bedrock with areas of gravels and cobble. Strand-line vegetation is generally not present and restricted to very few plants of thrift *Armeria maritima*.	Low Local
Continuous bracken	This habitat is species poor and of limited ecological value.	Negligible
Unimproved acid grassland	Unimproved acid grassland is noted as a UK BAP broad habitat category. The small area behind the Harbour buildings has an increased presence of wetter grassland communities and as such may have some moderate dependency on groundwater.	Moderate Local
Unimproved calcareous grassland	These areas are heavily influenced by grazing sheep creating a short sward. The grassland communities can often have a high dependency on groundwater. However, in this instance the presence of the habitat on very steep ground is likely to result in a reduced (low to moderate) dependency on groundwater.	Moderate Local
Wet heath / acid grassland mosaic	The wet heath component of this mosaic is recognised as an Annex 1 habitat within the Habitat Regulations and is a UK Biodiversity Action Plan priority habitat within the upland heathland classification.	Regional
Wet modified bog	Blanket bog is recognised as an Annex 1 habitat within the Habitat Regulations and is a UK Biodiversity Action Plan priority habitat. The area of wet modified bog is heavily modified by peat-cutting, drainage and livestock grazing.	Regional
Flora: Other Notable Habitats		
Woodland	The mixed broadleaved woodland in Lealt Gorge is recognised as an Annex 1 habitat within the Habitat Regulations and is a UK Biodiversity Action Plan priority habitat within the old sessile oak woods classification.	Regional
Semi-improved neutral grassland	The neutral grassland has undergone historical disturbance and enrichment from the road construction and land management.	Low Local

Receptor	Evaluation Rationale	Receptor Value
Acid/Neutral Grassland	The areas of mixed acid/neutral grassland communities have been subject to disturbance from historical quarrying activities and sheep grazing.	Low Local
Running Water	The small watercourse is unlikely to support aquatic ecology, however, it may be utilised by otter.	Moderate Local
Exposed rock / hard cliff	This habitat, made up from natural landforms, is of limited ecological value.	Negligible
Bare ground / built environment	This habitat is of limited ecological value.	Negligible
Fauna: Protected Species		
Otter	Otters are a UK BAP priority species and receive full legal protection as an EPS. Otters are found throughout most of Scotland. The species is considered relatively widespread and common and the Scottish population represents 90% of the total British population (SNH, 2010). Suitable otter habitat has been identified in the area and records of otter nearby have been identified.	International
Birds	The sensitivity of ornithological receptors is species specific hence a range of values may apply.	Low Local to National

11.5 Impact Assessment

It is anticipated that during the operation of the development the potential impacts to terrestrial ecology receptors will be negligible and so they were scoped out of the EIA process for the operational phase. This included the potential impacts associated with water abstraction, as flow rate measurements at the spring have proven that the volume of water required to be pumped to the new harbour buildings will be sufficiently low that significant effects on groundwater are unlikely to occur.

11.5.1 Construction

11.5.1.1 Proposed SCH Development

A number of potential impacts (in the absence of secondary mitigation) have been identified in connection with the construction phase of the development at the Harbour site. These may be direct or indirect impacts and include:

- Loss of habitat within the construction footprint due to the development and associated infrastructure;
- Disturbance to habitat within and adjacent to the construction footprint during construction works; and
- Pollution incidents during construction works.

The assessment of impacts arising from construction activities are carried out below. The project design has made all reasonable attempts to avoid significant impacts to sensitive habitats and unavoidable impacts are minimised wherever possible through embedded primary mitigation measures, which have been considered within the assessment of effects.

Habitat Loss

Most of the onshore elements of the proposed SCH development will be constructed on the area of existing hardstanding (or land reclaimed from the intertidal area which is considered in Chapter 8: Benthic Ecology) and so the permanent loss of terrestrial habitats will be minimal. As detailed in Table 11.4.2, of the 0.45ha of terrestrial habitat within the boundary of the harbour development, only 0.27ha consists of natural vegetation, notably marsh/marshy grassland, and unimproved acid grassland. The assessment pessimistically assumes that all of the vegetation within the footprint will be lost. In reality this is likely to be an overestimate, as strips of natural vegetation are expected to be retained in the buffer areas around the new harbour buildings and hardstanding. The improvements to the laybys along the access road, as detailed in Chapter 15: Traffic and Access, will be limited in extent and thus only very small areas of mostly acid/neutral grassland and marsh/marshy grassland vegetation will be directly impacted by these works.

Marsh/Marshy Grassland

Areas of marsh/marshy grassland should be considered to be groundwater dependent, however, habitat identified within the Harbour area is likely to be heavily influenced by historical drainage systems and overgrazing and therefore not of high quality and representative of GWDTEs. An area of 0.2ha of marsh/marshy grassland will be removed within the development footprint, in addition to small strips at laybys 13, 14 and 15 which are subject to widening and lengthening works. This is only 6.5% of the total area of this habitat found across the total survey area, and it understood to be a common and widespread habitat in the wider region. It has therefore been assessed that impacts resulting from the removal of this habitat of **moderate local** value will be **permanent** and **low** resulting in a **minor: non-significant** effect.

Unimproved Acid Grassland

This habitat is noted as a UK BAP broad habitat category and an area of 0.07ha will be lost during construction of the onshore elements. The area behind the Harbour buildings has an increased presence of wetter grassland communities and as such may have some moderate dependency on groundwater. Unimproved acid grassland within the construction footprint represents only 6.5% of the total area of this habitat found across the total survey area, and it is understood to be a relatively common and widespread habitat in the wider region. It has therefore been assessed that impacts resulting from the removal of this habitat of **moderate local** value will be **permanent** and **low** resulting in a **minor: non-significant** effect.

Acid/Neutral Grassland

This habitat has been identified adjacent to layby 12, which will be subject to lengthening and widening. It is also thought that this habitat type is most likely to be adjacent to the laybys not covered in the Phase 1 survey. These works will therefore result in the removal of strips of this habitat type. However, this will be very limited in extent, and the wider survey area contains large areas of this habitat outwith the development footprint. The areas of this habitat adjacent to the road are likely to be heavily influenced by overgrazing and previous tracking over by vehicles and therefore not of high quality or species diversity. It has therefore been assessed that impacts resulting from the removal of this habitat of **low local** value will be **permanent** and **low** resulting in a **negligible: non-significant** effect.

Habitat Disturbance

Marsh/Marshy Grassland

The new water pipe connecting the spring to the Harbour buildings will cross an area of this habitat type, and it will therefore be susceptible to some disturbance during construction work. Tracking over may lead to temporary damage of the habitat. The area excavated to lay the pipe will be minimal and localised, and since this habitat is widespread across the survey area it is likely to recover from disturbance. In the absence of secondary mitigation, it has therefore been assessed that impacts resulting from the disturbance of this habitat of **moderate local** value will be **reversible** and **low** resulting in a **minor: non-significant** effect.

Unimproved Acid Grassland

The spring that will feed the new Harbour buildings is located in an area of this habitat type, and it will therefore be susceptible to some disturbance during construction work. Tracking over may lead to temporary damage of the habitat. Only a very short length of pipe will cross this habitat type, and so the area excavated to lay the pipe will be minimal and localised. Since this habitat is widespread across the survey area it is likely to recover from disturbance. In the absence of secondary mitigation, it has therefore been assessed that impacts resulting from the disturbance of this habitat of **moderate local** value will be **reversible** and **low** resulting in a **minor: non-significant** effect.

Pollution Incidents

If an accidental spill was to occur during construction, it could have an impact upon the surrounding flora with potential knock-on effects to fauna such as otter and breeding birds. Habitats in the area of the Harbour potentially affected may include marsh/marshy grassland and neutral grassland. As discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, mitigation including pollution prevention measures, and a pollution response plan will be in place and the risk of a spill occurring and having an impact on surrounding habitat of **regional** to **low local** value is **low** resulting in a **negligible/minor: non-significant** effect.

Effects on Protected Species

Potential construction impacts may include:

- Disturbance to species, for example habitat disturbance: noise, visual and human presence, during construction works;
- Accidental physical damage inflicted to protected species as a consequence of construction works, resulting in injury or death;
- Fragmentation of habitats and barrier effects of ecological corridors during construction.

Disturbance

Impacts from construction through disturbance to habitat, visual disturbance and the generation of noise may lead to avoidance of affected areas by certain species which may alter their spatial use of surrounding habitat, including disruption to commuting and foraging patterns.

Otters are a very mobile and wide-ranging species and have been recorded as potentially using the site on an infrequent basis. It is therefore likely that otter will pass through the Harbour site at some point. If present, otters may be disturbed by construction works including noise and visual disturbance. However, with the development being situated in an already active Harbour and where there is frequent activity from people using the Harbour and tourists, otter inhabiting this area may already be used to relatively high noise and visual disturbance. Should otter be temporarily displaced from the area, sufficient and higher quality habitat is available nearby. With otters having not been identified as regularly utilising the Harbour area, it is likely they are using higher quality habitat outwith the Harbour anyway. Works will generally be carried out between the hours of 7am and 7pm Monday to Saturday, although some tide-dependent activities may take place outwith these hours. Construction works are therefore not continuous, and otter will be able to utilise the area when the site is inactive should it provide resource. It has therefore been assessed that general disturbance effects displacing transiting otter of **international** value will give rise to **reversible, negligible** magnitude impacts, giving rise to **minor: non-significant** effects.

If an otter couch, layup, holt or more importantly, a natal holt are present and in use during construction and no secondary mitigation is implemented, impacts on otter could give rise to impact magnitudes of **reversible, low** resulting in a **moderate: significant** effect. It is noted that an EPS licence from NatureScot would be required if a couch, layup, or holt were to be disturbed by the works.

Disturbance to breeding birds during construction at the Harbour is possible during the breeding bird season (March – September), however the majority of works will be carried out outwith suitable breeding habitat and it is therefore unlikely but not impossible that nests will be disturbed. In the absence of secondary mitigation, impacts on birds potentially ranging from **national** to **low local** value have been assessed as of **low** magnitude resulting in **minor: non-significant** effects.

Accidental Physical Damage

During construction, it is possible that otter are accidentally injured or killed through interactions with machinery or plant, or by becoming trapped in an excavation. In the absence of secondary mitigation this effect is likely to have a negative and permanent impact on the animal, however it is very unlikely to occur at a frequency that could result in population level effects. For otters, of **international** value, in the absence of secondary mitigation, impacts have been assessed as **low**, resulting in a **moderate: significant** effect.

As noted in Section 11.5.1.1.4, the majority of works will be carried out outwith nesting habitat however, there is the possibility a nest or young birds which may be less mobile than adults could be encountered during the breeding bird season (March – September) and could come to physical harm resulting in the injury or death of individuals. In the absence of secondary mitigation, impacts on birds potentially ranging from **national** to **low local** value have been assessed as of **low** magnitude resulting **minor: non-significant** effects.

Habitat Fragmentation and Barrier Effects

Three potential resting places for otter were identified to the west of the Harbour, across the access road. Increased use of the area and access road could potentially deter otters from crossing and utilising this area and therefore creating a barrier effect. Although suitable habitat has been identified, no evidence of use was found, and more high-quality habitat is available to the north. Impacts on otter of **international** value have therefore been assessed as **negligible**, resulting in a **minor: non-significant** effect.

11.5.1.2 Borrow Pit

A number of potential impacts (in the absence of secondary mitigation) have been identified in connection with the resumption of extractive activities at the Borrow Pit during the construction phase of the development. These may be direct or indirect impacts and include:

- Loss of habitat within the construction footprint due to the development and associated infrastructure;
- Disturbance to habitat within and adjacent to the construction footprint during construction works; and
- Pollution incidents during construction works.

The assessment of impacts arising from these works are carried out below.

The potential effects of dust associated with operating the Burrow Pit have been considered within Chapter 5: Air Quality.

Habitat Loss

As detailed in Table 11.4.3, the borrow pit development footprint covers an area of 2.56ha. However, the habitats within this area largely consist of bare ground with occasional patches of short-perennial and neutral grassland vegetation. As detailed below, only small areas of habitat of potential ecological value may be impacted by permanent removal. The assessment pessimistically assumes that all of the vegetation within the footprint will be lost. In reality this is likely to be an overestimate, as strips of natural vegetation are expected to be retained around the edges of the boundary in the buffer areas around the blasting operations.

Semi-improved Neutral Grassland

An area of 0.6ha of semi-improved neutral grassland is found within the development boundary, which comprises 73.2% of the total area of this habitat type within the wider surveyed area. Semi-improved neutral grassland in this area has been subject to historical disturbance and enrichment from road construction and land management and a large amount of this habitat combines with and is surrounded by road and bare ground within the quarry area. This habitat is of poor ecological value. It has therefore been assessed that impacts resulting from the removal of this habitat of **low local** value will be **permanent** and **low** resulting in a **negligible: non-significant** effect.

Acid/Neutral Grassland

An area of 0.17ha of acid/neutral grassland is found within the borrow pit development boundary. The majority of this is towards the south of the site although a small strip also extends into the north. This habitat is believed to have been subject to significant disturbance from historical quarrying activities and sheep grazing. It has therefore been assessed that impacts resulting from the removal of this habitat of **low local** value will be **permanent** and **low** resulting in a **negligible: non-significant** effect.

Unimproved Calcareous Grassland

An area of 0.18ha of calcareous grassland was identified along the south-east edge of the quarry footprint. The patch of this habitat within the borrow pit development footprint consists of a calcareous/neutral grassland mosaic. This was found to be heavily influenced by grazing sheep. This habitat can have a high dependency on groundwater however this area of grassland is located on very steep ground therefore this is unlikely. It has therefore been assessed that impacts resulting from the removal of this habitat of **moderate local** value will be **permanent** and **low** resulting in a **minor: non-significant** effect.

Habitat Disturbance

Semi-improved Neutral Grassland

An area of semi-improved neutral grassland lies to the north of the quarry site and is on the edge of the development bordering a proportion which will have been removed during construction. The edge of this habitat will therefore be susceptible to an element of disturbance. This may result in an exposed edge potentially drying out and a slight loss of vegetation however the habitat extends back from the development area, and it is likely it will recover from disturbance. In the absence of secondary mitigation, it has therefore been assessed that impacts resulting from the disturbance of this habitat of **low local** value will be **reversible** and **low** resulting in a **negligible: non-significant** effect.

Acid/Neutral Grassland

This habitat has been identified within the construction footprint by the access to the site, to the south outwith the footprint and to the north within and extending outwith the footprint. This habitat will be susceptible to disturbance at the edges of the buffer which may result in an exposed edge potentially drying out and a slight loss of vegetation. The habitat within the site may be disturbed through tracking over or alongside it and the temporary storage of materials. This habitat extends outwith the construction footprint, to the north and the south, and it is likely that any disturbed habitat will have the ability to recover. In the absence of secondary mitigation, it has therefore been assessed that impacts resulting from the disturbance of this habitat of **low local** value will be **reversible** and **low** resulting in a **negligible: non-significant** effect.

Unimproved Calcareous Grassland

Calcareous/neutral grassland can have high dependency on groundwater. This habitat has been identified within the construction footprint and extending out to the east. As with the aforementioned habitats, the edge of this habitat will be impacted where a proportion will be removed within the footprint. This may result in an exposed edge drying out and having an impact on groundwater flows however, this habitat is located on steep ground, and it is therefore unlikely it is highly dependent on groundwater. An exposed edge may also result in a loss of vegetation however this habitat has been heavily influenced by grazing sheep, so it is unlikely there is a significant amount of vegetation present. This habitat extends outwith the construction footprint, to the east, and it is likely that any disturbed habitat will have the ability to recover. In the absence of secondary mitigation, it has therefore been assessed that impacts resulting from the disturbance of this habitat of **moderate local** value will be **reversible** and **low** resulting in a **minor: non-significant** effect.

Pollution Incidents

If an accidental spill was to occur during construction, it could have an impact upon the surrounding flora with potential knock-on effects to fauna including otter and breeding birds. Habitats potentially affected may include unimproved calcareous grassland, wet heath/acid grassland mosaic, wet modified bog, woodland, semi-improved neutral grassland and running water. A small watercourse runs along the north of the quarry area that could be sensitive to pollution incidents. In addition, the quarry is situated above a gully and above the River Lealt with some steep slopes meaning that if a major spill was to occur it could carry downhill from the site and into sensitive receptors such as running water. However as discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes with mitigation including pollution prevention measures, and a pollution response plan in place, the risk of a spill occurring and having an impact on surrounding habitats of **regional** to **low local** value and on running water of **moderate local** value is **low** resulting in a **minor: non-significant** effect.

Effects on Protected Species

Potential construction impacts may include:

- Disturbance to species, for example habitat disturbance: noise, visual and human presence, during construction works;
- Accidental physical damage inflicted to protected species as a consequence of construction works, resulting in injury or death;
- Fragmentation of habitats and barrier effects of ecological corridors during construction.

Disturbance

Impacts from construction through disturbance to habitat, visual disturbance and the generation of noise may lead to avoidance of affected areas by certain species which may alter their spatial use of surrounding habitat, including disruption to commuting and foraging patterns. Otters are very mobile and wide-ranging species and have been recorded at close proximity to the site. It is therefore likely that otter will pass through on occasion. If present, otters may be disturbed by construction works including noise and visual disturbance. Should otter be temporarily displaced from the area, sufficient and higher quality habitat is available nearby. Works will generally be carried out between the hours of 7am and 7pm Monday to Saturday. Disturbance is therefore not continuous, and otter will be able to utilise the area when the site is inactive. It has been assessed that general disturbance effects displacing transiting otter of **international** value will give rise to **reversible negligible** magnitude impacts, giving rise to **minor: non-significant** effects.

If an otter couch, layup, holt or more importantly, a natal holt are present and in use during quarrying works and no secondary mitigation is implemented, impacts on otter could give rise to impact magnitudes of **reversible, low** resulting in a **moderate: significant** effect. It is noted that an EPS licence from NatureScot would be required if a couch, layup, or holt were to be disturbed by the works.

During the breeding bird season (March – September), there is the chance of nests being encountered. In the absence of secondary mitigation, impacts on birds potentially ranging from **national** to **low local** value have been assessed as of **low** magnitude resulting in **minor: non-significant** effects.

Accidental Physical Damage

During construction, it is possible that otters are accidentally injured or killed through interactions with machinery or plant, or by becoming trapped in an excavation. In the absence of secondary mitigation this effect is likely to have a negative and permanent impact on the animal, however it is very unlikely to occur at a frequency that could result in population level effects, particularly for mobile species. For otters, of **international** value, in the absence of secondary mitigation, impacts have been assessed as **low**, resulting in a **moderate: significant** effect.

As noted in Section 11.5.1.1.4, the majority of works will be carried out outwith nesting habitat however there is the possibility a nest or young birds which may be less mobile than adults could be encountered during the breeding bird season (March – September) and could come to physical harm resulting in the injury or death of individuals. In the absence of secondary mitigation, impacts on birds potentially ranging from **national** to **low local** value have been assessed as of **low** magnitude resulting **low: non-significant** effects.

Habitat Fragmentation and Barrier Effects

Otter activity was recorded around the Borrow Pit area towards the coast on the east and they are likely to use the River Lealt to the south. Suitable resting habitat was identified within the quarry site however no evidence of use was detected. With no use within the site and evidence of use outwith to the east and south it is unlikely that the works will create a barrier effect. Otters would likely access the river from the mouth on the coast and no high-quality habitat was found across the site, and across the road to the west. Impacts on otter of **international** value have therefore been assessed as **negligible**, resulting in a **minor: non-significant** effect.

11.6 Mitigation Measures

This section outlines the proposed terrestrial ecological mitigation for the development. Mitigation measures aim to prevent or reduce any negative effects on the ecological receptors identified. As detailed in Chapter 3: Methodology, standard construction practices such as Guidance on Pollution Prevention are assumed to be applied. Even where the overall impact significance is minor in EIA terms, mitigation should still be implemented to minimise negative effects and maintain high environmental working standards.

11.6.1 Habitats and Flora

Plant should be precise when stripping vegetation within the construction footprint to ensure disturbance to surrounding vegetation is kept to a minimum. If practical, turves from removed habitat within the footprint should be used to surface exposed edges. The vegetation temporarily removed during the laying of the water pipe feeding the SCH buildings will be reinstated as soon as practicable.

11.6.2 Ground Water Dependent Terrestrial Ecosystems

Mitigation measures identified in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented to prevent pollution associated impacts. The primary mitigation discussed in Section 11.5.1. will prevent significant impacts on the section of moderate-to-high groundwater dependent marsh/marshy grassland habitat which occurs around the proposed SCH development.

11.6.3 Protected Species

Potential significant impacts were identified for otter, if present, resulting from effects of habitat disturbance and accidental physical damage resulting from construction activities. In addition, during the construction phase, there is the potential for a breach in wildlife legislation through the disturbance of protected species, and although no significant effect was identified on breeding birds, disturbance of a nest would be a breach. As a result, a number of mitigation measures will be implemented to reduce impacts and ensure compliance with relevant conservation legislation for both otters and birds. These are summarised below.

11.6.3.1 Pre-Construction Surveys

Prior to any works commencing at the proposed SCH development site, a pre-construction otter survey will be undertaken. The otter survey will be conducted across the entire site within 200m of the proposed SCH development and should be carried out 6-8 weeks before construction commences. If any places of rest (couch, layup, holt) are found then the need for an EPS licence will be determined. The findings of the survey will inform the requirements of the Species Protection Plan (SPP) (see Section 16.3.3).

If construction is planned to commence during the breeding bird season (March – September), a breeding bird survey should be carried out at an appropriate point prior to construction commencing. The survey should focus on areas highlighted which could provide nesting habitat. Where nests are identified, suitable exclusion zones should be implemented, see Section 11.6.3.4.

11.6.3.2 Seasonal Considerations

Seasonal considerations should be given to nesting birds. Where practicable, ground clearance and movement of large piles of materials should be carried out outwith the breeding bird season. However, where this is not practical, bird nest checks should be carried out regularly ahead of clearance/material movement works, see Section 11.6.3.4.

11.6.3.3 Species Protection Plans

Upon completion of pre-construction surveys, detailed SPPs will be developed in collaboration with the design and construction team to ensure compliance with wildlife legislation and the impacts on the relevant species is minimised. The SPPs will outline specific mitigation measures.

An outline of the proposed SPP for otters and birds are detailed below based on existing baseline data.

Otter

- Should pre-construction surveys identify use of the habitat by otter, the potential for disturbance, subsequent further survey work and/or the requirements for an EPS licence under the Conservation (Natural Habitats &c.) Regulations 1994 as amended in Scotland from NatureScot will be considered. This will include the need for tailored mitigation measures to be included into the SPP.
- In the unlikely event that a previously undiscovered otter resting place is identified during the works, works will stop within 30m of the feature. Appropriate mitigation measures will be identified through consultation with an environmental consultant and NatureScot, as necessary. Works will not recommence in the affected area until suitable mitigation measures and licencing is in place.
- A toolbox talk will be delivered to site operatives by a suitably qualified individual detailing the considerations that should be given to otters during construction.
- Artificial lighting within the site should only be used where required to light works sites and for safety reasons and should be directional towards the required works area.
- Any pipes or other such materials shall be stored upright, or have covers fitted to the ends, or be appropriately fenced off to prevent entrapment or occupation. Temporary ramps will be utilised within excavations to allow mammals to escape by

themselves, should they fall in. Alternatively, excavations should be appropriately fenced off.

- Pre-works checks will be carried out for otter for bulk material moves.
- The duration of works within areas where otter may be present should be kept to a minimum where practical.

Birds

- During the breeding bird season (March – September), ongoing checks for nests will be required, acknowledging that some species may nest within the construction site boundary whilst construction works are underway, i.e. in material stockpiles, in plant, under pallets etc.
- Suitable bird deterrents can be installed to minimise the risk of birds breeding in the area.
- On entering a new area of the site, a breeding bird survey will be required prior to mobilisation if between March and September.
- If nests are identified, appropriate exclusion zones will be implemented to minimise disturbance until the chicks have fledged.
- In the event that a previously undiscovered nest is identified during works, works will be stopped within an appropriate buffer, and the Contractor and Client will be informed. Appropriate mitigation measures will be identified specific to the species by an Environmental Consultant. Works will not recommence in the affected area until suitable mitigation measures are in place.
- Any pipes or other such materials shall be stored upright, or have covers fitted to the ends, or be appropriately fenced off to prevent entrapment or occupation.
- Artificial lighting within the site should only be used where required to light works sites and for safety reasons and should be directional towards the required works area.
- The duration of works within areas where nesting birds may be present should be kept to a minimum where practical.

11.7 Residual Effects

The construction phase of the proposed development resulted in significant effects on otter.

Impacts on otter included disturbance of protected species and accidental damage. Through the implementation of appropriate mitigation measures including carrying out pre-construction surveys, preventing entrapment and following pollution prevention guidance, the impact magnitude on otter decreased from **low** to **negligible** giving rise to a **minor: non-significant** effect.

11.8 Cumulative Effects

As detailed in Chapter 3: Methodology, no cumulative effects were identified associated with terrestrial ecology.

11.9 Summary

The key habitats and species within the respective survey area were identified during the completion of baseline surveys. From the baselines surveys and assessment carried out, significant effects on ecological receptors were identified. Several best practice measures have been identified along with a number of species-specific mitigation measures in order to reduce ecological effects as far as possible resulting in no significant residual effects from the construction phase of the development. Table 11.9.1 provides a summary of impacts, mitigation and residual effects.

Table 11.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction – Proposed SCH Development							
Marsh/marshy grassland	Permanent Habitat Loss	Moderate Local	Low Adverse Permanent	Minor: Non-significant Adverse	Mitigation incorporated into design to minimise habitat area removed.	Low Adverse Permanent	Minor: Non-significant Adverse
Unimproved acid grassland		Moderate Local	Low Adverse Permanent	Minor: Non-significant Adverse	Mitigation incorporated into design to minimise habitat area removed.	Low Adverse Permanent	Minor: Non-significant Adverse
Acid/neutral grassland		Low Local	Low Adverse Permanent	Negligible: Non-significant Adverse	Mitigation incorporated into design to minimise habitat area removed.	Low Adverse Permanent	Negligible: Non-significant Adverse
Marsh/marshy grassland	Habitat Disturbance	Moderate Local	Low Adverse Short-term Reversible	Minor: Non-significant Adverse	Vegetation removed during water pipe laying will be reinstated as soon as practicable. Plant will be precise when stripping vegetation so disturbance to surrounding vegetation is minimal.	Low Adverse Short-term Reversible	Minor: Non-significant Adverse
Unimproved acid grassland		Moderate Local	Low Adverse Short-term Reversible	Minor: Non-significant Adverse	Vegetation removed during water pipe laying will be reinstated as soon as practicable. Plant will be precise when stripping vegetation so disturbance to surrounding vegetation is minimal.	Low Adverse Short-term Reversible	Minor: Non-significant Adverse
Surrounding Flora	Pollution	Regional – Low Local	Low Adverse Short-term Reversible	Negligible/Minor: Non-significant Adverse	Pollution prevention measures, and a pollution response plan as detailed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes.	Low Adverse Short-term Revers	Negligible/Minor: Non-significant Adverse
Otters		International	Low Adverse	Moderate: Significant	Pre-construction surveys. EPS licence sought if required.	Negligible Adverse	Minor: Non-significant

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
	Disturbance of Protected Species		Short-term Reversible	Adverse	Development of Species Protection plan (SPP).	Short-term Reversible	Adverse
Birds		National	Low Adverse Short-term Reversible	Minor: Non-significant Adverse	Pre-construction surveys. Ongoing checks for nests during breeding bird season. Development of Species Protection plans (SPP). Seasonal considerations when timing works where practical.	Negligible Adverse Short-term Reversible	Negligible: Non-significant Adverse
Otters	Accidental Physical Damage	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Measures to prevent entrapment. Pollution prevention as identified in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes.	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse
Birds		National	Low Adverse Short-term Reversible	Minor: Non-significant Adverse	Pre-construction survey. Ongoing surveys during breeding bird season. Seasonal considerations when timing works where practical. Development of Species Protection Plan for birds.	Negligible Adverse Short-term Reversible	Negligible: Non-significant Adverse
Otters	Habitat Fragmentation and Barrier Effects	International	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse	Pre-construction survey. Consideration for EPS licence. Development of Species Protection Plan for otters.	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse
Construction – Borrow Pit							

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Semi-improved neutral grassland	Permanent Habitat Loss	Low Local	Low Adverse Permanent	Negligible: Non-significant Adverse	Mitigation incorporated into design to minimise habitat area removed.	Low Adverse Permanent	Negligible: Non-significant Adverse
Unimproved calcareous grassland		Moderate Local	Low Adverse Permanent	Minor: Non-significant Adverse	Mitigation incorporated into design to minimise habitat area removed.	Low Adverse Permanent	Minor: Non-significant Adverse
Acid/neutral grassland		Low Local	Low Adverse Permanent	Negligible: Non-significant Adverse	Mitigation incorporated into design to minimise habitat area removed.	Low Adverse Permanent	Negligible: Non-significant Adverse
Semi-improved neutral grassland	Habitat Disturbance	Low Local	Low Adverse Short-term Reversible	Negligible: Non-significant Adverse	Plant will be precise when stripping vegetation so disturbance to surrounding vegetation is minimal. Edges of remaining habitat will be sealed to prevent drying out and if practical, turves from removed habitat will be used to surface exposed edges.	Low Adverse Short-term Reversible	Negligible: Non-significant Adverse
Acid/Neutral Grassland		Low Local	Low Adverse Short-term Reversible	Negligible: Non-significant Adverse	Plant will be precise when stripping vegetation so disturbance to surrounding vegetation is minimal. Edges of remaining habitat will be sealed to prevent drying out and if practical, turves from removed habitat will be used to surface exposed edges.	Low Adverse Short-term Reversible	Negligible: Non-significant Adverse
Unimproved calcareous grassland		Moderate Local	Low Adverse Short-term Reversible	Minor: Non-significant Adverse	Plant will be precise when stripping vegetation so disturbance to surrounding vegetation is minimal. Edges of remaining habitat will be sealed to prevent drying out and if	Low Adverse Short-term Reversible	Minor: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
					practical, turves from removed habitat will be used to surface exposed edges.		
Surrounding Flora	Pollution	Regional – Low Local	Low Adverse Short-term Reversible	Minor: Non-significant Adverse	Pollution prevention measures, and a pollution response plan as detailed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes.	Low Adverse Short-term Reversible	Minor: Non-significant Adverse
Running Water		Moderate Local	Low Adverse Short-term Reversible	Minor: Non-significant Adverse	Pollution prevention measures, and a pollution response plan as detailed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes.	Low Adverse Short-term Reversible	Minor: Non-significant Adverse
Otters	Disturbance of Protected Species	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Pre-construction surveys. EPS licence sought if required. Development of Species Protection plan (SPP).	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse
Birds		National	Low Adverse Short-term Reversible	Minor: Non-significant Adverse	Pre-construction surveys. Ongoing checks for nests during breeding bird season. Development of Species Protection plans (SPP). Seasonal considerations when timing works where practical.	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse
Otters	Accidental Physical Damage	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Measures to prevent entrapment. Pollution prevention as identified in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes.	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse
Birds		National	Low Adverse Short-term	Minor: Non-significant Adverse	Pre-construction survey. Ongoing checks for nests during breeding bird season.	Negligible Adverse Short-term	Minor: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
			Reversible		Seasonal considerations when timing works where practical. Exclusion zones around nests.	Reversible	
Otters	Habitat Fragmentation and Barrier Effects	International	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse	Pre-construction survey. Consideration for EPS licence. Development of Species Protection plans (SPP).	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse

Key

Significant Effect
Non-significant Effect

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11.11 Glossary

Acronym	Definition
AWI	Ancient Woodland Inventory
BBS	Breeding Bird Survey
BoCC	Birds of Conservation Concern
BTO	British Trust for Ornithology
CIEEM	Chartered Institute of Ecology and Environmental Management
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPS	European Protected Species
GWDTE	Groundwater Dependent Terrestrial Ecosystem
ha	Hectares
JNCC	Joint Nature Conservation Committee
km	Kilometres
LDP	Local Development Plan
m	Metres
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SNH	Scottish Natural Heritage
SNIFFER	Scotland and Northern Ireland Forum for Environmental Research
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UK BAP	United Kingdom Biodiversity Action Plan
WAC	Wildlife and Countryside Act 1981
WFD	Water Framework Directive

Chapter 12: Soils, Geology and Palaeontology

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Contents

12 Soils, Geology and Palaeontology

12.1 Introduction

This chapter considers the likely effects of the proposed Staffin Community Harbour (SCH) development within the redline boundary of Staffin Harbour (hereafter referred to as "the proposed SCH development") on the geology and palaeontology associated with the construction and operation (Drawing 73.01.B and Drawing 73.04.01). It also examines the likely effects on geology and palaeontology associated with the Borrow Pit development area at Lealt Quarry (hereafter referred to as the "Borrow Pit") (Drawings 73.01.B and Drawing 73.02.01).

12.2 Regulations, Guidance and Sources of Information

12.2.1 National Legislation

12.2.1.1 The Geological Conservation Review (GCR)

Geological Conservation Review (GCR) sites contain geological and geomorphological features of national and international importance, and are selected through a process known as the Geological Conservation Review. GCR sites are identified based on features such as:

- Rocks, minerals and fossils;
- Landform features formed during the Ice Age; and
- Modern rivers and coasts.

Most have statutory protection through designation as geological features in Sites of Special Scientific Interest (SSSIs), see Section 12.2.1.2. As part of their management of SSSIs, NatureScot are also responsible for the conservation, monitoring and enhancement of GCR sites. Most GCR sites are in private ownership.

For more information on GCRs, see Section 12.3.2.

12.2.1.2 Nature Conservation (Scotland) Act 2004

As discussed in Section 7.2.3 of Chapter 7: Biodiversity, Sites of Special Scientific Interest (SSSI) are designated under the Nature Conservation (Scotland) Act 2004. SSSI are legal designations that protect any land of special interest for its natural features. These features can be one or more of the following:

- Flora;
- Fauna;
- Geological features; and
- Geomorphological features.

SSSIs may be designated solely for their geological interest (geo-SSSI), their biological interest (bio-SSSI), or a mixture of both (mixed SSSIs).

The land comprising a SSSI can belong to an individual, organisation or governmental body, but the ownership does not affect the SSSI designation and protection. Every SSSI is accompanied by a management statement which provides guidance to owners and occupiers of land within a SSSI as to how the natural feature specified in the SSSI notification should be conserved or enhanced. Certain operations within a SSSI require consent from NatureScot. Any person who intentionally or recklessly damages any natural feature specified in an SSSI notification is guilty on an offence and could be subject to prosecution.

Nature Conservation Orders (NCOs) are also designated under the Nature Conservation (Scotland) Act 2004. An NCO makes it illegal to carry out specific activities in specific areas and/or at specific times. They may be issued by Scottish Ministers when there is no other adequate means to protect such areas. An NCO may apply to:

- Sites of Special Scientific Interest (SSSIs) (under the provisions of Chapter 2 of the Nature Conservation (Scotland) Act 2004);
- European sites (under Regulations 19 and 20 of the Conservation (Natural Habitats, &c.) Regulations 1994); and
- Any other land which is of special interest in the opinion of the Scottish Ministers (under the provisions of Chapter 2 of the Nature Conservation (Scotland) Act 2004).

12.2.2 Other Guidance

12.2.2.1 The Scottish Fossil Code

The Scottish Fossil Code sets out best practice for collecting, identifying, conserving and storing fossil specimens found in Scotland. It was developed by NatureScot in consultation with paleontological researchers, land managers, fossil collectors and other stakeholders. The Scottish Fossil Code:

- Provides an introduction to fossils and the fossil heritage of Scotland;
- Outlines best practice for the collection and care of fossils in Scotland by amateur, academic or commercial collectors;
- Provides more detailed best practice and guidance for specialist and other groups involved in Scotland's fossil heritage, including commercial collectors and dealers, researchers, land managers, quarry operators and developers;
- Provides information and advice to museum and other public collections on donating specimens; and
- Lists supporting and further information including a simplified geological map of Scotland, a geological timescale and a list of Scottish museums with substantial collections of Scottish fossils.

Although lacking legal power, the Scottish Fossil Code outlines the law regarding designated areas such as SSSIs, and is considered a vital document to ensure Scotland palaeontological heritage is protected from damage and over collecting. Notably, it outlines what to do if you uncover unusual or significant fossils. The main guidance provided is summarised as follows:

1. **Seek permission.** Common fossils and small geological specimens have traditionally been collected without permission and usually without hindrance. However, you are acting within the law if you obtain permission to extract, collect and retain fossils.
2. **Access responsibly**. Consult the Scottish Outdoor Access Code prior to accessing land. Be aware that there are restrictions on access and collecting at some locations protected by statute.

3. **Collect responsibly.** Exercise restraint in the amount collected and the equipment used. Be careful not to damage fossils and the fossil resource. Record details of both the location and the rocks from which fossils are collected.
4. **Seek advice**. If you find an exceptional or unusual fossil do not try to extract it; but seek advice from an expert. Also seek help to identify fossils or dispose of an old collection.
5. **Label and Look After**. Collected specimens should be labelled and taken good care of.
6. **Donate**. If you are considering donating a fossil or collection chose an accredited museum, or one local to the collection area.

12.2.3 Sources of Information

A detailed desk-based assessment was carried out, drawing on existing databases, published scientific literature, geological maps and aerial photography, all used to identify areas could have geological and/or palaeontological significance.

A study of the geology of the Borrow Pit area has been made with reference to published information from the British Geological Survey (BGS) and to data held by Dalgleish Associates Ltd (DAL). The 1:50,000 Series BGS publication, Sheet 80E and part of 82W (Portree), showing Bedrock and Superficial Deposits, 2007, was consulted in order to determine the documented geology of the borrow pit site and the surrounding area.

12.3 Method of Assessment

12.3.1 Baseline Methodology

12.3.1.1 Extent of Study Area

The aim of this assessment is to identify the geological and palaeontological significance of the area in the which the Proposed Development (the proposed SCH development and Borrow Pit) is taking place, to identify the potential significant finds which may result as a consequence of the Proposed Development, to identify the threats to these assets, and to propose mitigation methods to minimise their damage or loss. Included for consideration are the geological and palaeontological assets within 1.5 miles of the proposed SCH development and Borrow Pit, as well as the underlying geological and palaeontological potential of the rock units therein, which extend across Skye and the Inner Hebrides (Drawing 73.12.01).

The following assessment has been carried out as a desktop research exercise; field research visits were not carried out due to the ongoing Coronavirus pandemic. The wealth of existing literature on the geology and palaeontology of the site makes desktop based assessment possible. This assessment has been done using records of previous discoveries, identifying the underlying geology and important geological assets, and assessing the likelihood and significance of palaeontological discoveries that could result from the Proposed Development, based on these factors and discoveries in nearby locations.

12.3.1.2 Extent of the Statutory Designated Sites

The geographical extent of the Statutory Designated Sites, and information about their contents and geology, were collected using published resources, accessed online (see Section

12.10 References). Although neither the proposed SCH development nor Borrow Pit are within designated areas, they lie directly adjacent to them, and share features of their geology.

12.3.1.3 Hydraulic Modelling

Hydraulic modelling was undertaken within the proposed SCH development area to predict the wave climate around the proposed breakwater, pontoons and slipways, and to examine the impact on the sediment transport regime. The Hydraulic Modelling Report is attached as Appendix Q.1, in Volume 3 of the EIAR. This information was used to assess the potential for erosion, or deposition of sediments, on geological and palaeontological assets in the proposed SCH development area and adjacent protected area, An Corran GCR.

Wave modelling has undertaken for 1 in 50, and 1 in 1 year return period storms at high water spring tides. The Mike21 SW wave model was used to transform the storm waves from offshore to the site and then the Mike21 Boussinesq harbour disturbance model was used to simulate the wave conditions around the proposed pontoon berths and slipways. The impact of the proposed SCH development on the sediment transport regime has been assessed by examining the littoral currents and wave climate for both the existing and the proposed harbour layout for 1 in 1 year storms, and for the tidal conditions with the average wave height.

12.3.1.4 Site Visits

The Borrow Pit site was visited by a Chartered Geologist from DAL on 11th March 2021, when all exposures of bedrock and superficial deposits were examined and recorded. In addition, peat probing was carried out in the vicinity of the proposed SCH development early in the project to inform the positioning of the site.

12.3.2 Method of Assessment

Geoconservation is conservation that concerns geodiversity, defined as 'the natural range of geological (rocks, minerals, fossils), geomorphological (landforms, landscape-shaping processes) and soil features' (Grey, 2004). It is vital to consider methods of conservation for geodiversity because it plays a role in sustainable development, conserving and promoting scientifically and culturally important features, sites and specimens that might also be used for education and recreation. Many such features are regionally and locally important for both economic wealth and cultural identity (Ellis, 2011). Geology's importance in these respects is outlined by Prosser et al (2006):

> *'Geology underpins society's need for the natural resources and raw materials which support our day-to-day existence. Geological knowledge is fundamental to the successful exploration for natural resources such as oil, gas, water, stone for aggregate and building, and metal ores. Although not everyone realises it, society depends, and always has depended, on geology'.*
>
> *'Another very important practical application of geology is in trying to understand the dynamic nature of the environment, as evidence from the geological record demonstrates how our climate has changed, how sea levels have risen and fallen, and how numerous species have appeared, evolved and become extinct. An understanding of these past environmental changes is of great practical value, enabling us to better understand and plan for current and future environmental change and associated hazards'.*

The conservation of sites of geological importance has a long history in Europe. The identification of the most significant geological sites in Britain (including for geology, geomorphology, and palaeontology[1]) as a whole began in 1977, when the Nature Conservancy Council began a systematic review of the key Earth science localities. This was known as the Geological Conservation Review, and was completed in 1990 (Ellis et al., 1996). The Review was designed to identify, and help conserve, those sites of national and international importance in Britain, and ultimately provided the scientific evidence-base for the designation of Sites of Special Scientific Interest (SSSIs), to be protected and managed under British Law.

12.3.2.1 Criteria for Assessing Importance of Features

The rationale of the Geological Conservation Review was to select sites that would comprehensively represent the geological history of Britain, and demonstrate the range and diversity of the best Earth science sites in the country (Ellis et al., 1996; Ellis 2011). Sites fall broadly into 3 categories (see Table 12.3.1):

1. Sites of importance to the international community of Earth scientists
2. Sites that are scientifically important because they contain exceptional features
3. Sites that are nationally important because they are representative of an Earth science feature, event or process which is fundamental to Britain's Earth history

Table 12.3.1: Categories for Establishing Importance of Geological Assets in the Geological Conservation Review

Category	Geological Assets
International Importance	• Time interval or boundary stratotypes; • Type localities for biozones (rock strata which are characterised by a closely defined fossil content, usually a fossil species) and chronozones (rock strata formed during the time-span of the relevant stratotypes); • Type localities for particular rock types, mineral or fossil species and outstanding landform examples; • Historically important type localities where rock or time units were first described or characterised, or where great advances in geological theory were first made; • Important localities where geological or geomorphological phenomena were first recognised and described, or where a principle or concept was first conceived or demonstrated.
Exceptional Features	• Sites with unique, rare or special features or preservation; • Sites that are visually striking and can contribute dramatically to the character of the landscape; • Sites with extraordinary fossil assemblages.
Representatives	• Representative of features, events and processes that are fundamental to our understanding of the geological history of Britain

The Geological Conversation Review split sites into Review Blocks, corresponding to divisions of geological time or major events. They can be broadly placed into 7 categories:

- Stratigraphy;
- Palaeontology;
- Quaternary geology;
- Geomorphology (the landforms and processes that form the current landscape)

[1] Palaeontology is the study of extinct life, principally by examining fossils.

- Igneous petrology;
- Structural and metamorphic geology; and
- Mineralogy.

Fossils of vertebrates (animal with backbones), arthropods (including insects, crustaceans, millipedes and spiders) and plants were given their own dedicated selection categories in the Review, owing to the relative rarity of this fossil material compared to the common marine invertebrate fossils found widely across the country.

Using the guidance in the Geological Conservation Review, it is possible to evaluate the importance of sites (the Resource, or Receptor) for the purposes of this assessment for the proposed SCH development and Borrow Pit. This is outlined in Table 12.3.2 below, and is used to subsequently establish the sensitivity of the site in Table 12.3.3.

Table 12.3.2: Criteria to Determine the Importance of the Geological Resources

	Criteria		
Importance	**International Importance**	**Exceptional Features**	**Representatives**
Very High	Resource is internationally and nationally very rare and includes many of the following: a biozone, chronozone, or stratotype; type localities for particular rock types, mineral or fossil species; outstanding landform examples; features that are historically important for geology; localities where geological or geomorphological phenomena were first recognised and described; locations were a principle or concept was first conceived or demonstrated.	Resource has unique, rare or special features or preservation; it is visually striking and contributes dramatically to the character of the landscape.	Resource has extraordinary fossil assemblages; it is representative of features, events and processes that are fundamental to our understanding of the geological history of Britain.
High	Resource is internationally and/or nationally rare and includes some of the following: a biozone, chronozone, or stratotype; type localities for particular rock types, mineral or fossil species; outstanding landform examples; features that are historically important; localities where geological or geomorphological phenomena were first recognised and described; locations were a principle or concept was first conceived or demonstrated.	Resource has unique, rare or special features or preservation; it is visually striking and contributes to the character of the landscape.	Resource has fossil assemblages; it is representative of features, events and processes that are important to our understanding of the geological history of Britain.
Medium	Resource is nationally rare, and includes one or two of the following; a biozone, chronozone, or stratotype; type localities for particular rock	Resource has unique, rare or special features or preservation; it is visually interesting	Resource has fossil assemblages; it is a minor representative of features, events or

Importance	Criteria		
	International Importance	**Exceptional Features**	**Representatives**
	types, mineral or fossil species; outstanding landform examples; features that are historically important; localities where geological or geomorphological phenomena were first recognised and described; locations were a principle or concept was first conceived or demonstrated.	and contributes to the character of the landscape.	processes that are of interest to our understanding of the geological history of Britain.
Low	Resource is not particularly rare nationally, although it may include one of the following: a biozone, chronozone, or stratotype; type localities for particular rock types, mineral or fossil species; outstanding landform examples; features that are historically important; localities where geological or geomorphological phenomena were first recognised and described; locations were a principle or concept was first conceived or demonstrated.	Resource lacks unique, rare or special features or preservation; it is not visually striking, and does not contribute to the character of the landscape.	Resource has no notable fossil assemblages; it is not especially representative of features, events or processes that contribute to our understanding of the geological history of Britain.

To assist in avoiding subjectivity in determining the importance of a resource, we use the following examples to additionally guide each importance level:

- **Very High:** Sites protected by International or EU/European legislation for their geology/palaeontology (e.g. World Heritage Sites, Geoparks);
- **High:** Sites protected by UK legislation for their geology/palaeontology (e.g. Site of Special Scientific Interest);
- **Medium:** Sites of local or regional geological/palaeontological importance; and
- **Low:** Sites with little or no geological/palaeontological interest.

This should serve as a guide only – it is worth noting that geological features in protected areas (such as SSSIs) can extend beyond the boundaries of the designated area, so adjacent areas must feature in the evaluation, and extent of geological outcrops should also be considered.

The criteria for establishing an asset's relative sensitivity to changes to its setting is detailed in Table 12.3.3 below. This has been established by first consulting the criteria for importance outlined in Table 12.3.2 above, which guides the measure of sensitivity for an asset. The guidance from NatureScot (Scottish Natural Heritage, 2018) outlines that sensitivity is subjective, but is based on 'the distribution, character and special interests of heritage assets and their setting and the vulnerability of landscapes to loss of local character or distinctiveness'.

12.3.3: Criteria for Establishing Relative Sensitivity of Geological Asset to Changes

Relative Sensitivity	Criteria
Very High	An asset that is critical to the understanding and experience of the site or area and its geology, should be thought of as having Very High Sensitivity to changes to its setting. This is particularly relevant for assets of international as well as national importance, usually also visually striking, of very high historical significance, that have unique features and/or fossil assemblages, and are representative of processes that are fundamental to our understanding of the geological history of Britain. The loss of this asset would radically reduce the distinctiveness and character of the site or area.
High	An asset that makes a major contribution to the understanding and experience of the site or area and its geology, should be thought of as having High Sensitivity to changes to its setting. This is particularly relevant for assets of international or national importance, usually also visually interesting, of high historical significance, that have unique features and/or fossil assemblages, and are representative of processes of interest to our understanding of the geological history of Britain. The loss of this asset would reduce the distinctiveness and character of the site or area.
Medium	An asset that makes a moderate contribution to the understanding and experience of the site or area and its geology, should be thought of as having Medium Sensitivity to changes to its setting. This is relevant for assets of minor national importance, perhaps visually interesting, of limited historical significance, that occasionally have interesting features or fossil assemblages, and are of minor representation of processes illustrating our understanding of the geological history of Britain, but it's main value may derive from other characteristics. The loss of this asset would somewhat reduce the distinctiveness and character of the site or area.
Low	An asset that makes some/little contribution to the understanding and experience of the site or area and its geology, should generally be thought of as having Low Sensitivity to changes to its setting. This may include some minor geological features of relevance that are not particularly nationally significant and does not contain distinctive fossil or geological features. This is an asset whose value is predominantly derived from its other characteristics. The loss of this asset is unlikely to significantly reduce the distinctiveness and character of the site or area.
Negligible	An asset that makes minimal contribution to the understanding and experience of a site or area and its geology, should generally be thought of as having Negligible Sensitivity to changes to its setting. The loss of this asset will not noticeably reduce the distinctiveness and character of the site or area.

12.3.2.2 Criteria for Assessing Impact

Prosser et al. (2006) identify 5 of the biggest threats to geological/palaeontological sites:

1. Loss of geological exposure through burial under coastal protection schemes, landfill or other developments, such as housing;
2. Loss of geological exposure as a consequence of vegetation encroachment;
3. The removal of irreplaceable features such as caves, landforms or finite deposits of fossils or minerals through quarrying;
4. Removal of fossil or mineral specimens through irresponsible collecting; and
5. Damage to geomorphological features or processes, for example, as a result of coastal protection or river management schemes.

The aim of geoconservation is to find the balance between conservation and preservation Conservation allows ongoing scientific and educational usage of the resource, whereas preservation implies that the resource is completely protected from any form of further depletion. It is therefore paramount to manage geological heritage assets to retain their identified qualities, by managing changes rather than preserving their features with no change at all. However, in rare cases some degree of preservation may be sought, notably when the geological features are extremely finite, and/or limited in extent.

The Earth Science Conservation Classification (ESCC) was established in order to effectively carry out geoconservation and rationalise the practical approach to conservation of the various types of geological site (Nature Conservancy Council, 1990). The ESCC classifies sites into 3 major categories containing a total of 16 site types (see Table 12.3.4). This provides a framework for identifying possible threats to each site, as well as outlining conservation techniques appropriate for each site. The site types, threats and conservation methods relevant for work on the SCH development and Borrow Pit are outlined in Table 12.3.5.

Table 12.3.4: Major Categories and Site Types in Earth Science Conservation Classification System. Site Types in Bold are Most Relevant to this Assessment and Expanded in Table 12.3.3

Major Categories	Type of site
Exposure or Extensive (E)	**Active quarries and pits** Disused quarries and pits **Coastal cliffs and foreshore** River and stream sections Inland outcrops Exposure underground mines and tunnels **Extensive buried interest** Road, rail and canal cuttings
Integrity (I)	**Static (fossil) geomorphological** **Active process geomorphological** Caves Karst
Finite (F)	**Finite mineral, fossil or other geological** Mine dumps Finite underground mines and tunnels **Finite buried interest**

Generally speaking, at exposure or extensive sites, the conservation aim is preserve exposures, judging potential changes on their merits in terms of exposure, and where possible, enhance the sites. At integrity and finite sites, the conservation aim is to minimise changes and avoid significant interference with natural processes in order to preserve the integrity of physical attributes, composition, structure and visibility of systems and sites (SNH, 2018).

Many of the threats to geological sites are mitigated through the planning system, designated protection and the guidelines that accompany it (see Sections 12.2 and 12.4), and the statutory requirement on site owners or occupiers not to undertake any damaging activities. The emphasis is on prevention of damaging activities through sensitive planning, and conservation legislation (Prosser et al., 2006)

Table 12.3.5: Selected Relevant Threats and Conservation Techniques for Geological Sites. (E) = Exposure or Extensive; (F) = Finite; (I) = Integrity. From Prosser et al (2006)

Type of site	Potential Threats / Impacts	Conservation Techniques
(E) Active quarries and pits	• Scientific access to geological features • Storage of quarry waste • Quarry floor development • Restoration	• Consultation with the quarry operator to promote best conservation practice and gain ongoing access for scientific study • Early and ongoing consultation with planners and quarry operators to consider and promote geological conservation during and after the working life of the quarry • Include conservation sections within the restoration plan
(E) Coastal cliffs and foreshore	• Coastal protection • Development • Vegetation management • Dredging	• Maintain natural coastal processes • Avoid developments in front of or on cliffs or foreshore • Discourage development on eroding coasts that may require coastal protection • Vegetation management is usually only required where natural processes are inhibited • Use shoreline management plans for holistic coastal management
(E) Extensive buried interest	• Inappropriate agricultural practices • Tree planting and afforestation • Development • Quarrying • Inappropriate recreational activities	• Promote appropriate agricultural practice • Avoid tree planting and afforestation near buried geological features • Restrict development close to buried geological features • Restrict removal of the buried geological features • Promote good recreational practice
(F) Static (fossil) geomorphological	• Coastal protection • Development • Quarrying and dredging • Infilling of natural depressions • Vegetation encroachment • Tree planting and afforestation • Inappropriate recreational activities • Irresponsible specimen collecting	• Maintain natural processes • Restrict quarrying and dredging • Restrict development • Avoid dumping and infilling of natural depressions • Vegetation management • Avoid tree planting and afforestation • Promote good recreational practice • Promote good collecting practice
(F) Active process geomorphological	• Coastal protection • River and land management schemes • Development • Quarrying and dredging • Tree planting and afforestation • Inappropriate recreational activities	• Maintain natural processes • Use holistic management strategies such as shoreline management plans • Avoid tree planting and afforestation on or near active process sites • Restrict development on or near active process sites • Avoid quarrying and dredging on or near active process sites • Promote good recreational practice
(I) Finite mineral, fossil or other geological	• Irresponsible specimen collecting • Quarrying and mining	• Promote good collecting practice • Avoid quarrying or mining of finite interest features

Type of site	Potential Threats / Impacts	Conservation Techniques
	• Development • Vegetation encroachment • Tree planting and afforestation	• Avoid development near finite interest features • Vegetation management
(I) Finite buried interest	• Inappropriate agricultural practices • Tree planting • Development • Quarrying • Removal of material • Irresponsible specimen collecting • Inappropriate recreational activities	• Promote appropriate agricultural practice • Avoid tree planting and afforestation near buried geological features • Avoid development near buried geological features • Avoid removal of the buried geological features by quarrying • Promote good collecting practice • Promote good recreational practice

Harbour developments are listed as a type of project that frequently results in significant impacts on geodiversity, through impacts on natural coastal processes including erosion and accretion, coastal features including dunes, beaches, cliffs and shore platforms, and rock and sediment exposure in coastal cliffs and foreshore (Scottish Natural Heritage, 2018: Table A4.3). Coastal development can result in the loss of coastal rock or sediment exposures, destruction of active and relict landforms, disruption of natural processes, and changes in sediment cycles. Secondary impacts can include increased traffic/footfall, which can contribute to erosion, destabilisation of outcrops, and irresponsible fossil collection – although the latter can also result in an increase in fossil discoveries because more people are present to search for them.

Mineral extraction, including quarrying, can cause destruction of landforms, rock outcrops, and sediment records, and/or the disruption of natural processes, and runoff can disrupt drainage and cover other assets. But it may have positive benefits in creating new rock or sediment sections, or uncovering new fossils (Scottish Natural Heritage, 2018: Table A4.4).

The following criteria outlined in Table 12.3.6 are used in the assessment to measure the scale of magnitude of changes to the geological resource. They are based on NatureScot's Handbook on Environment Impact Assessment (Scottish Natural Heritage, 2018).

Table 12.3.6: Criteria for Assessing the Magnitude of Impact

Magnitude of Impact	Criteria
Major	Definite significant changes, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness. Finite and integrity features would be lost. Extensive features would be buried or obscured. Duration of impact long term, more than 3 years and irreversible. Changes would not occur naturally, or occur at such a slow rate they would be almost imperceptible (over decades).
Moderate	Noticeable, but not significant changes, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness. Finite and integrity features would be damaged. Extensive features would be buried or obscured for a short duration. Duration of impact medium-term, not more than 3 years, or significant changes for more than 6 months but less than 3 years, but not long-term or irreversible.

Magnitude of Impact	Criteria
Minor	Noticeable changes over a small area with minimal effect on features or to the landscape's character. Finite and integrity features would be preserved. Extensive features may be buried or obscured for a very short duration. Duration short term, less than 3 years, significant changes for less than 6 months, or barely discernible changes for any length of time.
Negligible	Any change would be negligible, unnoticeable, or there are no predicted changes. No effect on features or the landscape's character.

12.3.2.3 Criteria for Assessing Significance of Effects on Geological Features

The determination of the significance of the effects on each geological/palaeontological feature was made by taking into account the importance and sensitivity of the resource (Table 12.3.3), and the magnitude of impact (Table 12.3.6), and applying it in the matrix provided in Table 12.3.7.

Table 12.3.7: Significance of Effects on Geological Features

Magnitude of Impact	Sensitivity/Value of Resource/Receptor				
	Very High	**High**	**Medium**	**Low**	**Negligible**
Major	Major	Major	Moderate	Minor	Negligible
Moderate	Major	Moderate	Moderate	Minor	Negligible
Minor	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible	Negligible

Key

(orange)	**Significant Effect**
(grey)	**Non-Significant Effect**

Following the guidelines in the EIA Handbook (Scottish Natural Heritage, 2018) and professional judgement, moderate and major effects are considered significant, while minor and negligible effects are considered not significant in EIA terms.

These pre-defined criteria will help provide a level of consistency, in evaluating the significance of effects on geological features, and will inform proposals for mitigation. However, qualitative description is also necessary, and provided in this assessment for each asset, to summarise and explain the context of the sites, which is important in establishing sensitivity and magnitude of impact for each individual site/resource.

12.4 Baseline

12.4.1 Statutory Designated Sites

The NCOs on the Isle of Skye all have the following purpose: '**Prevent damage to & removal of Jurassic vertebrate fossils**'. Within an NCO, the following operations are prohibited:

- Damaging, excavating and attempting to excavate (by mechanical means or through use of hand-held tools) vertebrate fossils (body and trace) from either in situ rock or beach deposits including rock fall from cliffs.
- Infilling vertebrate trace fossils and covering or coating trace fossils and immediately associated rock with decorative coatings such as paint or plaster and other cementing or construction material that sets and hardens.
- Removal of vertebrate fossils (body and trace).
- Dumping or construction works that would obscure or obliterate trace fossils or associated rock.

Such operations are only possible if carried out for non-commercial purposes for scientific study and public exhibition, exclusively on the proviso that material is accessioned to a fully accredited Institution in the United Kingdom, or to Staffin Museum (Ellishadder, Culnacnoc, Portree, IV51 9JE), they can only be excavated or removed by officially affiliated individuals, and written consent of the landowner is required.

An "officially affiliated individual" is an employee or volunteer with the necessary qualifications, experience and skill required to excavate or remove vertebrate fossil material and who is instructed in writing by an Accredited Institution or the Staffin Museum to undertake the operations specified in Article 3 of this Order.

There are currently 5 areas on the Isle of Skye that are part of the Skye NCO 2019. Neither the proposed SCH development nor the Borrow Pit are located within an NCO. However, both lie directly adjacent to an NCO, and share features of their geology: the proposed SCH development is adjacent to An Corran NCO; the Borrow Pit lies adjacent to Valtos SSSI (which is also subject to an NCO) (see Section 12.4.1 for more information on An Corran NCO and Valtos SSSI).

There are 28 SSSIs on the Isle of Skye, of which 15 are designated for geological features, 5 for biological, and the remaining 8 for a mixture. Neither the proposed SCH development nor the Borrow Pit are located within SSSI designated areas, but the Borrow Pit lies adjacent to the Valtos SSSI and shares features of its geology (see 12.4.2 for more information on this SSSI).

12.4.1.1 An Corran GCR (NCO)

Although the proposed SCH development site is not located within an NCO, it lies directly adjacent to An Corran Geological Conservation Review Site. The NCO for this site prohibits the damage or removal of Jurassic vertebrate fossils. Fossils here comprise dinosaur footprints, dating to the Middle Jurassic.

An Corran GCR includes all of the land lying between the Mean Low Water Springs (MLWS) and the public road at An Corran Beach, and the MLWS and the public road at Garrafad (the slipway where the SCH development is proposed) (National Grid reference: NG493684; Drawing 73.12.02).

In terms of its geology, An Corran GCR is significant for:

- Dinosaur Footprints
  - Internationally and Nationally rare types of fossil;
  - Internationally and Nationally rare age of fossils, Middle Jurassic age (approx. 166 million years old);
  - The first *in situ* dinosaur footprints found on Skye, and by extension, Scotland; and
  - Focus for local, national and international tourism and education visits.

Underlying Geology and Geomorphology

The rock exposures at An Corran are part of the Duntulm Formation and Valtos Formation (Figure 12.4.1). Throughout Skye the older Jurassic rocks, dating to around 166 million years old, are uncomformably overlain by the Paleogene Skye Lava Group, and dykes from this Group often cut through the older sediments (Drawing 73.12.03). The Skye Lava Group is part of the Paleogene Igneous Province (BIPIP), characterized by intrusive complexes and predominantly basaltic lava fields covering most of Skye, Mull and NE Northern Ireland, with basaltic dykes across Skye, Rum, Mull, and Arran, and some extending to the Outer Hebrides, southern Scotland, north Yorkshire and parts of North Wales (Bell et al., 2002). These were laid down between 64-52 million years ago during the opening of the North Atlantic Ocean. These, by their nature as igneous rocks, are almost entirely unfossiliferous, although some exceptions occur (see Section 12.4.2.3).

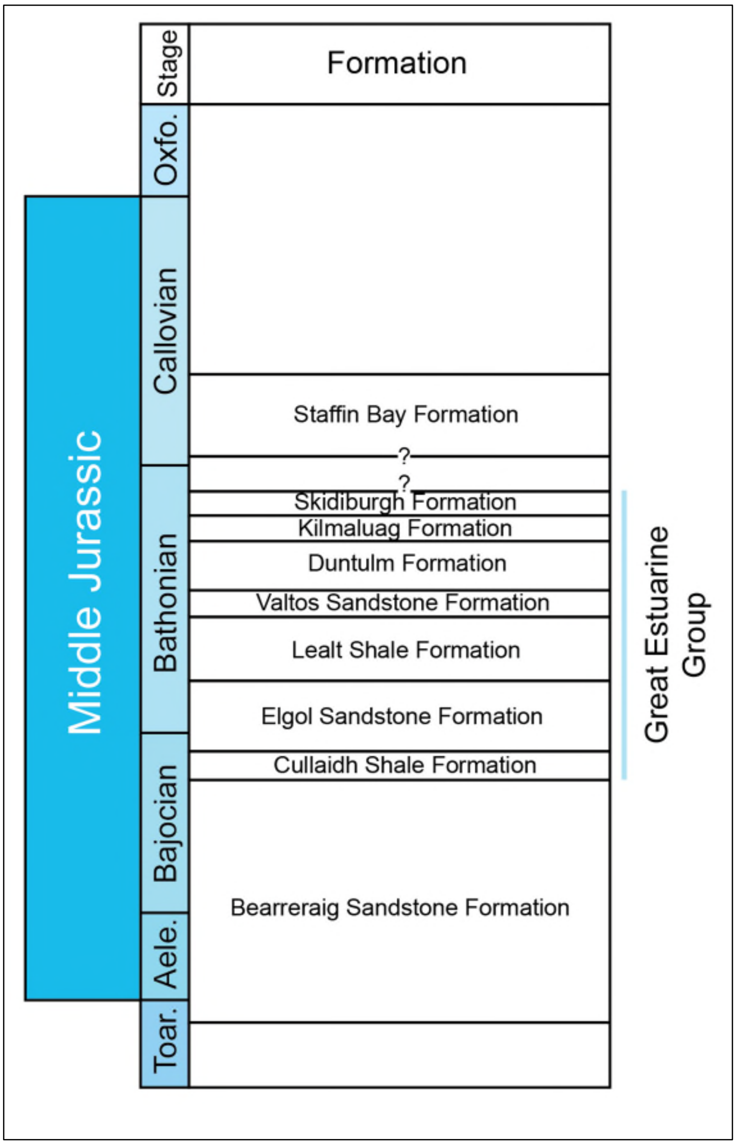

Figure 12.4.1: Stratigraphy of the rocks on Skye (source: Barron *et al.*, 2012)

An Corran GCR is bounded by a Palaeogene dyke to the west and is undercut by a Palaeogene sill intrusion to the east (Cox, 2002, Clark et al., 2004). Above An Corran, there is a section of Kilmaluag Formation in the overlying Palaeogene sill, which supports the exposure on the shore of An Corran belonging to the upper part of the Duntulm Formation (Clark et al., 2004). BGS maps for this area show the Duntulm Formation underlying the shoreline, slipway, and extending within Breun Phort to the east, with the Valtos Formation extending east of Breun Phort and along the shore, southwards.

For more information on the geology of the Valtos Formation, see Section 12.4.1.2.1.

The oyster-rich beds of the Duntulm Formation represent the best developed marine phase in the Great Estuarine Group. The Duntulm Formation is underlain by the Valtos Formation, and the lower boundary is defined by the first occurrence of the oyster *Praeexogyra hebridica*, while the upper boundary is marked by the first occurrence of the ostracod-bearing limestone beds of the Kilmaluag Formation (Barron et al., 2012). The Duntulm Formation is between 33 and 55 metres thick on the Trotternish Peninsula, thinning southwards (Harris and Hudson, 1980).

It extends across Strathaird, Duirinish, Waternish and Trotternish districts on Skye, as well as the Isles of Raasay, Eigg and Muck.

The stratigraphy of the Duntulm Formation is dominated by fissile mudstones and monospecific oyster beds suggesting a strong marine influence, with subordinate limestone, algal limestone and calcareous sandstone beds (Barron et al., 2012). The oyster beds are preserved in limestone or mudstone and vary from a single shell plaster to beds 2m thick. The palaeoenvironment is interpreted as the marine–brackish fringe of a microtidal lagoon (Hudson and Andrews, 1987). Within the Great Estuarine Group, *Praeexogyra hebridica* is confined to the Duntulm Formation, and supports the identification of the fossil footprint-bearing beds as belonging to this formation (Clark et al., 2004).

Palaeontological Heritage

An Corran GCR was designated for the 15 or more dinosaur footprints, found in the Duntulm Formation on the sliver of exposure at the foreshore at An Corran on the south shore of Staffin Bay (Figure 12.4.2). Some have also been found on loose blocks (Clark et al., 2004). The footprints are often covered by a thick layer of sand (this moves seasonally and with changing wind and water conditions). They are usually exposed from late Autumn to late Spring. The accessibility makes the footprint site popular with tourists as well as a research/educational resource.

Figure 12.4.2: Dinosaur Footprints at An Corran Beach (image provided by Niel Clark)

The dinosaur footprints are found on top of two bioturbated calcareous sandstones in the Duntulm Formation. The lower of the sandstones contains theropod dinosaur footprints, and vertical fossil burrows (*Rhizocorallium*). The upper sandstone contains many simple vertical fossil burrows (*Skolithos*) and a smaller ornithischian dinosaur footprint that was found on a loose block of this material (Clark et al., 2004). A bone from an ichthyosaur (a marine reptile), has also been reported as coming from near the slipway at An Corran (White and Ross, 2020) (Figure 12.4.3).

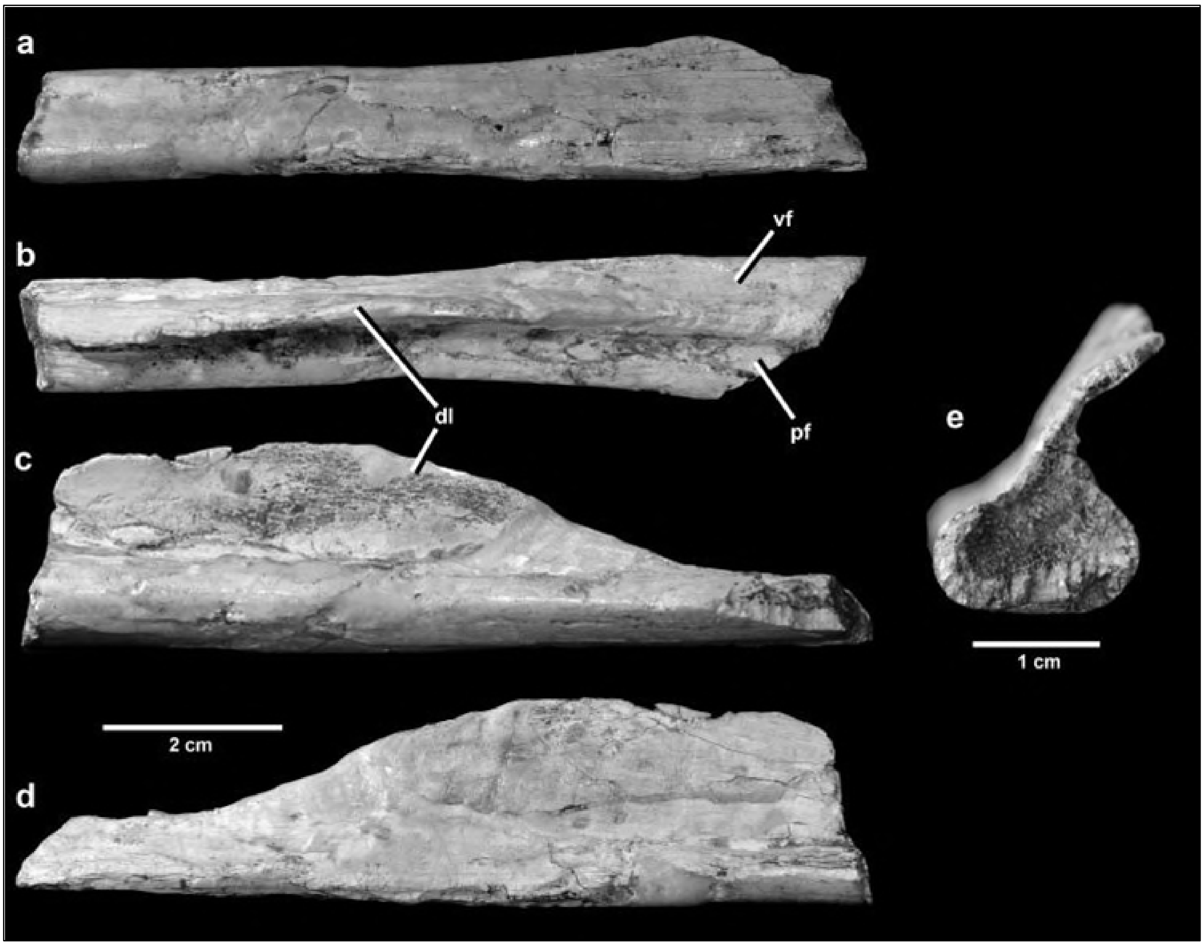

Figure 12.4.3: The ichthyosaur bone (source: The Hunterian, 2021)

Theropod dinosaurs are animals such as *Tyrannosaurus* and *Megalosaurus*, which walked on two legs, and were predominantly meat-eaters. They produced three-toed footprints similar to those of birds (which are their living descendants). Ornithischian dinosaurs were mainly herbivorous, and include animals such as *Stegosaurus* and *Iguanadon*. Some were bipedal and others walked on all-fours.

Identification of dinosaur footprints is difficult beyond the broadest groups, and identifying which exact species of dinosaur that made them is not possible. Ichthyosaurs and other marine reptiles were not dinosaurs, but belonged a separate radiation of reptiles. Their bones are known from multiple location in the Inner Hebrides, notably the Isle of Eigg (Miller, 1858; White and Ross, 2020).

The dinosaur footprints at An Corran are significant for the Isle of Skye, as well as the UK, and internationally. Dinosaur remains (and other vertebrate fossils) from the Middle Jurassic are rare worldwide. Those in An Corran resemble others found elsewhere on the Isle of Skye, as well as the Middle Jurassic of England (e.g. from quarries in Oxfordshire and the Cleveland basin of Yorkshire), Portugal and the United States. The An Corran footprints are over 50cm in length, making them some of the largest theropod dinosaur footprints of Jurassic age.

Elsewhere on Skye, the Duntulm Formation holds abundant fossils. At Cairidh Ghlumaig an extensive dinosaur trackways site and isolated blocks containing sauropod, theropod and ornithischian dinosaur footprints have been found. As well as this, there are belemnites, bivalves, bone fragments (including crocodile), branchiopods (*Cyzicus*), echinoderm fragments, fish fragments, foraminifera, gastropods, ostracods, plant and wood fragments, rhynchonellid brachiopods, shark fin spines, trace fossils (including *Lockeia, Monocraterion, Thalassinoides*) and worm burrows (Harris and Hudson, 1980; Barron et al., 2012).

For more information on the palaeontology of the Valtos Sandstone Formation, see Section 12.4.2.

12.4.1.2 Valtos SSSI (GCR and NCO)

Although the Borrow Pit is not located within a SSSI designated area, it lies directly adjacent to the Valtos SSSI, which is also a GCR site and has NCO status, and shares features of its geology.

Valtos SSSI is located on the north east coast of Skye and comprises three separate, but adjacent stretches of coastline:

1. Inver Tote and along the Lealt River;
2. Along the coast south of Port Earlish; and
3. The cliffs below Valtos and in the roadside exposure at Dun Dearg.

The NCO includes the three parts of the SSSI plus all intervening ground lying between the MLWS at Kilt Rock and Mealt Falls Viewpoint and the low water mark at Lealt Falls and the public road (A855), forming part of the Kilmuir Estate in the County of Inverness Underlying Geology and Geomorphology (Drawing 73.12.04). (National Grid reference: NG 522600 – 522610; NG 521627 – 527621; NG 509655 – 517638).

In terms of its geology, Valtos SSSI, GCR and NCO is significant for:

- Overall scientific understanding of the Great Estuarine Group;
- Elgol Sandstone Formation:
  - Most northerly occurrence; and
  - Important for understanding changes in Formation.
- Lealt Shale Formation:
  - Type section of Lealt Shale Formation; and
  - Type section of the Lonfearn Member of the Lealt Shale Formation.
- Valtos Formation:
  - Type locality for Valtos Formation; and
  - Largest continuous outcrop of Valtos Formation.
- Trace and body fossils:
  - Internationally and Nationally rare types of fossils;
  - Internationally and Nationally rare ages of fossils, Middle Jurassic age (approx. 166 million years old);
  - The first dinosaur footprints found on Skye, and by extension, Scotland;

- One of the first dinosaur bones found on Skye, and by extension, Scotland; and
- Focus for local, national and international tourism and education visits.

The site encompasses rock sections of stratigraphical, sedimentological, paleoecological and paleogeographical significance. The NCO prohibits the damage or removal of Jurassic vertebrate fossils, while the Valtos SSSI lists the following operations requiring consent:

- Construction, removal or destruction of roads, tracks and hardstands; and
- Removal of geological specimens, including rock samples and fossils.

If any of those operations are to be carried out, consent must be obtained from NatureScot unless a local authority has granted planning permission (under Part III of the Town and Country Planning (Scotland) Act 1997 or a designated regulatory authority has given written permission (under s.15 of the Nature Conservation (Scotland) Act 2004). If such permission has been granted work may proceed without obtaining consent from NatureScot for the same operation.

Underlying Geology and Geomorphology

Valtos SSSI encompasses sections of the Elgol Sandstone Formation, the Lealt Shale Formation and the Valtos Sandstone Formation (Drawing 73.12.05). Each section is of considerable sedimentological and/or palaeontological interest, and together they are of major stratigraphical importance in studies of the Great Estuarine Group, a rock unit dating to the Bajocian-Bathonian (Middle Jurassic) which is significant for the geological history of Scotland, and the fossils it contains (Figure 12.4.1). The sections in the Valtos SSSI are the most informative of their type in Northern Skye. In multiple places these Formations are overlain unconformably by the Paleocene Skye Lava Group (see Section 12.4.1.1).

The Elgol Sandstone Formation exposures at Invertote are one of the most northerly occurrences of these sandstones in the Inner Hebrides. This rock formation comprises bioturbated, clay-rich sandstone with some silty fissile mudstone, overlain by white, pure, noncalcareous sandstone (Barron et al., 2012). The lower boundary is delineated by the appearance of dark fissile mudstones from the underlying Cullaidh Shale Formation, while the upper boundary is sharply defined by the appearance of silty or bitumous fissile mudstones from the overlying Lealt Shale Formation. The Elgol Sandstone Formation is between 9m and 32m in depth, at its thickest in Southern Trotternish, thinning north and southwards (Harris and Hudson, 1980; Barron et al., 2012). It is found in the Strathaird and Trotternish districts on Skye, as well as the Isles of Raasay and possibly Eigg. It represents the distributary channels of a delta. At Invertote the outcrops are important for understanding lateral facies changes within these sediments.

The Lealt Shale Formation overlies the Elgol Sandstone Formation, and is exposed in a large section in the Lealt River. This is the type section of the Lealt Shale Formation (Harris and Hudson, 1980). The type section of the Lonfearn Member of the Lealt Shale Formation occurs along the coast, south of Port Earlish. The upper boundary of the Lealt Shale Formation is marked by the range top of the conchostracan *Cyzicus*, and by the base of the Valtos Sandstone, comprising a silty mudstone with monotypic *Neomiodon* beds (Barron et al., 2012). The Lealt Shale Formation is typically around 45m in thickness, but varies across its extent, which includes the Strathaird and Trotternish districts on Skye, the isles of Raasay and Eigg, and Ardnamurchan (Barron et al., 2012).

The Lealt Shale Formation typically comprises fossiliferous silty, fissile mudstones with subordinate thin limestones and septarian nodules (Barron et al., 2012). It is divided into two units, the Kildonan, and the Lonfearn Members. The Kildonan Member mainly comprises mudstones with shell beds and limestones, and bone beds. There is one sandstone bed and at the top of the member, a prominent bed of stromatolitic algal limestone containing gypsum pseudomorphs, recognisable throughout the Hebrides Basin. The Lonfearn Member comprises dark, grey-brown fissile mudstone ('paper shale') with interbedded ooidal limestone (Barron et al., 2012). Desiccation cracks are also present in the uppermost beds. The fossil fauna includes bivalves, conchostracans, gastropods and ostracods. The environment represented in the Lealt Formation is shallow water and coastal lagoons, of low, but variable salinity.

The base of the Valtos formation is marked by silty fissile mudstones with monotypic beds of the bivalve *Neomiodon*, and the top of the formation is defined by the first occurrence of the oyster *Praeexogyra hebridica,* indicative of the overlying lowermost beds of the Duntulm Formation (see below) (Barron et al., 2012). The Valtos Formation has a maximum onshore thickness of 120mon Trotternish, thinning Southwards (Harris and Hudson, 1980). It extends across Strathaird, Duirinish, Waternish and Trotternish districts on Skye, as well as the Isles of Raasay, Eigg and Muck. The Valtos Sandstone Formation is of greatest exposure in an almost continuous section at its type locality in the cliffs below Valtos (which reaches around 120m in thickness), and in the roadside exposure at Dun Dearg.

The Valtos Formation is dominated by upward coarsening sandstone, which is medium- to coarse-grained, white to pale yellow and friable, with cross-bedded sets up to 6m thick (Barron et al., 2012). It contains large ovoid to near-spherical calcareous concretions up to 1m in diameter. The sandstone units are capped by thin shelly limestone beds containing *Neomiodon*. Bioturbated green silty fissile mudstone and *Neomiodon* limestone beds occur within the sandstone units in a series of five cycles of sedimentation (Anderson and Dunham, 1966).

In Trotternish the Valtos Formation is divided into three distinct units, although they don't have official member status: a lower sandstone dominated unit, a middle limestone-shale dominated unit and an upper sandstone dominated unit. The latter is the youngest of these, named the Upper Sandstone Division, and comprises 46m of coarsening-upwards sandstone with intercalated silty fissile mudstone beds (Barron et al., 2012). The environment represents near-shore lagoons that at times were emergent, and occasionally influenced by freshwater input from rivers, bringing sediment and plant debris.

Palaeontological Heritage

Scotland's first Jurassic dinosaur footprint, and one of the first dinosaur bones, were found in the Valtos SSSI. The footprint is a 3-toed print found within the Lealt Shale Formation, and now housed in the Huntarian Museum at the University of Glasgow (Delair and Sarjeant, 1985). One of the two first dinosaur bones, a fragmentary limb bone belonging to a large sauropod dinosaur, was later also found within the Valtos Sandstone Formation (Clark et al., 1995)(Figures 12.4.4 and 12.4.5). These discoveries (and others since) are significant not only for Scotland, but globally, due to the rarity of Middle Jurassic fossil-bearing localities worldwide.

Figure 12.4.4: The Dinosaur Bone and Tooth (taken by Elsa Panciroli)

Figure 12.4.5: The Dinosaur Tooth (taken by Elsa Panciroli)

Since that time more dinosaur discoveries have been made in the Lealt Shale Formation, including extensive footprint sites like that at Rubha nam Braithearean (approx. 1.5 miles north of the Lealt River and the Borrow Pit), containing both sauropods and theropods (dePolo et al., 2018), and a large theropod dinosaur tooth (Young et al., 2019) (Figures 12.4.4, 12.4.5, 12.4.6 and 12.4.7).

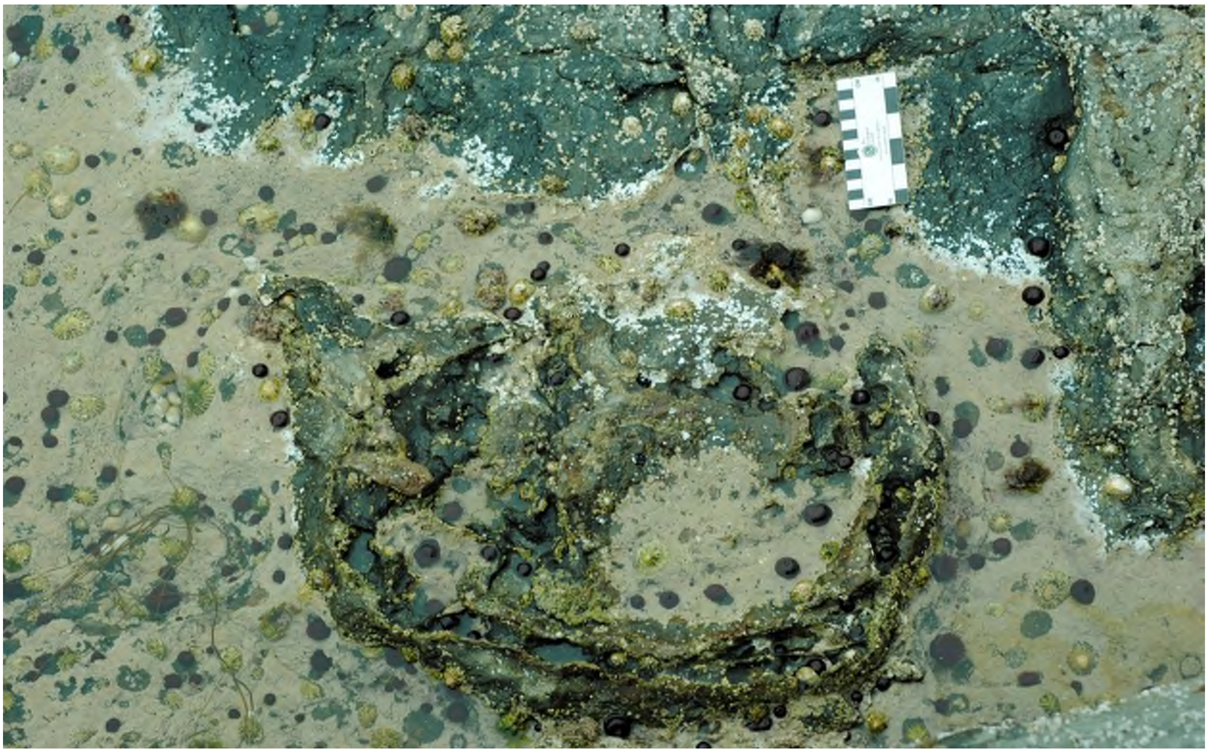

Figure 12.4.6: Dinosaur Footprints at Rubha nam Braithearean (provided by Neil Clark)

Figure 12.4.7: Dinosaur Footprints at Rubha nam Braithearean (provided by Neil Clark)

It is worth noting these sites come from different stratigraphic horizons within the Lealt Shale Formation, indicating that there is potential for footprints and body fossils at various depths within this rock unit. As well as fossil footprints, the Lealt Shale Formation contains bivalves (notably *Neomiodon*), conchostracans (*Cyzicus*), gastropods and plants (ferns), shark teeth and plesiosaur bones (Barron et al., 2012). The restricted, brackish marine faunas are of great interest for palaeoecological studies.

The Valtos Sandstone Formation (which overlies the Lealt Shale Formation), has also produced further finds since the site was given SSSI status. Theropod and sauropod teeth, bones and footprints (mainly from the Valtos SSSI) (White and Ross, 2020). There are also large amounts the bivalve *Neomiodon*, gastropods (*Viviparus*), fish fossils (fin spines, scales and teeth), trace fossils (*Lockeia*, *Monocraterion*, *Planolites* and *Thalassinoides*) and coniferous wood (Barron et al., 2012).

The Elgol Sandstone Formation (which underlies the Lealt Shale Formation) is relatively unfossiliferous, with only some sparse plant remains and trace fossils, including *Diplocraterion*, *Monocraterion*, *Planolites* and *Thalassinoides*. Moulds of bivalves (possibly *Unio*) are found in the uppermost beds at the type section (Barron et al., 2012).

12.4.1.3 Non-designated Assets and Palaeontological Potential

The Isle of Skye is one of Scotland's most significant locations for geology and palaeontology. The rocks and fossils found there make it a tourist hotspot, and popular destination for educational groups including amateurs and professionals. The geology of Skye is iconic, particularly the dramatic landscape created by Palaeogene volcanic activity, which has resulted in the Cuillin mountains, and the dramatic lava traps, for example on the Trotternish Peninsula including Quirang and Old Man Of Storr. These have been extensively studied by geologists, helping them reconstruct geological processes that took place over 55 million years ago. They have subsequently been shaped by ice ages, the last one ending around 10,500 years ago.

The Great Estuarine Group – the collection of Middle Jurassic rock formations found on Skye and other Inner Hebridean Islands – have been extensively studied since the early 20th Century (e.g. Peach et al., 1910; Harris and Hudson, 1980; Barron et al., 2012), and the first fossils of vertebrates (animals with backbones) came from these rocks as found on the nearby Isle of Eigg, by Scottish geologist and writer, Hugh Miller (Miller, 1858). The first vertebrate fossils on Skye were noted in 1933 by Arkell (1933).

Across Skye, the bones of dinosaurs, pterosaurs (flying reptiles), ichthyosaurs and plesiosaurs (marine reptiles), crocodiles, turtles, lizards and other small reptiles, fish (including sharks) and mammals have all been discovered in the last 40 years (see White and Ross [2020] and Panciroli et al., [2020] for more information about these discoveries and their significance).

Vertebrate fossils from the Middle Jurassic are globally rare, making the discoveries on Skye important both nationally and internationally (as outlined in most publications on fossils from the island). Although less well known, the most scientifically important fossils on the island are the exceptionally rare, near-complete skeletons of small Jurassic mammals and lizards, found in the Kilmaluag Formation on the Strathaird Peninsula (Panciroli et al., 2020).

Non-vertebrate fossils such as belemnites (a type of shelled animal), oysters and other shellfish, and smaller ostracods, are extremely abundant on Skye. Although many of fossil discoveries were made, and continue to be made, in designated protected areas, outcrops of fossiliferous rocks are found across the island, including in areas not formally under protection.

The Jurassic sediments are by far the most fossiliferous rock units on Skye, but there is also the possibility of fossils in the overlying Palaeogene lavas and their associated sedimentary layers. Famous examples of such fossils include fossil wood from the Isle of Eigg (Woolnough and Overnell, 2006) and 'MacCulloch's Tree' on the Isle of Mull, the cast of a conifer tree stood upright within the basalt (Figure 12.4.8) (Bell and Williamson, 2016). Such fossils are found embedded in lava fields all over the world, and although not currently known on Skye, such a discovery there would be hugely significant.

Figure 12.4.8: MacCulloch's Tree (provided by James Westland)

12.4.2 Soils and Geology

12.4.2.1 Proposed SCH Development

Soil

As detailed in Table 11.4.2 of Chapter 11: Terrestrial Ecology, the area within the SCH development includes 0.2ha marsh/marshy grassland and 0.07ha of acid grassland, which would suggest the presence of at least some soil.

Geology

As discussed in Section 12.4.1.1, the BGS maps for the area of the SCH development show the Duntulm Formation underlying the shoreline, slipway, and extending within Breun Phort to the east, with the Valtos Formation extending east of Breun Phort and along the shore, southwards.

There are no records of coal working within the vicinity of the proposed SCH development; it is not necessary to consult The Coal Authority records and mine abandonment plans.

The 200m buffer area subject to Phase 1 around the SCH development was dominated by marsh/marshy grassland. As such, the potential for peat was identified. Peat probing was completed and identified that it was present to the south of the development. This informed the design of the development such that no area of peat will be constructed upon, thereby avoiding any peat related impacts.

Made Ground

As detailed in Table 11.4.2 of Chapter 11: Terrestrial Ecology, the area within the SCH development includes 0.18ha of made ground (roads, and buildings).

12.4.2.2 Borrow Pit

Soils

Most of the site is bare ground. Soils present are restricted to a small area of additional landtake to the north belong to the Darlieth Association. The parent materials are drifts derived from basaltic rocks. The soils are generally peaty gleys.

Where present, soils within the development area are very thin (generally less than 300m) and there is no definable split between topsoil and subsoil which would require these to be stripped separately. All soils shall be retained on site and utilised for screening and restoration. There are no relevant impacts in relation to the soil resource.

Geology

The solid geology underlying the Borrow Pit site is shown on published British Geological Survey (BGS) mapping to comprise intrusive igneous strata, predominantly sills of the Little Minch Sill Complex, within the North Britain Palaeogene Sill Suite, of Palaeogene age. These consist of undivided microgabbro, olivine basalt and dolerite.

Observations during the site visit show that the average dip of the strata within the site is approximately 7° (1:8 or 12%) in a westerly direction. The dip represents surfaces of the individual lava intrusions within the igneous sill structure.

Immediately to the east and south-east of the proposed borrow pit site, strata belonging to the Elgol Sandstone Formation are exposed, directly underlying the igneous sill. This material is documented as comprising bioturbated, clay-rich sandstone, intercalated with silty fissile mudstone.

Some 120m to the west of the site, strata from the Lealt Shale Formation are documented, comprising limestone, sandstone, siltstone and mudstone.

The solid strata within the region are cut by several parallel faults, trending from the north-north-west to the south-south-east, with direction of displacement unknown. One of these fault lines is documented to lie immediately to the east of the Borrow Pit site, along the line of the incised burn channel.

There are no records of coal working within the vicinity of the Borrow Pit site; it is not necessary to consult The Coal Authority records and mine abandonment plans.

Drift geology at surface is shown on published BGS mapping to comprise glacial diamicton till to the west of the site. The central and eastern sections of the site are documented as having no significant superficial cover; bedrock is at or near surface. Peat is shown to be present to the north-east of the Borrow Pit, but not within the proposed Borrow Pit site boundary.

Made Ground

There are no documented areas of made ground on the borrow pit site or surrounding area on published topographical or geological mapping. However, the areas associated with the former quarry operations, may have isolated areas of made ground relating to backfill of quarry spoil and overburden.

Land and Mineral Ownership

The land and minerals within the boundary of the Borrow Pit planning application area are owned by the Scottish Government; permission has been obtained with respect to occupying the land and the winning and working of minerals.

12.4.3 Sensitive Receptors / Features

12.4.3.1 Proposed SCH Development

There is one designated protected area adjacent to the proposed SCH development boundary: An Corran GCR/NCO. The following palaeontological features within its boundary that could be impacted by the construction work:

- Fossil dinosaur footprints in the Duntulm Formation (see Section 12.4.1.1); and
- Middle Jurassic vertebrate fossils including dinosaur bones and tracks.

The impact assessment will consider the potential for direct impacts upon these as a result of the construction and operation of the proposed SCH development. The assessment will also include possible impact on potentially fossiliferous underlying rock layers, which extend below the surface all along the shore.

The extent of geological features underwater and offshore is not well understood or characterised. Underwater palaeontology is rare, and extremely difficult to achieve practically. We are therefore not considering possible offshore geological features.

12.4.3.2 Borrow Pit

There is one designated protected area adjacent to the Borrow Pit boundary: the Valtos SSSI/GCR/NCO. The following palaeontological and geological features within its boundary could be impacted by the work at the Borrow Pit:

- The most northerly occurrences of the Elgol Sandstone (see 12.4.2);
- The type section of the Lealt Shale Formation (see 12.4.2); and
- Middle Jurassic vertebrate fossils including dinosaur bones and tracks (see 12.4.2).

The impact assessment will consider the potential for direct impacts upon these as a result of the extraction.

Within 2 miles of the Borrow Pit are related palaeontological features and discoveries, made in areas under designated protection, notably:

- Extensive dinosaur footprint tracksites at Rubha Nam Brathairean, as part of the Valtos SSSI/GCR/NCO (see 12.4.2); and
- Theropod dinosaur tooth found at Rubha Nam Brathairean, as part of the Valtos SSSI/GCR/NCO (see 12.4.2).

The impact assessment will consider the potential for similar discoveries and the impacts upon such assets during the operational phase of the Borrow Pit. The assessment will include possible impact on potentially fossiliferous underlying rock layers in the Borrow Pit, beneath the Palaeogene Lava.

12.5 Impact Assessment

12.5.1 Construction

12.5.1.1 Palaeontological Heritage Impacts

Proposed SCH Development

Based on the Baseline information in Section 12.4, and following the criteria set out in Section 12.3, we consider the sensitivity of An Corran CGR (NCO) to be **High / Very High**. It should be noted that the proposed SCH development does not fall within An Corran CGR, but being directly adjacent to it, geological features may extent into this area, and so it must be taken into account during this assessment.

During the construction of the proposed SCH development, there will likely be direct physical impacts on the immediate area around the existing slipway. This will involve covering the bedrock underlying the immediate area, which includes the Duntulm Formation, the rock layer that has produced fossil footprint and bones along other sections of the coast, including those that are part of An Corran's protected designation (see Section 12.4.1). Sections of the igneous rock (Palaeogene, Skye Lava Group) will also be covered during construction, but this is not significant due to the wide extent of this formation, and lack of distinctive features in this rock in the immediate area.

No bedrock excavation is planned, or earthmoving, so damage to the bedrock itself will be minimal. There is not predicted to be any debris or other runoff that could potentially cover outcrops in the immediate area (see Chapter 17: Water Quality and Coastal Processes).

Some stone removal will take place around the existing slipway, which could potentially uncover new fossil material. Although only one fossil bone has been found from the area immediately around the slipway, it is possible that more are present underneath the existing slipway breakwater and toe, and potentially damaged in the process. However, it should be noted that any such fossils would not be exposed at all if construction did not go ahead, so the potential exposure could be seen as a positive impact, as well as a negative one.

There will be increased traffic and footfall due to construction. This will be short term (the duration of construction), but could have some negative impacts from increased likelihood of damage to fossils in the immediate area. However, it could also result in a positive impact, the discovery of new fossil material, because the more people are in the area the higher the likelihood that existing fossils will be detected.

These impacts are **unlikely** to extend into An Corran GCR, and the magnitude of impact is **Minor / Moderate,** therefore the effects are considered **Moderate/ Major: Significant**.

Borrow Pit

The Borrow Pit lies just outside the Valtos SSSI, but directly adjacent to it. The Valtos SSSI contains type localities, outstanding landforms, unique fossil assemblages and being crucial to our knowledge of the Great Estuarine Group (see Section 12.4.2), therefore its sensitivity is considered **High / Very High**.

The Borrow Pit does not presently contain any significant geological features, exposing only a section of the Palaeogene Skye Lava Group that is not known to contain any significant assets. However, by Phase 2 of construction (as discussed in Chapter 2: Project Description), the quarry bottom will potentially approach the level of the underlying Valtos Formation. This could result in exposing new fossil footprints and other fossils, and/or damaging fossils during extraction. However, there is also a potential positive impact, if new significant fossil discoveries are made as a result of the increased rock exposure - this includes in the short term, and later when the quarry is no longer in use.

There is also a possibility of finding fossils within the Palaeogene Skye Lava Group. However, such fossils are extremely rare and currently not known in any nearby exposures. Therefore, this is not considered to be very likely, or give rise to a significant impact.

Any runoff from quarrying, including fine rock sediment could cause a negative impact. Runoff could also be caused by the increased footfall, which may erode paths around the quarry. Such runoff could potentially obscure sections of the adjacent Valtos SSSI, obscuring existing outcrops. Such impacts are likely to be relatively short term. However, there is not anticipated to be any runoff from the quarrying or footfall, and mitigation measures are in place to prevent this as discussed in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes.

These impacts are **unlikely** to reach the Valtos Formation and other Middle Jurassic exposures, therefore magnitude of impact is **Negligible / Minor**, and therefore the effects are considered **Minor: Non-Significant** to **Moderate: Significant**.

12.5.1.2 Use of Soil and Geological Assets

Proposed SCH Development

The majority of the proposed SCH development will be constructed within the marine environment or on existing made land. There is only 0.27ha of unmade land within the redline boundary and noting that this includes a buffer this is extremely small. A strip of land to the south of the development will be excavated to allow the new pipe to be installed to supply water to the SCH from the spring. The ground will be reinstated once the pipeline has been installed, mitigation to minimise effects on the surrounding land have been identified in Chapter 11: Terrestrial Ecology. Due to the footprint of the development on un-made land being so small the impacts will not be noticed and hence will have a **negligible** magnitude of effect on **low** quality soil giving rise to a **negligible: non-significant effect**.

Borrow Pit

Most of the existing borrow pit is bare ground with soils and overburden forming screening mounds on the western and northern boundaries.

The proposed development areas to the north and east extend to around 0.3ha and soils are very thin (generally less than 300m) and there is no definable split between topsoil and subsoil which would require these to be stripped separately. The soil is of **negligible** value. All soils shall be retained on site and utilised for screening and restoration.

Soil stripping over the full area shall be undertaken at the commencement of operations. Prior to the commencement of soil stripping a blind catch ditch shall be formed along the northern boundary. Prior to soil stripping, silt traps shall be installed along the minor water feature on the eastern site boundary (discussed further in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes). Soils stripped from the excavation area shall be stored within the northern part of the site.

Soil stripping shall only be carried out when soils are reasonably dry. Work routines for stripping operations shall be designed to minimise vehicle movements on unstripped land, and at all times the mechanical handling and compaction of the topsoil shall be minimised. No vehicle, other than those involved in the stripping operations, shall be permitted on unstripped land.

Soil mounds shall not be traversed by heavy vehicles or plant other than in the course of formation or removal for respreading. The sides and top surfaces of all mounds shall be evenly graded and shaped to prevent water ponding on their surfaces.

As the limited soil resource is being kept on site, and handled in such a way so as not to reduce its quality the effects on soil are of **negligible** magnitude of impact giving rise to a **negligible: non-significant** effect.

The rock within the Lealt Quarry is suitable for a range of quarried products including armour which is locally valuable, but available elsewhere as such it is deemed to have a **low** value. The amount of rock to be blasted and processed is greater than that required for the development due to the need to obtain appropriately sized blocks for use as primary and secondary rock armour. The excess material will be retained at reinstatement and remain available for future developments. The amount of rock needed for the construction of the proposed SCH development has been minimised by reusing the material from the breakwater on the existing slipway. Overall, the use of this local resource is assessed as having a **moderate adverse** permanent magnitude of impact giving rise to a **minor: non-significant** effect.

12.5.2 Operation

12.5.2.1 Proposed SCH Development

Direct effects on known and any previously unknown geological features that may be present on within the proposed SCH development would cease with the completion of the construction stage of the project.

Due to the larger berthing area and improved onshore infrastructure, there will be increased public traffic to the harbour and along the road, and footfall along the coastline including within the An Corran GCR. This could increase erosion of protected features along the shoreline, namely the dinosaur footprints. However, the additional number of people in the area could lead to more fossils being discovered, which would be a positive impact.

Changes to the wave and sediment patterns in the harbour caused by the proposed SCH development, could change the exposure of the existing footprints at An Corran, which are currently exposed more or less seasonally (also with changing weather patterns) through the late Autumn to Late Spring, then covered with sand at other times. Increased erosion of bedrock outcrops, as well as superficial deposits, may lead to loss of geological features through their removal, or by being covered in sediment in the longer term. However, the hydraulic modelling (Volume 3, Appendix Q.1) suggests that there will be little, to no change in the wave and flood flow patterns along the shore within the proposed SCH development, or in the An Corran GCR (see Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes).

Some fine suspended material could potentially deposit behind the breakwater in the sheltered area of the harbour. However, modelling suggests it is not expected to exceed what occurs behind the existing slipway. Removal of superficial deposits or the Palaeogene Lava Group could expose new footprints and fossils, which could be a positive impact, the modelling doesn't suggest that the development will increase the removal of superficial deposits.

The magnitude of the impacts from the operation of the proposed SCH development are **Negligible,** therefore the effects are considered **Minor : Non-Significant.**

12.5.2.2 Borrow Pit

Direct effects on known and any previously unknown geological features that may be present on within the Borrow Pit would cease with the completion of the construction stage of the project.

12.6 Mitigation Measures

Details of mitigation measures that may be required to avoid, prevent, minimise, reduce or offset impacts, together with residual and cumulative impacts following mitigation, are provided below.

12.6.1 Construction

12.6.1.1 Proposed SCH Development

It is vital that the Construction of the proposed SCH development does not encroach onto the adjacent An Corran GCR.

The presence of fossils in the area will be included in the risk assessment for work on the site. A visual inspection will be undertaken before work commences, and when slipway stone are removed (uncovering underlying rock exposures). Appropriate construction site staff training will be provided to key employees (such as site supervisor) that includes awareness of fossil resources, and information on the Scottish Fossil Code (see Section 12.2.3.1).

A Scottish Fossil Code Poster will be placed on the environment, health and safety boards in the welfare facilities to make all construction workers aware of the fossil resources. Tool box talks on the fossils and geology of Skye will be given covering:

- How to recognise a fossil; and
- Clear guidance on what to do if they find a fossil.

In the event that potential fossils are detected in the construction area, a designated person should be informed (e.g. site supervisor) who can contact an expert (from the Staffin Dinosaur Museum or a relevant research group) to verify. Plans should be in place for their collection, see Section 12.6.1.3.

12.6.1.2 Borrow Pit

It is vital that the Borrow Pit work does not encroach onto the adjacent Valtos SSSI.

The presence of fossils in the area will be included in the risk assessment for work on the site. A visual inspection will be undertaken before work commences. Appropriate construction site staff training will be provided to key employees (such as site supervisor) that includes awareness of fossil resources, and information on the Scottish Fossil Code (see Section 12.2.3.1).

A Scottish Fossil Code Poster will be placed on the environment, health and safety boards in the welfare facilities make all construction workers aware of the fossil resources. Tool box talks on the fossils and geology of Skye will be given covering:

- How to recognise a fossil; and
- Clear guidance on what to do if they find a fossil.

In the event that potential fossils are detected in the construction area, a designated person should be informed (e.g. site supervisor) who can contact an expert (from the Staffin Dinosaur Museum or a relevant research group) to verify. Plans should be in place for their collection, see Section 12.6.1.3.

12.6.1.3 In the Event of Fossils Being Found

If fossils are found, follow the Scottish Fossil Code, and do the following:

1. The provided contacts should be consulted to confirm the find is a fossil. In the first instance this will likely include staff from the Staffin Dinosaur Museum or NatureScot.
2. If the find is confirmed to be a fossil, the next stage is for a professional palaeontologist to determine the significance of the find. If it is not significant, construction may either continue, or the fossil may be removed by those with the licence and experience to do so, and placed in an appropriate museum (e.g. Staffin Dinosaur Museum or National Museums Scotland). Information on the location of the fossil and geological context will be collected, in accordance with the Scottish Fossil Code.
3. In the event that they are significant fossils (e.g. dinosaur trackways, or dinosaur or other vertebrate bones), a professional palaeontologist should work in consultation with NatureScot to:
    a. Record the discovery in situ using photography, photogrammetry;
    b. Remove the fossil material as appropriate; and
    c. Collect any other information necessary for the study and publication of the fossil(s).

12.6.2 Operation

12.6.2.1 Proposed SCH Development

Once construction is complete, it is important that visitors remain aware of the potential for fossil discovery at this site. A Scottish Fossil Code poster should be placed in the office, and a publicly accessible area so that visitors are aware of potential fossils know what to do if they find one.

If any new significant geological or palaeontological features were exposed in the construction phase of the project, there must be consultation with NatureScot and a professional palaeontologist to determine how these should be conserved and managed during operation and into the future.

12.6.2.2 Borrow Pit

If any new significant geological or palaeontological features had been exposed in the construction phase of the project, a geoconservation management plan will be required for the quarry, in consultation with NatureScot and a professional palaeontologist.

12.7 Cumulative Impacts

No cumulative impacts on the geology and palaeontology are identified for the proposed SCH development or Borrow Pit.

12.8 Residual Effects

The Proposed Development has been designed, where possible, to avoid direct impacts on geological resources and designated areas, and lies outside of the protected An Corran GCR and Valtos SSSI. The implementation of the mitigation measures outlined in Section 12.6 reduces the significant effects to non-significant, minimising potential damage to known geological features of significance, and helping ensure any new features exposed during construction and operation are identified and appropriate action taken in line with the guidance in the Scottish Fossil Code.

At the proposed SCH development, in the long-term there are likely to be more visitors to the immediate area, which could increase footfall on the An Corran GCR (NCO), which could lead to both negative and positive impacts (e.g. erosion, new fossil discoveries). The mitigation measures outlined above in Section 12.6 will not prevent these issues, however, they are considered non-significant. NatureScot and the local community should be made aware of this potential residual effect, which is also part of a larger pattern of increased tourism on Skye, so that they can include it in any sustainable tourism plans and geoconservation management plans being drawn up for An Corran GCR and other designated protected areas nearby.

12.9 Summary

Below, Table 12.9.1 provides a summary of impacts, mitigation and residual effects of the proposed SCH development and Borrow Pit on the geology and palaeontology of the immediate area.

Table 12.9.1: Summary of Impacts, Mitigation and Effects on Geological Features

Receptor	Nature of Impact	Receptor Sensitivity	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction: Proposed SCH Development							
An Corran GCR – whole area	Direct Impacts	High / Very High	Minor / Moderate Adverse	Major / Moderate: Significant Adverse	Harbour Construction not to encroach on An Corran GCR; key employees aware of existing assets.	Negligible Adverse	Negligible/ Minor: Non-Significant Adverse
An Corran GCR - Dinosaur Footprints and other fossils	Potential for direct impacts and new discoveries.	Very High	Minor Adverse	Moderate: Significant Adverse	Potential for fossils included in risk assessment; visual check for fossil assets prior to construction, and after boulder removal; Scottish Fossil Code posters put up; key employees made aware of fossil potential; plans in place for collection/study if fossils found.	Negligible Adverse	Minor: Non-Significant Adverse
An Corran GCR – Duntulm Formation outcrops	Potential Direct Effects	High	Negligible Adverse	Negligible: Non-Significant Adverse	Harbour Construction not to encroach on An Corran GCR; key employees aware of existing assets.	Negligible Adverse	Negligible: Non-Significant Adverse
An Corran GCR – Skye Lava Group	Potential Direct Effects	Low	Minor Adverse	Negligible: Non-Significant Adverse	Potential for fossils included in risk assessment; visual check for fossil assets prior to construction, and after boulder removal; Scottish Fossil Code posters put up; key employees made aware of fossil potential; plans in place for collection/study if fossils found.	Negligible Adverse	Negligible: Non-Significant Adverse
Construction: Borrow Pit							
Valtos SSSI – whole area	Direct Impacts	High / Very High	Negligible/ Minor Adverse	Minor/Moderate: Significant Adverse	Borrow Pit not to encroach on Valtos SSSI.	Negligible Adverse	Negligible/ Minor: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Valtos SSSI – Lealt Shale Formation type section	Direct Impacts	Very High	Negligible Adverse	Minor: Non-Significant Adverse	Borrow Pit not to encroach on Valtos SSSI.	Negligible Adverse	Minor: Non-Significant Adverse
Valtos SSSI – Valtos Formation type section	Direct Impacts	Very High	Negligible Adverse	Minor: Non-Significant Adverse	Borrow Pit not to encroach on Valtos SSSI.	Negligible Adverse	Minor: Non-Significant Adverse
Valtos SSSI – trace and body fossils	Potential for direct impacts and new discoveries.	High	Negligible Adverse	Negligible: Non-Significant Adverse	Potential for fossils included in risk assessment; Scottish Fossil Code posters put up; key employees made aware of fossil potential; plans in place for collection/study if fossils found.	Negligible Adverse	Negligible: Non-Significant Adverse
Valtos SSSI – Skye Lava Group	Direct Impacts	Low	Negligible Adverse	Negligible: Non-Significant Adverse	Borrow Pit not to encroach on Valtos SSSI	Negligible Adverse	Negligible: Non-Significant Adverse
Soils	Movement and disturbance of soils	Negligible	Negligible Adverse	Negligible: Non-Significant Adverse	Soils to be handled appropriately to minimise structural damage.	Negligible Adverse	Negligible: Non-Significant Adverse
Rock	Blasting, removal and use of resource.	Low	Moderate Adverse	Minor: Non-Significant Adverse	Blast design aimed to maximise yield of required sizes. Unrequired rock to be stored at the Borrow Pit suitable for future use.	Minor Adverse	Negligible: Non-Significant Adverse
Operation: Proposed SCH Development							
An Corran GCR – whole area	Direct Impacts	High / Very High	Negligible Adverse	Negligible/ Minor: Non-Significant Adverse	If geological features found, appropriate people notified.	Negligible Adverse	Negligible/ Minor: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
An Corran GCR - Dinosaur Footprints and other fossils	Potential for direct impacts and new discoveries.	Very High	Negligible Adverse	Minor: Non-Significant Adverse	Scottish Fossil Code posters placed in prominent location; if geological features found, appropriate people notified	Negligible Adverse	Minor: Non-Significant Adverse
An Corran GCR – Duntulm Formation outcrops	Potential Direct Effects	High	Negligible Adverse	Negligible: Non-Significant Adverse	If geological features found, appropriate people notified.	Negligible Adverse	Negligible: Non-Significant Adverse
An Corran GCR – Skye Lava Group	Potential Direct Effects	Low	Negligible Adverse	Negligible: Non-Significant Adverse	If geological features found, appropriate people notified	Negligible Adverse	Negligible: Non-Significant Adverse

Key

	Significant Effect
	Non-Significant Effect

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12.11 Glossary

Acronym	Definition
DAL	Dalgleish Associates Ltd
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ESCC	Earth Science Conservation Classification
GCR	Geological Conservation Review
m	metres
MLWS	Mean low water springs
NCO	Nature Conservation Order
SCH	Staffin Community Harbour
SSSI	Sites of Species Scientific Interest

Chapter 13: Landscape, Seascape and Visual

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13.1 Introduction

13.1.1 Scope and Aims of the Assessment

This report has been prepared as part of the Environmental Impact Assessment which accompanies the planning application for the development of the proposed Staffin Community Harbour (SCH) development.

The assessment addresses the potential landscape and visual impacts of the proposal on the *landscape,* in respect of the *landscape resource,* and on *human beings* in terms of *visual amenity*. It has been carried out utilising the methodology and approaches as recommended by Guidelines for Landscape and Visual Impact Assessment prepared by the Landscape Institute and Institute of Environmental Assessment 3rd ed., 2013 (GLVIA, 2013) and Landscape Character Assessment Guidelines for England and Scotland, 2002.

Landscape and visual impacts are related, but independent issues. Landscape impacts relate to "effects on the landscape as a resource in its own right". Visual impacts relate to "effects on specific views and on the general visual amenity experienced by people." (GLVIA, 2013). It is important at this stage to differentiate between landscape and visual impacts. Landscape is defined as "An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors." (Council of Europe, 2000). A landscape impact is therefore an alteration to people's perception of an area; these changes involve effects on topography, landforms and texture, as well as the use of the land and may directly or indirectly affect individual landscape elements, or patterns of landscape elements i.e. the components of the land. A landscape impact relates directly to what is happening to the land and changes to its character. Visual impacts, however, are concerned with the effects of changes in the landscape upon views, and therefore relate to people's perceptions of aesthetic characteristics; visual amenity. Landscape and visual impacts are assessed separately, despite their relationship, as a development that has a landscape impact may not necessarily have a visual impact if there are no views of the development attainable (GLVIA, 2013 2.18 - 2.22 refers). The importance of the sea in this setting is noted and considered throughout, for simplicity however all general references to landscape relates to the landward, coastal and seaward resource, this is further detailed at 13.4.1. This is consistent with the definition of landscape from the European Landscape Convention which includes seascapes and marine environments; as the UK Marine Policy Statement, 2011 also indicates, "seascape should be taken as meaning landscapes with views of the coast or seas, and coasts and adjacent marine environment with cultural, historical and archaeological links with each other."

The aim of this assessment is to:

- evaluate the predicted landscape impacts of the proposed development upon the landscape of the site, and its environs and the visual effects that the development would have when viewed from areas outwith the site;
- identify mitigation measures which could be incorporated into the development of the quarry in order to reduce both the existing and future landscape and visual impacts.

This iterative design process is critical to the EIA process and landscape and visual impact assessment methodology.

13.1.2 Potential Impacts

The following potential types of impact are considered in the assessment:

- direct and indirect impacts on landscape resources and character, including physical and perceptual qualities of the landscape, and upon designated landscapes;
- visibility of the development and effects on views and visual amenity;
- short term and temporary impacts during construction phase;
- intermittent impacts associated with the operation of proposed SCH development such as vehicular and pedestrian activity, movement and lighting;
- cumulative effects resulting from the proposal in combination with other ongoing, planned and proposed development in the area; and
- long term impacts of proposed SCH development (operational phase).

13.1.3 Design Process

There are several elements to the proposed development and their design requirements, and the design processes, vary. Common to each element however is the iterative process of design. This has been central to master planning and detailed planning of site elements and the design team have been able to keep in mind the potential landscape and visual effects of design permutations throughout. The major elements are noted below.

Intensification of use of the site has been considered in design.

13.1.3.1 New Breakwater

To be formed in natural rock armour stone, this being in keeping with the existing breakwater at Staffin (Drawing 2297-111).

Location and form have been considered, primarily from a practical point of view but also with landscape in mind. The principle of enhancing the existing harbour at Staffin does not introduce a new feature.

13.1.3.2 Pontoons

The finish of the proposed pontoons is to be GRP Mini Mesh (Figure 13.1.1) this has been subject to discussion with the local community as part of a formal pre-application consultation exercise. Lighting will be necessary to facilitate safe use. The form and arrangement will respect the harbour layout.

Figure 13.1.1: An Example of GRP Mini Mesh

13.1.3.3 Slipway

A new slipway is proposed in addition to the retention of the existing slipway (Drawing 2297-111). While scale and layout is led by practical constraints, there is some scope for design to minimise potential effect in relation to form and finish.

13.1.3.4 Onshore built elements

Hardstanding including an area of land reclamation, storage sheds, toilets and office, car and boat parking, roadways, barriers, gateways, soft landscaping, and signage all have the potential to affect landscape and visual amenity (Drawing JG4846). Equally, good design can enhance an area and the development has the potential to create a quality user experience for locals, commercial users and visitors alike (Drawings JG4850 and JG4848). Utilities will be buried where possible, the requirements extend to: a water tank; septic tank and outfall pipe; two above ground fuel tanks; and a substation and associated electrical cabling to serve the SCH.

13.1.3.5 Borrow Pit

The proposal includes the use of an established quarry as a Borrow Pit (currently not operational), with the intention of providing all aggregate and armour stone locally.

Engineering and mining operations (which for the avoidance of doubt includes all winning and working of minerals) are explicitly exempt from the requirements to provide a formal design and access statement (The Town and Country Planning (Development Management Procedure)(Scotland) Regulations 2008, Section 13). Nevertheless, quarries and borrow pits are *designed*, and it is important to note that the design of the Borrow Pit is not only the basis for efficient, safe working of the development but also key for the mitigation of impacts. Impacts arise from design, and as such, through careful design, impacts can be minimised 'up front'.

Regulations, Guidance and Sources of Information

13.1.4 European and International Convention

The European Landscape Convention was adopted by the Committee of Ministers of the Council of Europe on 19 July 2000 and opened for signature by its Member States in Florence on 20 October 2000 (Council of Europe, 2000). This remains relevant in terms of its content and in particular the acceptance of standard definitions as laid out in its general provisions.

13.1.5 National Legislation

The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Town and Country Planning (Environmental Impact Assessment) (Scotland) 2017 require that a full assessment of likely effects. This includes the potential for significant effects on landscape, seascape and visual amenity.

13.1.6 Other Guidance

National and Local Policy was considered throughout this assessment, as laid out in Scottish Planning Policy (SPP) and the local development plan. Planning Advice Notes 50, 58, 60 and 64 are of relevance to the assessment of landscape and visual effects.

The study was also informed by the guidance documents listed below:

- Landscape Institute and the Institute of Environmental Management and Assessment, Guidelines for Landscape and Visual Impact Assessment 3rd ed. (GLVIA, 2013);
- SNH and the Countryside Agency (2006) Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity;
- Landscape Institute (2011) Landscape Institute Advice Note 01/11: Photography and photomontage in landscape and visual impact assessment;
- Countryside Agency and SNH (2002) Landscape Character Assessment Guidance for England and Scotland;
- Highland Council Visualisation Standards for Wind Energy Developments, July 2016;
- SNH, Guidance note, Coastal Character Assessment, August 2017;
- SNH, Guidance on Landscape/Seascape Capacity for Aquaculture, 2008;
- SNH, Commissioned Report No. 103 An assessment of the sensitivity and capacity of the Scottish seascape in relation to windfarms.
- SNH, Commissioned Report No. 374 – The Special Qualities of the National Scenic Areas, 2010

13.1.7 Sources of Information

The study was informed by data gathered from the sources of baseline information listed below:

- Development Plans covering the study area;
- SNH Landscape Character Assessments (LCAs);
- NSA and LLA citations
- Ordnance Survey Landranger (1:50,000) and Explorer (1:25,000) maps;
- Field surveys and site photography;
- Aerial and drone photography;
- Computer generated Zones of Theoretical Visibility (ZTVs);
- Computer modelled images and photomontages; and

Source data for modelling theoretical visibility included the following digital data:

- NEXTMap® Britain Data containing 3-D contour information at 5m intervals, reported as being accurate to ±1m;

- Raster Data at 1:50,000 which show surface details such as roads, forest and settlement detail equivalent to the 1:50,000 scale Landranger maps;
- OS Mastermap data, site specific topographical survey and detailed design proposals;
- GPS readings at viewpoint locations.

13.2 Method of Assessment

Landscape and visual impact assessment methodology includes the collection of baseline data from desk study and fieldwork and information from consultees. The existing *landscape character* is described; key landscape components are identified as are any landscape designations. The visual relationship between the development area and its environs is also established.

Potential impacts of the proposal are also then determined, on the landscape resource, its components and designations, and landscape character as well as visual amenity. Within this framework the positive and negative impacts of the proposal may be identified.

Mitigation measures are identified, including a consideration of 'mitigation by design' as well as any further measures as necessary

The significance of potential residual impacts is then assessed as well as a consideration of these impacts over time and any cumulative effects of the development.

In order to establish the significance of landscape impacts the sensitivity of the resource and the magnitude of impacts must be determined. Sensitivity is related to the value placed on a resource and there is inevitably an element of subjectivity in this aspect of landscape and visual impact assessment.

Landscape components and character are considered important, in their own right, and are valued for their intrinsic qualities regardless of whether they are seen by people. Visual amenity relates to the sensitivity of visual receptors. Sensitivity is a response to a stimulus and is therefore dependant on, and specific to, the nature of the proposal. It is however accepted that some landscapes and viewpoints have higher inherent sensitivity than others.

Determining the magnitude of change is generally more objective and quantifiable.

This section sets out the methodology used in the assessment. Work was undertaken in accordance with the methodology set out in published good practice guidance particularly that of the Highland Council and NatureScot (formerly Scottish Natural Heritage - SNH).

13.2.1 Terms and Definitions

Key terms and definitions used in the assessment are consistent with European Landscape Convention (2000) and definitions provided in the Guidelines for Landscape and Visual Impact Assessment 3rd ed. (2013). Wild land definitions taken from SNH 'Wildness in Scotland's Countryside Policy Statement (2002):

- **Cumulative Effects** the summation of effects that result from changes caused by a development in conjunction with other past, present or reasonable foreseeable actions.
- **Elements** of the landscape are the parts which make up the physical landscape such as trees and buildings.

- **Features** are the more prominent or noticeable elements within the landscape, e.g. a tower or woodland.
- **Landscape** is "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (Council of Europe, European Landscape Convention, 2000) or, "the human perception of the land conditioned by knowledge **and** identity with a place".
- **Landscape Capacity** is the degree to which a particular landscape character type or area is able to accommodate change without unacceptable effects on its character (a measure of how robustness it is to change). Capacity varies according to the type and nature of the change being imposed, and will reflect both the sensitivity of the landscape resource and its visual sensitivity;
- **Landscape Character** is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people;
- **Magnitude** relates to the size and scale of effect, geographical extent, duration and reversibility. The IEMA recommend magnitude is referred to as simply the 'nature of effect'.
- **Seascape** is "an area, as perceived by people, from land, sea or air, where the sea is a key element of the physical environment" (European Landscape Convention, 2000) or "the visual and physical conjunction of land and sea which combines maritime, coast and hinterland character" (Alison Grant, 2006).
- **Sensitivity** is specific to receptors but also relates to specific development or impact types. This combines the susceptibility of a receptor and the value of the receptor. The IEMA recommend sensitivity is referred to as simply the 'nature of receptor'.
- **Visual** Receptor viewer group that will experience an effect.

13.2.2 Key Steps in the Methodology

An iterative approach was adopted during the design and development of the project, enabling an understanding of the baseline environment and the early identification of potential effects to be fed into the evolving design, refining and adapting it so as to help develop the best possible scheme.

The key steps in the methodology were as follows:

- consideration of initial site design;
- identification of policy and designations which are of relevant to landscape and visual amenity;
- identification of significant landscape components that may be affected by the development;
- understanding the local landscape character areas and types informed by the relevant published landscape character assessment for the area and by field surveys (February and March 2021), taking into account geology, topographical structure, vegetation, features of landscape importance (e.g. archaeological, ecological, geological), existing condition, quality and given value (reflecting landscape designations);
- determination of the sensitivity of each area to the type and scale of the development;

- the production of a ZTV for the development area in order to determine the study area, and to identify key viewpoints;
- selection of assessment viewpoints which are representative of the range of views and types of viewer likely to be affected and determination of the sensitivity of each view to change;
- the production of computer modelled and photomontage images of the development from an appropriate selection of viewpoints;
- iterative design development, and identification and evolution of appropriate measures to mitigate effects;
- the prediction of magnitude of change in the landscape (both in terms of direct changes to landscape features and changes to character of surrounding landscapes) of each landscape unit (character area/type), and in the visual amenity of each viewpoint;
- the evaluation of the significance of residual effects (i.e. assuming mitigation is taken on board) upon each landscape unit and viewpoint; and
- consideration of cumulative issues to judge the effects of the development in combination with other ongoing or proposed projects nearby.

13.2.3 Baseline Methodology

13.2.3.1 Study Area

The identification of the study area was based on the recommendations contained in GLVIA 2013, and reflects the extent of the Zone of Theoretical Visibility (ZTV – 13.3.3.2 and 13.4.2 refer). The Landscape Context (Character Areas) and Viewpoint Locations are illustrated on Drawing 73.13.01.

The maximum *theoretical* extent within which any part of the development may be seen is illustrated on Drawings 73.13.02 and 73.13.03 relating to the SCH and Borrow Pit respectively. Viewpoint selection guided by this ZTV takes into account existing and potential future impacts of the Staffin Harbour facility and Lealt Quarry Borrow Pit.

13.2.3.2 Zone of Theoretical Visibility Mapping

LSS 3D modelling software was used to generate the ZTV. The programme calculates areas from which the development components are potentially visible. This is performed on a 'bare ground' computer generated terrain model, which does not take account of potential screening by buildings or filtering by vegetation. The input parameters used were a 50m x 50m grid which means that for each 50m grid point the computer outputs 'visible' or 'not visible' (+1 and -1 values respectively). The receptor grid points used were set at 1.8m above ground level. The +1 and -1 output values are plotted as contours and the 1m contour is overlaid onto the Ordnance Survey (OS) base map to illustrate the extent of the ZTV. It should be noted that the programme uses point height data, rather than continuous data, and assumes straight line topography between data points. It is not able therefore to take account of small-scale topographic features. As it uses a 'bare ground' model, it is considered to over emphasise the extent of potential visibility, and therefore represents the maximum potential visibility. The ZTV indicates theoretical visibility of any component of the project.

13.2.3.3 Viewpoint Selection

Viewpoints used for this assessment were chosen according to the following criteria:

- being publicly accessible;
- having a reasonably high potential number of viewers or being of particular importance to the viewers affected;
- providing a representative range of viewing distances (short, medium and long-distance views) and elevations, although this being limited by local topography;
- representing a range of viewing experiences (static views, views from settlements and sequential points along routes);
- representing a range of view types, (panoramas, vistas, glimpses); and
- representing views with different extents of the development visible.

Viewpoints lie within the calculated ZTV and locations with the clearest views of the have been selected. It is more appropriate to select viewpoints representative of residential properties rather than views specifically from individual properties. The visual receptors represented by each chosen viewpoint are noted within the assessment which follows.

Viewpoint 1A (Drawing 73.13.04) is included as a useful illustration of the site layout from an oblique aerial view. Note, this is not included for assessment of visual effects, being a drone image and the viewpoint not readily accessible to viewers.

13.2.4 Method of Assessment

The assessment of landscape and visual effects is typically based on three stages:

- establish the sensitivity of the landscape and visual receptors to the development proposed, that is the nature of the receptor;
- predict the magnitude of change in the landscape or the view, that is the nature of the impact; and
- evaluate the significance of landscape and visual effects.

Sensitivity and magnitude are described as low, medium or high. Where impacts do not fit clearly within one of these broad categories the notation 'low-medium' or 'medium-high' may be used indicating that the impact/receptor under consideration may be within that wider range of sensitivity/magnitude or indeed is considered to be intermediate to the two categories. Significance is described as negligible, slight, moderate, major or exceptional and once again if there is a wider range of significance which does not fit within a single category or an intermediate significance this is described as comprising two categories e.g. 'slight-moderate'.

13.2.4.1 Sensitivity

Sensitivity is simply the 'nature of the receptor', in so far as this relates to the interaction with an impact to give rise to an effect.

Landscape sensitivity is a function of the value placed on the environment and its ability to accommodate change i.e. without adverse effects on its character. This is dependent on the existing quality of the landscape. The sensitivity of different aspects of the landscape, e.g.

landscape elements or characteristics may vary. Sensitivity in relation to different types of development may also vary. For the avoidance of doubt, although assessments often imply that certain landscapes have an inherent sensitivity this strictly relates only to a 'likely' or 'potential' sensitivity. This would relate to inherent (i.e. development independent) aspects such as importance or value of a landscape or element/feature, in some landscapes the ability to accommodate change may also be considered in general terms and not specifically in relation to a development type. The proper place for a consideration of sensitivity, in accordance with the GLVIA, is within the assessment of effects rather than the landscape baseline.

The sensitivity of visual receptors is a function of the value or importance of each view, the expectations of the average viewer the number of people likely to be affected and the ability of the view to accommodate the development without significant or noticeable adverse change. This is dependent on the existing quality of views, including any impacts of existing operations as well as the nature of the viewpoint in relation to likely viewer types and their occupation while at the viewpoint. An assessment of the condition/context of a viewpoint and the value attributable to a view is highly subjective.

For avoidance of any potential confusion over terminology where this report refers to 'view/viewpoint sensitivity' this relates to the likely collective sensitivity of viewers at that viewpoint, it is noted that the viewpoint *per se* is not visually sensitive.

'Noticeability' is used as an overarching term to describe the interplay of a number of factors such as the context of a viewpoint (including to some extent the complexity/diversity of the components in the view which affect the ability of the view to accommodate change) and the expectations/occupation of the viewer (e.g. residential, working, driving, organised recreation, casual recreation etc.). While the term is not used within the GLVIA it effectively summarises a number of standard factors accepted as contributing to sensitivity of visual receptors. The primary reason for the use of this term is to clearly differentiate from 'visibility'.

Table 13.2.1: Sensitivity

Landscape		Visual
Important landscapes; national designations; landscape of particularly distinctive character or those susceptible to relatively small changes.	High	Residential areas, major roads; well used paths; popular recreational facilities; historical buildings, unspoilt areas, and settlements very close to source of impact.
A landscape of fairly common and/or valued characteristics which is reasonably tolerant of change.	Medium	Quieter settlements; isolated properties/farms; recreational facilities; areas affected by human activity; roads and paths with average usage.
For example, a relatively unimportant landscape, or the nature of which is potentially tolerant of substantial change.	Low	Agricultural/ rural land; industrial areas; areas clearly affected by human activity; minor roads; and remote public rights of way.

13.2.4.2 Magnitude

Magnitude is simply the 'nature of the impact', in so far as this relates to the interaction with a receptor to give rise to an effect.

There is no accepted standard methodology for quantifying the scale of impact although it is recognised as beneficial to be objective and quantify effects where possible, such as 'area affected' or 'duration' of a particular impact, or numbers (or range of numbers) of viewers affected.

Magnitude of landscape impact relates to scale of change, degree of contrast or ability of integration of any new features which may affect landscape character, duration and nature of impact, the loss or effect on specific features or landscape elements.

The effect on a view will depend on the extent of visibility both in relation to the amount of a development which is visible and also the proportion of view affected by a development. The degree of obstruction of existing features or screening by existing features as well as any screening proposed as mitigation will also affect the magnitude of visual impact. The mitigation itself may of course have an impact and should also be assessed. The degree of contrast with the existing view, angle of view, duration of view and distance from the development may also contribute to magnitude of impact.

Table 13.2.2: Magnitude

Landscape		Visual
Notable changes in landscape character; or changes in landscape elements over an extensive area; intensive change over a more limited area.	High	A very large number of viewers affected or a major changes in view. This change may relate to physical scale, duration, proximity, contrast or other effect on noticeability.
Moderate changes to landscape elements in a more localised area. Intensive changes over a limited area of temporary duration	Medium	For example, many viewers affected or moderate change in view.
Virtually imperceptible change in any landscape components over a large or small area.	Low	For example, few viewers affected or a minor change in view.

Number of viewers and distance to proposed development may be factors in consideration of both sensitivity and magnitude. The number of viewers may be related to the importance of a view but is also referenced in the GLVIA in consideration of magnitude of impact at a viewpoint. Separation distance from an impact source will affect the context of the viewpoint and the clarity with which any development is seen; this relates to sensitivity in relation to that specific development location. It also affects the magnitude since an impact of fixed areal extent will appear to be of greater scale in the view if in closer proximity.

At a greater distance it may be equally possible to attain a more complete view of a development, potentially increasing the magnitude. This may be either the perceived scale relative to the wider landscape or in terms of impact duration in the case of a sequential development such as sand and gravel or open cast coal extraction. Each assessment is site specific and professional judgement is required to ascertain the balance of these effects.

13.2.4.3 Significance

The significance of potential impacts is then considered; this is a function of the resource sensitivity and impact magnitude. Significance thresholds can be determined from the combination of sensitivity and magnitude according to Table 13.3.3 below. This significance may relate to either adverse or beneficial impacts.

Table 13.2.3: Significance criteria

Impact Magnitude	Sensitivity		
	High	Medium	Low
High	Exceptional	Major	Moderate
Medium	Major	Moderate	Slight
Low	Moderate	Slight	Negligible

Major or Exceptional impacts can be a product of high sensitivity of receptor or high impact magnitude. This may be reduced to Moderate levels if either factor is considered to be low. Moderate impacts can result from medium sensitivity and magnitude or a combination of high sensitivity and low magnitude or high magnitude and low sensitivity. Slight impacts result from magnitude and significance factors classed as Low and Medium in combination. Negligible impacts result from Low magnitude and Low sensitivity.

Professional judgement and experience must be applied in order to identify significance for each receptor. Each case is assessed on its own merits as factors unique to each circumstance need to be considered. As noted above there is a gradual transition between significance classes.

Impact assessed as moderate or greater may be considered 'significant' in EIA terms; those identified as major or exceptional should be given greatest weight in the decision-making process. Lesser impacts assessed as being slight are those which the decision maker should be aware of, as they may relate to noticeable changes in the landscape or views but are generally unlikely to warrant much weight in the decision-making process. Impacts are negative unless stated as being beneficial.

13.2.5 Visualisations

An individual assessment was made for each viewpoint to examine any visual impacts of existing operations; assessments were then made of the anticipated visual impacts of the proposed development.

Visualisations are illustrations that aim to represent an observer's view of a proposed development. Visual Representation of Wind Farms: Good Practice Guidance (SNH, 2006) stresses that "*visualisations, whether they are hand drawn sketches, photographs or photomontages will never appear 'true to life'. Rather they are merely tools to inform an assessment of impacts, and like any tool, their application requires careful use*". It is important therefore to note that the computer-generated images, including the ZTVs and photomontages are used as tools to provide an illustration of the potential effects. They are not a substitute for the actual review of likely visual changes in the field, which forms a key part of the assessment methodology.

The methodology for production of the visualisations was based on the GLVIA (2013); SNH (2006) Visual Representation of Wind Farms: Good Practice Guidance; and Landscape Institute (2011) Advice Note 01/11: Photography and photomontage in landscape and visual impact assessment. Further information about the approach is provided below.

13.2.5.1 Photography

The camera used for the photography was a high quality digital SLR with the lenses set at a 35mm focal length (equivalent to approximately 50mm focal length lens on a 35mm film camera). The camera was moved through increments of around 15° and rotated through a full 180° at each viewpoint. This enabled a panorama, centred on the view towards the proposed development, to be cut from the wider panorama.

A single image is also presented for each assessment viewpoint enabling an assessment to be made in the field informing the decision-making process. This being aligned with the Highland Council's Visualisation Standards for Wind Energy Developments.

The location of each viewpoint was recorded in the field using a handheld GPS. Weather conditions and visibility were considered an important aspect of the field visits for the photography. Visits were planned around clear days with good visibility. Viewpoint locations were visited at times of day to ensure, as far as possible, that the sun lit the scene from behind, or to one side of the photographer. Photographs facing into the sun were avoided where possible to prevent the development site appearing in silhouette. Adjustments to lighting of the development were made in the rendering software, to suit the particular lighting and atmospheric conditions present at that time.

13.2.5.2 Photograph Stitching, Wireframes and Photomontages

Photograph stitching software (Photoshop) was used to piece together the adjoining images. Software was used to view the development from selected viewpoints in model format. NEXTMap® Britain Data (5m contour intervals) was used to model the landform seen in the view. The software includes a default viewer height of 1.8m above ground level. The model views were overlaid onto the pre-prepared 90° photographs in order to accurately render the development into each.

All views from viewpoints have been represented using photographs in accordance with the GLVIA and LI guidance. Viewpoints are also represented with fully rendered photomontages.

The presentation of fully rendered photomontages involved a number of additional stages. The LSS software was used to accurately reproduce the geometry of the site. Fixed features on the ground were used as markers to help line up the image extracted from the ground model with the photograph. The final stage required the rendered development to be blended into the actual view. This was carried out using Photoshop software and allowed the development to be located within the context of the existing elements that appeared in the original photograph.

For each view, the viewpoint location plan indicates the viewpoint and viewing angle. The panorama for each viewpoint then presents the existing photograph showing the context as well as an illustration of the predicted impact below. These image heights and viewing distances comply with the minimum recommended by NatureScot. NatureScot guidance suggests that a 'viewing distance' is quoted in order that the viewer may hold the image the correct distance from their eye (a distance over 30cm is recommended) in order that the image appears as it does 'in the field'.

13.2.6 Nature of Impacts and the Planning Balance

In accordance with the EIA Regulations this assessment states whether impacts are adverse or beneficial. In some instances, they may be considered neutral. Impacts may be direct or indirect (i.e. the development directly or physical affecting a landscape resource or view or a secondary impact as a result of a more complex pathway). Impacts can be short term or long term (i.e. during construction or the establishment of a development or development phase or those lasting for the life time of the scheme). In addition, they can be permanent or reversible, widespread or localised.

There are no specific accepted, legal requirements or published criteria to use as a basis on which to judge whether a change in the landscape, or in a view, is 'acceptable'. Acceptability is a matter for the decision maker to determine as part of the overall planning balance. In assessing predicted landscape and visual effects, a judgement is made in terms of the landscape capacity for the development to be accommodated. It is also important to account for the fact that a change to landscape character may actually be neutral or beneficial in nature; that its character is changed is not enough to judge acceptability or otherwise.

Aesthetic perceptions can vary greatly depending on individual attitudes to the principle and presence of development. It is therefore not possible to arrive at a single collective view relevant for all, on the direction of impacts resulting from a scheme. It is good practice to state the likely impacts together with factors which may mitigate those which are perceived as negative. It is inappropriate to consider beneficial and adverse impacts such that one may cancel out another. Each impact is therefore stated as assessed so that a full understanding is provided.

13.3 Baseline

Refer to Figures 73.13.01 Landscape Context and 73.13.02 Harbour Viewpoint Locations & ZTV as well as 73.13.03 Borrow Pit Viewpoint Locations & ZTV in conjunction with this report.

The landscape character assessment provides the setting for the site within its surrounding landscape. Additional characterisation is provided through SNH's more recent work on the special qualities of the National Scenic Areas (2010), Wild Land mapping (2002, 2012/2013) and Impacts on Wild Land (2007).

In addition to the ZTV the visibility of the site area and features of the proposed development are assessed in full at 13.8.

13.3.1 Landscape Character Assessment

This section of the assessment was completed with the use of the following publication for baseline data:

Caroline Stanton 1996, Skye and Lochalsh Landscape Assessment. No 71. Scottish Natural Heritage Review.

Reference has also been made to NatureScot's Landscape Character GIS data set which updates the characterisation and character type boundaries originally produced in the 1996 review.

In relation to seascape, defined as '*an area, as perceived by people, from land, sea or air, where the sea is a key element of the physical environment*' it is clear that this setting falls within the transition between land and sea where it could equally be referred to as a seascape or a landscape. For the purposes of this assessment the term landscape is used throughout, this being in accordance with the ELC, 2000. The importance of the sea within this setting is noted.

Relevant characteristics and qualities of the marine and coastal environment include:

- coastal features;
- Views to and from the sea;
- Particular qualities of the open sea;
- The importance of dynamic changes due to weather and tides;
- Change in seascapes due to coastal processes;
- Cultural associations;
- Contributions of coastal features to orientation and navigation at sea.

In accordance with SNH guidance on the assessment of seascapes (SNH, Offshore Renewables – guidance on assessing the impact on coastal landscape and seascape, March 2012) there are "qualities and issues that are *specific to the marine and coastal environment, for example the conjunction of land, intertidal areas and open seas; the shape and scale of coastline; views from the coast and views from the sea* whether on ferries, sailing boats or sea-kayaks. These are the key issues that differ from those usually considered in a landscape and visual assessment; *it is not the method of impact assessment itself that differs.***"**

13.3.1.1 Description of the Landscape Context

Landscape, as we experience it today is the result of physical influences over millions of years, changes in climate, vegetation and over our much more recent history of human influences. These layers of the physical fabric of the land overlain by the effects of changes in landuse, built environment and our experience/perception of the land give rise to a distinct and recognisable pattern within a particular area, its landscape character.

There were 16 'landscape character types' identified within Skye and Lochalsh in the 1996 SNH Review; however, setting the landscape context for this proposal, and in consideration of updates to the character types as now available digitally from NatureScot is the 'Smooth Stepped Moorland' character type. Immediately adjacent types include 'Scattered Crofting' and 'Linear Crofting'. To the west the land rises to the dramatic Trotternish Ridge, the character type defined as 'Landslide Edge'. Loch Mealt an 'Inland Loch' lies between the SCH and the Borrow Pit at Lealt but this landscape type is not affected by the proposal and is not considered further.

The landform of each character type stems from the solid geology which forms the foundation of the landscape. In this area a diversity of landform closely related to its complex geology. Overlain onto the underlying geological foundations is the effect of glacial modification; indeed, this action was responsible for the isolation of Skye as an island.

The Trotternish Ridge is one example of several key landmarks in the wider area. While arguably not recognised globally to quite the same extent as the Black Cuillins, the landscape has had a starring role in an ever-growing number of films, the Old Man of Storr and the Quiraing both providing unique backdrops.

Skye is subject to a mild maritime climate with high relative humidity, frequent cloud cover and rainfall. There is a consistent passage of westerly Atlantic depressions.

Human influence in this region has its origins in the Neolithic and Bronze Age with a number of surviving cultural heritage features, such as standing stones, burial mounds and cairns, present. Iron age settlement has left a clearer mark on the landscape, particularly relating to defensive sites, generally in prominent locations. Castles followed, associated with the more powerful clans.

Ultimately land division changed with runrig rotations replaced by crofting and then with decades of clearances and emigration. Crofting changed in 1886 with the Crofters' Holding Act, the crofting township remains the dominant settlement type in the area. What is interesting, particularly in relation to the SCH proposal is that while the location of these townships typically relates to the coast, watercourses or valleys, offering favourable microclimate, access, soil and drainage conditions, this does not generally relate to natural harbour locations. Crofting townships may be extensive where suitable land allows, harbour settlements, on the other hand, tend to be more confined, characteristically possessing a more concentrated hub of activity. The SCH is not a settlement, this typical character is however considered in its design and assessment.

It is notable that the LCA publication refers directly to the effects of visitors to Skye on its landscape. Going as far as stating that the landscape is "intermittently dominated by large numbers of visitors." This visitor pressure is not only as a result of landscape, but is also a feature of the landscape itself, the perception of this place including at certain times, the sheer number of visitors. It is simultaneously a major factor in the requirement for the proposed development and also represents one of the major receptors considered in the assessment of effects.

Managing tourism and by extension managing Skye's landscape will be key to maintaining its sense of place. There is concern that the increase in tourist related development, a move away from traditional land use and towards service industries, the growing population and knock on requirement for infrastructure and the potential increase in scale of development in Skye may divert attention away from the traditional land use practices which are responsible for the distinctive landscape for which people actually visit. The LCA raises the concern that this may "eventually result in the district becoming an indistinguishable tourist area, where the facilities rather than the place become the main focus of attention." It is important that this is recognised in the development of the SCH, ensuring it is in keeping with the traditional sense of place, supporting local employment at a sensitive scale, while enabling alternative access to the landscape for the recreational use of locals and for visitors.

13.3.1.2 Landscape Character Types

The proposal lies within the 'Smooth Stepped Moorland' character type. Closely associated with this LCT are 'Scattered Crofting' and 'Linear Crofting'. To the west the land rises to the Trotternish Ridge, providing the wider setting, the character type defined as 'Landslide Edge'. The sea to the east is not defined by an LCT but it is appropriate to consider the maritime influence throughout as it provides context for this area.

These landscape of 'Smooth Stepped Moorland' is characterised within the SNH Review as follows:

Smooth Stepped Moorland-

- This landscape has a stepped landform formed by the repetition of alternating open moorland and ridges, in direct relationship to the underlying geology, typically comprising basaltic lava flows.
- The distinct landform of this character type is often most clearly seen at its exposed edges or when viewed in profile. This means that attention tends to be drawn to the distinct stepped skyline and ridges formed by rock outcrops, particularly when these occur along the coastline. Settlements and access routes are typically found along these edges, utilising the favourable microclimatic conditions within the lee of the slopes. Fragments of indigenous broadleaf woodland are also often located within these areas.
- Visual characteristics of this landscape are dominated by the stepped landform and how this is illustrated by the skyline and mid and foreground horizons. The progression and rhythm of steps tend to encourage visual movement, the character of which, varies with the angle of the steps; upright stepped moorland tends to promote erratic visual movement, whereas diagonal slanting steps result in a more flowing visual movement.
- The rhythm of steps within this character type creates visual movement and a 'flow' to the landform, repetition suggesting visual predictability and reassurance. This is further reinforced by the spatial security created by the distinct edges created by the steps, especially valued within an otherwise open landscape. The step edges tend to be most marked where rock outcrops occur, or at the coast. The character of a step in forming a distinct edge will vary with its scale, and slope, in relation to its surroundings. The experience of these steps will vary according to its profile (vertical or diagonal), the height of the steps, and the position of a viewer.
- Hills often occur within this landscape character type. Although these may appear similar to the rugged hill landscape character type with their broad bases and horizontal emphasis, these hills are distinctive due to their stepped slopes. As a result of these characteristics, the landform tends to either form asymmetrical hills with ridges to one side, or stepped plateaux, the latter typically being referred to as tables.
- Similar to the smooth moorland landscape character type, certain weather conditions tend to emphasise the distinct landform of this landscape, with strong differences in light and shadow indicating the contrast between the horizontal, vertical and diagonal.

Key Characteristics are noted as follows:

- This landscape character type is distinguished by its stepped landform. This is most clearly seen on the skyline or where ridges are exposed.
- The steps form distinct edges and define spaces
- The steps possess a distinct rhythm, giving a 'flow' to the landscape. Their repetition implies visual predictability.
- Settlements, agricultural land use and fragments of broadleaf woodland tend to be located in order to utilise the favourable microclimate of step edges, and the open space of the step 'tread'.

- Hills within this landscape tend to have a massive form, a horizontal emphasis, broad bases and stepped slopes.
- The relative dominance of characteristics within this landscape vary considerably in different weather conditions, especially as a result of contrasting light and shade highlighting the landform.

In consideration of other relevant landscape types, their key characteristics are noted below.

Key Characteristics of Scattered Crofting:

- This landscape comprises a dispersed crofting township, the composition of which appears randomly scattered, with no distinct focus or consistent organising element.
- There is an experience of constant interest and surprise within this landscape due to its varying relationship of elements.
- The visual composition of this landscape is very confusing, with no discernible hierarchy or pattern of elements; this results in a difficulty to orientate oneself. The complexity of visual elements encourages one to view this landscape character type either from a distance, where it can be seen as a single collective feature, or by examining foreground details.

Key Characteristics of Linear Crofting:

- This landscape character type is dominated by its distinct repetitive pattern of buildings and land holdings within a linear arrangement, typically related to a linear edge or landform, and forming a linear space.
- Typically, there is an integrated relationship between the land use, built structures, and surrounding landscape characteristics within this character type.
- This landscape has a simple visual composition, with elements arranged horizontally. This tends to be most clearly seen from an opposite shore or slope, and is often highlighted under certain weather conditions.
- Visual movement within this landscape character type is directed along the access road and out towards the coast, with no dominant focus or centre to the township.
- Parallel lines of settlement often occur along opposite slopes of valleys within this landscape character type. The resultant symmetry typically creates visual balance.

Key Characteristics of Scattered Crofting Landslide Edge:

- The landform of this landscape character type is particularly distinctive with a high interior ridge which has undergone rotational slippage to result in the formation of rock pinnacles and hummocks.
- The characteristics of this landscape are unpredictable, with varying visibility, constant visual surprise, and a resultant 'mysterious' image.
- The landscape possesses a dynamic image, most obviously displayed by rock falls and scree.
- The drama of this landscape is accessible.

- The visual composition of the landscape is variable, exciting and dynamic. The relative dominance of elements varies considerably in different weather conditions. Visual movement jumps' back and forth over the slippage landform.
- The land cover is dominated by short grassland, creating a smooth texture.
- A large number of people visit this landscape and utilise the network of pathways within these areas.
- Some crofting townships exist on the edge of this character type. The land division of these tends to result in a balanced contrast of formal pattern upon the underlying variable landform.

13.3.1.3 Site Landscape Unit

The landscape of the SCH has very strong containment between coastal cliffs and the sea itself. This linear space provides natural screening from the stepped landform above and a sense of security. This is enhanced by the partial shelter afforded by Staffin Island to the north and by the Sgeir nam Foileann (skerry of the gulls) and small headland, Rubha Garbhaig, to the east.

The access to the SCH is an established road, leading to the pre-existing development at the site, which consists of a slipway and breakwater with associated parking and hardstanding. There are modern containers at the site as well as historic 'nausts' or boathouses.

The Borrow Pit is a previously worked quarry at Lealt, in an area with considerable mining heritage. The excavation itself is within a clifftop setting, predominantly screened from the road and from the surrounding landscape. Close views are attainable from footpaths associated with parking provision and viewpoints at Lealt Gorge and An Leth-allt/Inver Tote.

The proposed development at SCH lies within the Trotternish National Scenic Area and the importance of this designation is considered throughout. The proposed Borrow Pit lies within the Trotternish and Tianavaig Special Landscape Area (now termed Local Landscape Area).

13.3.1.4 Landscape Designations

National Scenic Area

As noted above the site lies within the Trotternish National Scenic Area.

"The eastern aspect of the peninsula of Trotternish affords an unusual landscape which combines the spectacular scenery of landslip topography with the fascination of columnar basaltic rock structures. Huge masses of basalt have collapsed at the Quirang to make a landscape of rock pinnacles interspersed with moist green meadows and tiny lochans. Below these strange formations lie peat moors and, on the better land, crofting settlements with improved land affording a green contrast to the brown moors.

On the seaward side the whole landscape drops suddenly into the sea in cliffs of varying height, but made up of more regular columnar formations of basalt. These 'kilt rock' cliffs have occasional waterfalls dropping sheer into the sea and afford spectacular views over the South of Raasay to the fjord coast of the mainland. The culmination of the finest features of this north-eastern coast of Skye centres on Staffin Bay, where the pattern of crofting settlement is enclosed to the west by the spectacular relief of the Quirang." Scotland's Scenic Heritage, Countryside Commission for Scotland, 1978.

The sensitivities in relation to the proposed development are considered to potentially include the following special qualities (SNH, 2010):

- The unique Trotternish landslip topography;
- Contrast between the platform of moorland and the ridge above;
- The human dimension of crofting settlement;
- Variations from dark to light across the landscape;
- Dramatic sea-cliffs of basaltic columns;
- Distant views over the sea;
- Mysterious presence of the Quiraing.

Local Landscape Area

The Trotternish and Tianavaig Special Landscape Area (SLA, now LLA) covers most of the Trotternish peninsula on Skye which lies outwith the National Scenic Area at the peninsula's north-eastern end. The regional designation takes in the coast of northwest and southeast Trotternish.

Key Landscape and Visual Characteristics are detailed within the Highland Council publication, in partnership with SNH, Assessment of Highland Special Landscape Areas, 2011.

Special Qualities are also noted:

Dynamic Landslip Character

- One of the most spectacular landscapes in Britain, resulting from a distinct land slip topography that results in a dramatic assemblage of rock outcrops, cliffs and pinnacle features.
- From the ridge crest, a succession of basalt lava layers create a gentle dip slope of undulating open moorland descending westwards to Loch Snizort, whilst to the east, a steep escarpment has been dramatically accentuated by a sequence of gigantic rotational landslips, although some of the best examples of this are also included within the adjacent Trotternish National Scenic Area.
- The dramatic isolated pinnacle of the Old Man of Storr forms a prominent feature along the eastern fringe. It is popular with visitors and frequently portrayed in publicity and media as distinctive Scottish landscape.

Ridgeline Spine and Coastal Fringe

- The Trotternish Ridge, the longest continuous ridge in Skye, forms the backbone of the island's northern peninsula, and dramatically defines and separates the landscape characters to its west and east. Variations in views from the coastal fringe assist in defining the differing characters of the eastern and western sides of the peninsula.
- Walking this great ridge in either a northerly or a southerly direction is an exhilarating experience which gives contrasting views – Raasay, Rona and the high peaks of the mainland on one side; broad Loch Snizort and the long profile of the Western Isles on

the other. The ridge is somewhat lower than that of the Cuillins but is still grand in scale and accessible in a wider range of weather conditions

- The elevated spine of the Trotternish ridge and its associated moorland core results in a narrow coastal fringe where settlements and communication routes are concentrated. Consequently, these have a close relationship with the Minch and the Sound of Raasay from elevated locations above the coastal cliffs, at lower levels overlooking Loch Portree or from the more intimate smaller bay at Tianavaig. The most striking natural features are the pinnacles set away from the main escarpment which are prominent in views along the coastal road.
- The bustling ports of Portree and Uig, from which the ferry to the Western Isles leaves, contrast with the remote interior. Uig Bay and Portree Bay are both semi-enclosed bays which are guarded by steep cliffs at their entrances. They offer areas of sheltered anchorage and form an impressive landscape setting for the settlements of Uig and Portree respectively.
- The island of Fladda-chùain and its adjacent skerries, Gaeilavore Island, Gearran Island, and Lord Macdonald's Table are key points of visual reference at a distance of 4-5kms out to sea from the northern tip of Skye due to their isolation and distinctive profiles. These are not only important navigational way markers for boats crossing the Minch but also add significantly to the value of seaward views at the north end of the peninsula.
- Steep slopes and cliffs extend along some stretches of relatively undifferentiated coastline, particularly noticeable along the 30 km section of coast between Staffin and Portree. Continuously steep, uninhabited slopes, topped by crags at about 150-250m, present an unbroken and at times forbidding face to the traveller by sea. Natural arches are a particular feature between Tote and Rigg on the east coast of Trotternish.

Historic landscape

- Throughout North and West Trotternish remains of prehistoric settlement predominantly roundhouses are common, both within the crofting townships and further up into the hills. Shielings, sometimes with associated enclosures, are also a common feature in the hills and along the rivers and burns away from the townships.
- To the west of Kilvaxter are the remains of the sizable, depopulated township of Knockhoe which is interspersed with a number of interesting earlier monuments including a dun and a chambered cairn. Sensitivity to change

Potential for landscape enhancement and reference to other designations/interests are also included. Of relevance to this proposal is the inclusion of:

- The Trotternish National Scenic Area (NSA) includes some of the most dramatic and distinctive of the Trotternish landform features. However, it is very limited in extent while the SLA covers the wider Trotternish landscape.

- Unlike many other parts of Skye, evidence for more recent industry is clearly evident in the landscape. Several of the buildings associated with the diatomite works at Lower Tote, including the chimney, still survive on the coast.

Coastal Zone

The Highland Council's supplementary guidance document, Coastal Development Strategy refers to developed undeveloped and isolated coast. Undeveloped and isolated coasts are graded on a sliding scale, relating to wildness. The existing facility at Staffin is clearly 'developed' and despite the importance of natural landscape at the site, this specific guidance is not considered further.

13.3.1.5 Forces for Change and Design Guidance

Forces for Change and Design Guidance are provided for each character type within the SNH Review.

Key Forces for Change and Design Guidance for Smooth Stepped Moorland is as follows:

- The location of new structures may interrupt the distinct visual movement over the stepped landform within this landscape and compromise the relative dominance of the vertical scale and edge of the step.
- New elements adjacent to, or which cross, the step edges within this landscape, can conflict with the distinct spatial characteristics of the step, weakening its edge, and compromising its vertical dominance.
- The location of new elements upon the hills of this landscape character sub-type may compromise the dominance of the landform by conflicting with its distinct steps, indicated by stripes and the skyline.
- In comparison to the smooth moorland character type, current woodland and agricultural practice creates a number of pressures within this landscape. This tends to be distinct within this sub-type as a result of the impact of visual elements and spaces in contrast to the stepped landform.

Forces for change are not detailed in NSA citations or Special Qualities of National Scenic Areas report. Further consideration of potential effects on special qualities is however considered at 13.8.1.

Sensitivity to change is also noted in relation to the Trotternish and Tianavaig SLA.

- Development in or around existing settlement areas could disrupt the traditional pattern or be out of scale with existing buildings.
- Development could impinge on the setting of historic features or landscapes.
- Widening or straightening of rural roads here could intrude on the distinct linear space and its relationship to the ridge or could threaten the current sense of relative remoteness. New roads or tracks penetrating into the moorland core would reduce the current sense of remoteness and isolation.

- Development on remote uninhabited areas of coastline could detract from the feeling of tranquillity and isolation or which would impinge on views out to sea or inland towards the ridge.
- Introduction of marine-based installations in nearshore waters could fall within important coastal views or introduce built elements in areas remote from habitation.
- Introduction of focal features could distract from the characteristic linear form of landscape or could divide the linear space and result in variations of vegetation type.
- Development such as woodland or forest could conceal the distinctive underlying landform.
- Large man-made structures outwith the SLA could encroach on panoramic views or affect the perception of scale of the landscape.

This landscape is of High inherent sensitivity. It is important to note however that despite the designations which recognise this value, the vulnerability to particular impacts must also be considered and this is site specific and relates to the nature of impact as well. The impact assessment which follows at 13.5 takes into account the impact on specific landscape elements and features as well as on the special qualities for which this landscape is designated. Sensitivity of this landscape to particular impacts varies from Low to High.

13.3.2 Visual Baseline

13.3.2.1 ZTV

The Zones of Theoretical Visibility are illustrated at Drawings 73.13.02 and 73.13.03. These ZTVs relates to the entire development footprint and take account of the extents of all proposed elements including vegetated bunding at the Borrow Pit. On Drawing 73.13.03 a distinction is drawn between this overall development ZTV and that of the proposed working Borrow Pit, demonstrating the degree of change anticipated.

These are bare ground models of theoretical visibility. It is standard practise to use a bare ground and therefore worst case ZTV for guiding assessment since land cover may change, e.g. forestry may be felled. It is important to keep in mind that this represents an area where any part of the development, or its effects e.g. on landform, may be visible to any degree.

13.3.2.2 Potential Viewers

Visual receptors are viewers, i.e. people. Viewers may include residential occupants, walkers and other recreational users (e.g. marine), fish farm workers, farm workers, and those travelling on the road network.

13.3.2.3 Viewpoints

The viewpoints identified in Table 13.4.1 were used to represent the existing visual amenity and for assessment of potential impacts, with the exception of Viewpoint 1A included for illustrative purposes only. It is worthy of note that there are no residential views of SCH.

Table 13.3.1: Viewpoints

Viewpoint	Location	Receptor Type Represented	Relative Number of Viewers
1A	NG 495 685	Illustrative only	None
1B	NG 495 685	Marine, recreational and professional	Few-Moderate
2	NG 495 676	Recreational	Few-Moderate
3	NG 491 684	Recreational, Road users	Few-Moderate
4	NG 518 605	Recreational	Few-Moderate
5	NG 516 599	Residential, Road users	Moderate
6	NG 517 591	Road users, Residential	Moderate

A full description of each view and a consideration of potential effects of the proposals is included at 13.8.2.

13.3.3 Summary of Baseline Conditions

The proposed SCH development site lies within the Trotternish National Scenic Area. The Borrow Pit, while not within the NSA, is within the Trotternish and Tianavaig Special Landscape Area.

The landscape type is categorised as Smooth Stepped Moorland.

The proposed SCH development is at a previously developed site, a natural harbour which has an existing breakwater and slipway.

Previous industrial operations at and near to the Borrow Pit are relevant to the baseline at this location.

13.4 Impact Assessment

This assessment looks at potential impacts on particular receptors which make up the landscape resource: Elements and Characteristic Features of the landscape, components of the landscape such as the Landform and Land cover in terms of colour and textural content; potential impacts associated with particular aspects of the proposed operations, e.g. plant, stockpiles, disturbed ground, and of the completed development during operational life, e.g. storage, vehicles, boats, none of which is new, the intention is however that the proposed SCH development should become better used in the future, the proposed infrastructure facilitating this and ensuring safe access and improved user experience for all.

Permanent landscape impacts of the proposed SCH development are considered at 13.5.2 Operation, whereas Borrow Pit effects are considered as Construction. Construction impacts at the proposed SCH development are assessed in relation to visual amenity.

All physical impacts represent potential sources of visual impact, these are assessed in relation to a series of representative assessment viewpoints at 13.8.2.

Impact type, rate of change and duration is considered.

13.4.1 Sources of Impact

A detailed description of the development and operation of the site is provided at Chapter 2.

Plans illustrating the development layout are included as Drawings JG4845 for the proposed SCH development General Arrangement, 73.02.01-73.02.07 for Borrow Pit operations.

Construction works for the proposed SCH development are expected to be completed within a 12-month period. The Borrow Pit is likely to be operational for much of this time, although blasting and crushing operations may be undertaken over a far shorter period. Due to construction phasing and materials storage capacity at the Borrow Pit and at proposed SCH development, this may be undertaken production may be intermittent, over a period of around 6 months.

An indication of the potential sources of impact on landscape and visual amenity is provided below as well as an assessment of likely impact, in the absence of additional mitigation measures.

13.4.2 Construction

13.4.2.1 Access Road

The existing access road will be the only landward access to the site for construction. Improvement to the access is proposed as enabling works and shall be complete prior to the construction of the proposed SCH development, and subject to a separate application. Edge repairs, patching and localised widening is proposed including removal of loose rock at one corner to neaten the existing cur face and improve forward visibility, see Drawing JG4844. The improved access to the proposed SCH development is not in itself likely to give rise to significant impacts, they are of Low magnitude.

13.4.2.2 Plant movement

Land reclamation, the removal of the existing breakwater adaptation of the existing slipway, the construction of the new breakwater and new slipway, will all require the movement of land-based plant, including long-reach excavators where appropriate.

Plant movements will be concentrated within the proposed SCH development area, predominantly within the footprint of these elements. This is a short-term, temporary effect associated with construction and is considered Low-Medium magnitude.

13.4.2.3 Materials stockpiles

In order to efficiently manage delivery and stockpiling of materials the contractor will be required to plan and liaise with the operator of the Borrow Pit. Storage capacity for materials at both the proposed SCH development and the Borrow Pit is limited. Access to the appropriate size of armour stone or aggregate at each phase of construction will be necessary, double handing of material will be avoided wherever possible, which will also minimise vehicle movement and disturbance. Stockpiling at the proposed SCH development will be within the newly formed hardstanding, avoiding any direct impact on the public access by road to Staffin or footpath to Garafad. This is a short-term, temporary effect associated with construction and is considered Low magnitude.

13.4.2.4 Fencing

Construction areas will require safety fencing. This will be minimised in extent and temporary in nature and kept in a tidy state, particularly important in an exposed coastal site. This is a short-term, temporary effect associated with construction and is considered Low magnitude.

13.4.2.5 Lighting

For certain operations there may be an external lighting requirement. There are health and safety requirements to ensure the safety of site personnel.

Consideration has been given to light pollution with particular reference given to the Scottish Executive Guidance Note "Controlling Light Pollution and Reducing Lighting Energy Consumption" dated March 2007:

- all lighting will have a clear purpose;
- over-lighting will be avoided; and
- all lights will be carefully directed to where they are most needed and will be designed to minimise light pollution.

Low level lighting will not cause any direct glare but there will be some visible light spill/glow associated with the site during construction. This is a short-term, temporary effect associated with construction and is considered Low magnitude.

13.4.2.6 Temporary Signs

Signage in accordance with HSE requirements and in relation to general information signage will be amalgamated as far as possible at the site entrance, to minimise visual intrusion. This is a short-term, temporary effect associated with construction and is considered Low magnitude.

13.4.2.7 Borrow Pit

The proposal includes the use of a former quarry as a Borrow Pit, with the intention of providing all aggregate and armour stone locally.

The Borrow Pit shall be worked in 3 phases; Drawings 73.02.02 – 73.02.05 refer.

Fixed lighting may become a requirement for safe operations during winter months, e.g. crushing operations, although this will only be necessary for a few weeks in total and is unlikely to be necessary during the hours of darkness. Otherwise, external lighting will be limited to vehicle and plant lighting.

Fencing of the site will be required for safety. Signage associated with the site access will be located on the perimeter fence. Signage will also be necessary informing recreational visitors to the adjacent footpath of the restricted access to the operational site itself. There is an opportunity here to include further interpretation signage relating to the site's establishment, historic, and contemporary use in supporting local development.

Effects may result from temporary impacts such as changes to land cover, including stockpiles, and movement of plant and vehicles, and permanent impacts such as on topography. All temporary impacts are considered Low magnitude and the permanent small-scale and well contained alteration to landform, at this established quarry, is also considered Low magnitude.

13.4.3 Operation

The permanent structures associated with the proposed SCH development are noted below with a consideration of their potential impacts.

As noted above the anticipated intensification of use of the site has been considered in design; there is a potential to 'industrialise' the harbour.

13.4.3.1 New Breakwater

The principle of enhancing the existing harbour at Staffin does not introduce a new feature; this is however a larger element in the landscape and in a new location and is considered in relation to effect on landform (alteration to the coastline) and on land cover. Elements necessary for safety such as provision of handrails along the footpath section, and of life rings, may be visible and potentially noticeable in near views, they are not however considered significant. These peripheral elements are a direct replacement of those currently associated with the existing breakwater. The impact has Low-Medium magnitude.

13.4.3.2 Pontoons

The introduction of pontoons at the proposed SCH development represents a new element in the landscape. The effect is considered in terms of landform; albeit relating to what is essentially a floating marine structure the effect is akin to land reclamation, effectively altering the perceived coastline. The form and arrangement will respect the harbour layout and should not appear incongruous in this setting, lighting is assessed separately. Magnitude is assessed as Low.

13.4.3.3 Slipway

The creation of a new slipway also has the effect of altering the coastline. The slipways are low lying and are not prominent or noticeable features. As with the proposed pontoons they are in keeping with the harbour setting and magnitude of impact is assessed as Low.

13.4.3.4 Onshore built elements

Potential effects relate to the extension of roadway and associated impermeable surfaces, industrialising the area, e.g. extensive tarmac or concrete surfaces, car parking with formal bays, barriers and signage. Further design iterations are discussed at 13.6 Mitigation.

The proposal will be well contained within the landscape and also visually screened from the wider area. The proposed SCH development will be apparent only within its established context of a local harbour. The aspirations of the design are to enhance the existing harbour, creating a quality user experience for locals, commercial users and visitors alike. The effect of introducing new infrastructure may be considered positive by many due the association with improved facilities and increase in user numbers. There may conversely be some visitors to the site who do not consider that they benefit directly from the enhancements and may view the secondary effects of intensification of use, as negative. The direct impact of the new built elements on landscape and on visual amenity are likely to be Low-Medium magnitude.

13.4.3.5 Lighting

Lighting will be installed on the pontoon, to include 8 lit bollards and a further 6 low level lights on the pontoon access bridge. Buildings shall not generally require external lighting, other than minimal security lighting. Internal building lighting may also be visible. Effects are unlikely to be significant in terms of increased light spill, no residential views will be affected, impact magnitude is assessed as Low.

13.5 Mitigation Measures

13.5.1 Construction

13.5.1.1 Harbour Development

During construction of the proposed SCH development many of the proposed environmental mitigation measures also ameliorate landscape and visual effects. Maintenance of a tidy site is paramount. This extends to appropriate storage of construction materials and consumables, parking of plant and vehicles, maintenance of temporary elements such as safety barriers, fencing, signage and lighting.

Construction site working hours will be controlled where possible to avoid unnecessary amenity effects. The constraints of tide and weather conditions must of course be considered; it is recognised that it will not always be possible to restrict working hours.

Construction site traffic (HGVs) may of course be controlled by condition; this is not tide or weather dependent.

13.5.1.2 Borrow Pit

As at the proposed SCH development construction site, keeping a tidy site is key.

As noted earlier in the chapter, impacts arise from design and where possible the design should therefore take account of this, to ‘embed’ mitigation. Use of existing screening is key at this site, the most visible element will be the short-term disturbance to soil and overburden mounds which will be re-landscaped during Phase 1. Once vegetated these no longer represent a noticeable element of the site.

Working hours will be restricted to 07.00 – 19.00 Monday to Friday inclusive and 07.00 – 12.00 on Saturdays. No blasting shall take place outwith the hours of 10.00 – 16.00 Monday to Friday.

Careful management of stockpiles will reduce perception of disturbance from the nearest residential receptors. This will require close liaison with the proposed SCH development main contractor.

13.5.2 Operation

The potential impacts of the proposed SCH development are wherever possible mitigated by design. The effect of increase in activity, the potential for a greater level of visual clutter associated with increased visitor numbers is inevitable. This effect of intensification of use may be partially mitigated through the provision of appropriate infrastructure, the two are inextricably linked.

Additional mitigation measures have been identified and are detailed below.

13.5.2.1 New Breakwater and Reclaimed Land

The breakwater and reclaimed land will be faced in locally won rock armour. This is a practical measure against the effects of wave and tide but also is entirely in keeping with the finish of the existing breakwater and complementary to the natural shoreline. Surfaced access to the slipway and pontoons is minimised, the outer breakwater arm having no provision for access.

13.5.2.2 Slipway

The southern aspect will be formed in rock armour, visible from the shore, a concrete wall will be formed to the north (Drawing 2297-112).

13.5.2.3 Onshore built elements

Hardstanding will be permeable and extensive areas of tarmac avoided; this being limited to repairs of existing tarmac surfaces. An impermeable concrete apron at the fuel tanks will be necessary.

Public parking bays will likely be marked, including disabled parking provision. Where possible, and only as necessary, parking (car and boat) should be delineated with recessed wooded logs or low concrete kerbs within gravel (permeable) areas.

Storage sheds, toilets and office are all buildings of a sensitive scale and proportion, the location is appropriate in terms of landscape guidance, the form and finish in keeping with the local harbour vernacular. The proposed use of colour will minimise massing and provide interest. The retained stone shed (naust) is integrated into the harbour layout.

Barriers and gateways will include low (<1m) dry stone walling and a single simple chain link vehicle barrier.

Signage will be limited and appropriately sited, welcome and orientation signage and a notice board at the harbour office and WC, and a single sign at the entrance to the working harbour area to control access.

Utilities will be buried where possible:

- Water tank will be above ground immediately to the south of the stone shed;
- septic tank and outfall pipe will be buried;
- two above ground (external) tanks will be required for fuel storage and a substation which will be enclosed and located as to be visually associated with the proposed office and WCs;
- cabling to serve the proposed SCH development will be undergrounded insofar as possible (overground poles are necessary only at the Staffin connection terminal)

13.5.2.4 Lighting

Other than on the pontoon all requirements for external security lighting (one per building) will be PIR sensor activated and on timers.

13.6 Cumulative Impacts

As detailed in Chapter 3 no cumulative effects are predicted.

The remit of cumulative impact assessment is not to examine the total significance of effects from a number of projects, but is focused upon the potential relationship between different developments. This assessment relates to existing and reasonably foreseeable development in combination with the proposal.

There is a development relatively close to the Borrow Pit which warrants additional consideration. This relates to ground excavation/clearance which was initially in relation to the construction of a farm building on land to the south-east of 2 Tote Scorrybreck. These works are some 700m to the south of the proposed borrow pit development works. It is understood that the excavation works are now proposed over a period of some 10 years with some 4,400cu.m being excavated over this period. The development of this area is therefore anticipated to be intermittent with operations being of a very small scale.

No cumulative landscape effect is predicted as the only impacts identified in relation to the Borrow Pit are of very small scale.

Cumulative visual impacts may include:

- Simultaneous (multiple sites visible within a single view);
- Successive (sites visible from one viewpoint but not within the same view); and
- Sequential impacts (visible one after another whilst travelling along a route)

As the two sites are intervisible, despite both being well screened, some potential for cumulative visual impact exists. Simultaneous views are not considered likely. Successive combined effects are possible, from viewpoints such as VP4 lying between the sites, although this is assessed as slight. Sequential impacts are limited as views to the Borrow Pit for example from the road, are generally from the south, whereas potential views to Scorrybreck are from the north.

13.7 Residual Impacts

This section addresses the likely changes to landscape in the absence of the proposed development, the sensitivity of the landscape and visual resource to the proposed development and ultimately the likely significance of impacts. This takes mitigation into account as outlined above and considers short, medium, and long-term impacts. The impacts on specific components of the landscape are considered, elements and features as well as aspects such as landform, landcover, texture and colour, before reaching a view on the impact on landscape character.

Visual impacts are assessed in relation to the viewpoints chosen as being representative of visual receptors in the area. The impacts, any mitigating factors, the sensitivity of different visual receptors and ultimately the potential impact significance during operations and after closure and final restoration are considered.

13.7.1 Predicted Impacts on the Landscape

The Landscape Type within which the development is set is described as 'Smooth Stepped Moorland'. This is fully described at 13.4.1.2. The NSA designation which takes in the proposed SCH development site and the SLA which includes the Borrow Pit, do confer additional value to the surrounding landscape, this and the seascape and coastal aspects of the landscape are all considered in this assessment.

It is likely that in the absence of a development such as this there would be very little change to the landscape of the site and environs. It is assumed that the existing harbour would continue to be used at current levels. The Borrow Pit at Lealt would remain a viable source of rock for local projects and likely to come back in to use at some point in the future.

The likely effects of the development on specific landscape elements and characteristic features present (landscape components) within the local landscape are summarised on Table 13.8.1. Within this matrix the potential impact on each existing element/feature is noted, including the type of impact (direct/indirect) and its duration. Only impacts acting physically on the element/feature are considered to be 'direct'. Impacts likely to occur as a result of the proposed development but affecting a receptor through a secondary pathway (including impacts on the setting of components or the effect of noise or dust for example) are considered here as 'indirect' impacts.

The presence of an element/feature within the landscape and even being characteristic of that landscape does not necessarily confer any particular value to it. The sensitivity of a landscape relates to its robustness to change as well as its value, this may be applied to an area or specifically to elements/features.

It is important to consider not only the elements/features present but also the likely impact types. A number of the identified elements/features would be highly sensitive to direct impacts, the proposed development however has a direct impact on very few elements/features. The impact on specific elements/features may be assessed in terms of the loss or alteration of each and this relates to their inherent value as well as amenity, cultural and biodiversity value. Biodiversity value is addressed within Chapters 7-11 and cultural associations are considered within Chapter 6.

In relation to overall landscape impact any loss or alteration is assessed in relation to the contribution of the element/feature to landscape character, the way the landscape is experienced, a particular effect on the sense of place.

The general sensitivity of the landscape resource, as a whole, is a product of a number of variables, one of which is a consideration of the sensitivity of these elements/features. Other factors include the effects of: existing land use; the pattern and scale of the landscape; visual enclosure/openness of views and distribution of visual receptors; scope for mitigation (in character with existing landscape); and the value placed on the landscape.

13.7.1.1 Landscape Components

Existing landscape components, elements and more distinctive features are noted below with a summary assessment of likely impacts, Table 13.8.1.

Where permanent impacts are identified temporary impacts due to construction are not noted.

Table 13.7.1 Landscape Components

Element, Feature	Impact Type	Sensitivity	Magnitude	Mitigation	Residual Significance
Access Road	Permanent (direct)	Low	Low	None	Negligible beneficial
Breakwater (existing)	Permanent direct	Low	High	Replacement	Negligible neutral*
Slipway (existing)	Permanent indirect	Low	Medium	None	Slight neutral*
Hardstanding parking area	Permanent direct	Low	High		Moderate beneficial
Containers	Permanent direct	Low	High	Replace with new sheds	Moderate beneficial
Historic naust	Permanent indirect	Medium	Low	Retain structure	Slight
Boat nausts	Permanent direct	Low	High	Reuse stone	Moderate
Harbour Signage	Permanent direct	Low	High	Replacement	Negligible beneficial
Garafad Footpath	Permanent indirect (setting)	Medium	Low	Access maintained	Slight
Grazing land	Permanent indirect	Low	Low	None	Negligible
Staffin Island	Permanent indirect (setting)	Medium	Low	None	Slight
Coastline	Permanent direct	Medium	Medium	Respect natural form	Moderate neutral*
Coastal cliffs and boulders	Permanent indirect	Medium	Low	None	Slight
Panoramic Views	Permanent direct	High	Low	None	Moderate neutral*
Lealt Footpath	Short-term indirect	Medium	Low	Access maintained	Slight
Lealt Gorge	Short-term indirect	Medium	Low	Access maintained	Slight
Inver Tote	Short-term indirect	Medium	Low	Access maintained	Slight
Lealt Parking and Picnic	Short-term indirect	Medium	Low	Access maintained	Slight
Lealt Quarry	Permanent	Low	Low	None	Negligible

*neutral, including where direct of impact is subjective

The above components combine and interact with landform and land cover to create landscape character.

13.7.1.2 Special Landscape Qualities

The proposal is considered specifically in relation to the special qualities of the NSA, as detailed at 13.4.1.4.

The unique Trotternish landslip topography, the Trotternish ridge and the eastern landslide slope is not affected directly or in its setting. Key focal features such as the Quiraing (identified as a location specific special quality) are well removed from the development and are not affected.

The contrast between the platform of moorland and the ridge above is unaffected by the proposal, as are the moorland and crofts beneath which extend from the base of the hills to the top of the sea cliffs.

The human dimension of crofting settlement is unaffected, the grazing land adjacent to the proposed SCH development is separated physically from the typical settlement pattern on the moorland platform to the west. The further development of the proposed SCH development is in keeping with the sense of long occupation of this landscape.

Variations from dark to light across the landscape, with distinctive dark rock formations of the cliffs of the Trotternish ridge, contrasting with green flushes of rich vegetation and darker browns of the sweeping expanse of moorland, in turn contrasting with the greens of the crofting pastures are unaffected.

Dramatic sea-cliffs of basaltic columns and the interplay of igneous and sedimentary rock has created an unusual, interesting coastline with sheer cliffs and fascinating columns of basalt. The setting of the cliffs at the proposed SCH development is affected by the proposal but not to the detriment of their grandeur. Encouraging visitors to proposed SCH development will only raise the profile of this feature, alongside sites such as Kilt Rock.

Distant views over the sea will not generally be affected. Closer views from the proposed SCH development itself and from the Garafad path will be altered. As noted above, encouraging visitors to experience this setting is also seen as a benefit in terms of the appreciation of this landscape.

The proposal is not assessed as affecting the special qualities of the NSA or its overall integrity.

In terms of the SLA, there shall be no impact on the Dynamic Landslip Character or Ridgeline Spine. The Coastal Fringe includes the haulage route for rock from the Borrow Pit to the proposed SCH development, on the A855, and the proposed SCH development itself. The key feature/special quality of the coastal cliffs from Staffin to Portree is not directly affected. The proposed SCH development will have some influence on the appreciation of the very northern end of this 30km stretch of coastline which is noted as presenting an unbroken and at times forbidding face to the traveller by sea; the harbour being welcome respite.

13.7.1.3 Landform

The proposal shall have a direct impact on the existing landform including the coastline. This section also considers the effect that landform, existing and proposed, has on the general landscape sensitivity.

The key elements in the landform at the proposed SCH development are the indented coastline, the bays of Ob nan Ron and Breun Phort and the associated headlands from An

Corran to Rubha Garbhaig, and the backdrop provided by the dramatic coastal cliffs to the west. The existing harbour is nestled in the modest shelter provided by this setting. The proposal to construct a new breakwater will be perceived as a protective arm around the proposed SCH development enhancing the natural shelter. The proposed land reclamation, although a noticeable change in coastal form, once established will have minimal effect on coastline and is not considered significant.

The pontoons and slipway are both low lying and are not prominent or noticeable features, only apparent in the landscape in elevated views, critically VP2, considered further at 13.8.2.2. The perceived alteration to coastline, at this scale, is acceptable in this established harbour context.

Other onshore elements are not considered to alter the landform.

The wider landform is assessed as having an inherently high sensitivity recognised in the designation as an NSA. The local landform however is assessed as having Low-Medium sensitivity in relation to the specific location and the alterations proposed. The existing nature and scale of the wider landform is not particularly susceptible to alteration within this confined site area. The screening effect of the coastal cliffs contains this site landscape unit and provides a degree of separation from the wider landform. The alterations proposed are in keeping with the natural coastline, enhancing the shelter, the breakwater alignment is closely associated with the headland and skerry which divide Ob nan Ron from Breun Phort.

While the operation of the Borrow Pit does impact on landform, it has very little effect due to the baseline as an established quarry, the scale of operations proposed, and the contained nature of the site. Impacts of excavation are assessed as Negligible.

The potential impact magnitude of the proposed development, in relation to landform, is Low-Medium. The current sensitivity, relating to the proposed development is considered as being Low-Medium in terms of landform. On balance the overall landform impact is assessed as Slight-Moderate and not significant. The proposal may be judged as having a negative effect on landform due to the alteration of natural topography. In providing improved infrastructure and a facility for the benefit of several user groups, this effect may equally be perceived by many as a positive effect.

13.7.1.4 Land Cover

The onshore development footprint is predominantly contained within the established harbour site, the exception being the proposed new breakwater, slipway, pontoons (perceived as new 'land' cover) and the area of land reclamation all of which will affect the coastline directly changing land cover.

Existing land cover exhibits a relatively low diversity with existing elements of bare ground and hardstanding. The variations apparent, due to this being a tidal location, introduce a greater diversity and dynamism in this local setting. The level of exposure of rock and shingle, and intertidal marine algae, as well as the effect of sea state and weather, play a major role in 'seascape'.

There are existing structures at the site and new buildings and additional parking areas do not introduce new landscape elements. The local onshore setting is unaltered with existing grazing land and the distinctive coastal cliffs being retained.

At the Borrow Pit no new land cover is proposed. The modest scale of operations marginally extending the area of bare rock but this remains associated with the established quarry void as well as with the sea cliffs immediately to the east.

The value attributed to the land cover and its sensitivity to the changes proposed is Medium, despite lying within an NSA. There is some benefit derived from existing land cover in relation to accommodating the development, the natural expanse of rock, particularly at low tide will more readily accommodate the proposed breakwater and slipway, with their rock armour facing (concrete on the slipway will not be apparent from onshore viewpoints or indeed from the seaward side of the breakwater which will provide screening). The impact on land cover is Low-Medium magnitude and overall the significance of this impact is assessed as Slight-Moderate.

13.7.1.5 Landscape Character

The effect on landscape character which is likely to result from the proposed development is set against the existing baseline, the character of the wider landscape as well as that of the site. Against this existing situation the predicted impacts on components, on landform and on land cover are assessed. As part of the existing character it is important to highlight certain intangible characteristics which are also specifically considered. At this location the ever-present coastline and effects of the sea as well as the NSA (and SLA) designations are also taken into account.

The inherent sensitivity of the wider landscape is considered to be High, it has high value and is potentially vulnerable to change. The changes proposed are however at an appropriate scale and form which may be more easily accommodated, particularly in the context of the local landscape setting at the proposed SCH development. Sensitivity of local landscape receptors varies from Low-Medium.

Landward access is maintained on its current alignment, wrapping around the northern end of the coastal cliffs this does not obviously break the stepped edges of the landform. Widening the road in places will not noticeably affect this access route. For most the perception of the road widening will as a convenience, if noticed at all. With appropriate local soft landscaping, e.g. tie in with adjacent vegetation, this will not be perceived as 'urbanisation', the proposal will have negligible residual effect on the access road.

Extending into the sea with a new longer breakwater will extend man's influence, but the provision of safe harbour is deeply rooted in our relationship with the sea. Enhancing natural shelter, and only at a modest scale, is not considered detrimental to the local landscape. There is no effect on the wider landscape character type.

It is accepted in published landscape character assessment that the focus of harbour settlements varies considerably in scale, from large ferry terminals to small jetties supporting local aquaculture or fishing industries, and that they tend to display an interesting visual variety of forms, textures, colours, people and movement. While not a settlement *per se* the influence of the proposed SCH development is precisely this, a local focal point for activity, entirely in keeping with the established use of the site and not at odds with the landscape character.

It is important that new elements relate to the existing scale of development, and remain inferior to landform, there is no increase in height with all built elements remaining appropriate to the use of the site.

New elements should also be located appropriately, maintaining the existing linear focus along the coast at the proposed SCH development, contained within this well-defined coastal strip. This is a traditional form for such a development, by necessity, in terms of relationship with the coast. Here, this is exacerbated by the degree of visual containment created by the coastal cliffs.

The sensitivity of landscape character is relative to the proposed development; through careful design the sensitivity is reduced to Low-Medium.

The magnitude of impact of the proposed operation on character is assessed as Low within the context of the wider landscape character unit.

Mitigation is predominantly embedded (through design) although as noted at 13.6 there are further mitigation measures proposed. Design has respected coastal alignment and the existing containment of the site. The adjacent land use for grazing has also been respected, avoiding any direct impact.

In terms of the Borrow Pit, there is no residual effect on landscape character.

The residual impact of the development on landscape character is generally assessed as being of Slight significance. It is not advisable to rely on aggregated impact significance for landscape effects and consideration of each component or quality informs the assessment of acceptability of the proposal. There are effects on certain aspects of the landscape which are moderate and therefore considered to be significant in EIA terms, and this should be considered in the overall planning balance, noting that several are considered beneficial or neutral in the sense that perception of the change may be viewed as a benefit rather than necessarily being adverse.

13.7.2 Predicted Impacts on Visual Amenity

The sensitivities of the visual receptors and the magnitudes of the potential impacts were assessed individually for each viewpoint, and an assessment of the visibility of the development - the degree to which the development will actually be seen - was made for each viewpoint. Where relevant, at the Borrow Pit, the potential visual impact of any screening is also addressed as well as the residual visual impact with mitigation in place and ultimately with the site restored, the ‘permanent’ impact of the development.

The temporal extent of any potential impact has a bearing on the magnitude of impacts with short term impacts being reduced in magnitude relative to longer term impacts. Rate of change can also have an effect on the resultant impact with gradual alteration often being more easily accommodated. Numbers of viewers contributes to the importance or value of a viewpoint, and therefore relates to the sensitivity of a view.

Sources of impact are considered at 13.5.1; in relation specifically to visual impact there are a number of key elements. The alteration to the fabric of the land, including reclamation of land, is perhaps the most obvious.

Reference should be made to Drawings 73.13.02 and 73.13.03 Viewpoint Locations and Zones of Theoretical Visibility as well as the photographs and visualisations presented as Drawings 73.13.04 to 73.13.16 when reading this section of the assessment. The ZTV has been modelled on bare ground topography and considers the entire site area rather than individual phases thus providing a worst-case scenario for visibility of the site. Visualisations are a guide to the likely impacts, while they are geometrically accurate it is not the intention to produce illustrations of the exact appearance of the scheme. The sheds are reproduced accurately from the 3D model, colour and finish is illustrative. Temporary structures such as vessels are shown to illustrate the potential intensity of operations; this is by necessity a theoretical snapshot in time.

13.7.2.1 Viewpoint 1B* – Low Elevation Drone from north-east of Slipway

Location	Representative of marine views looking towards SCH
Grid Reference	NG 495 685
Viewpoint Elevation	ca. 9m AOD
Bearing to Centre	183°
Horizontal Field of View	86°
Distance to Site Boundary	220m
Notable Elements	Breakwater, Sheds, Vehicles and vessels.
Receptor Types	Marine, recreational and professional
Receptor Sensitivity	Low This may be considered a valued view but in recognition of the viewer's expectations the sensitivity to the specific change proposed is low. There may be relatively few viewers vs onshore viewpoints although the hope is that this number may increase as a result of the development.
Impact Description	*N.B. Viewpoint 1A is included as illustrative of the development and is not assessed for visual effects. Existing views are dominated by the cliffs. In the foreground the existing breakwater is apparent although not highly noticeable, particularly at low tide, being backdropped by natural rock of similar colour. The breakwater also being naturalised by marine algae. Existing activity at the harbour is visible, including storage containers, vehicles and vessels. The access road is visible but not noticeable as it follows the coastal strip northwards (right of image). The Garafad path is also visible but not noticeable. The proposal includes a longer breakwater, albeit a replacement and acting to screen other new elements within the harbour. The breakwater will affect a wider extent within this view but not encroaching beyond Sgeir nam Faoileann or significantly further towards An Corran. The development will also introduce a greater level of activity associated with SCH. New buildings may be visible above the breakwater or from views to the south-east and north-west of the assessment viewpoint. They may be considered beneficial or adverse, being subjective and likely to be

	influenced by viewer familiarly and use of the harbour. Those seeking berth will welcome this sight. Activity levels will be variable, and the construction phase will certainly influence this view to a greater extent. This view is representative of transient receptors, the potentially more sensitive of which are tourists who are actually least likely to be subject to repeated exposure. It is likely that for most viewers the redevelopment of SCH will be seen as beneficial. This is a scale of development which is generally absent from this coastline and yet this use has historically been established at this site.
Impact Magnitude	Medium-High for construction phase Medium for operational life The proposal is limited in extent slightly increasing the envelope of the previously developed area. The additional impact on the existing baseline is assessed as being of low to medium scale and although number of viewers is relatively low, their focus is likely to be on the landscape.
Impact Significance	Slight-Moderate during construction Slight long-term, although associated with beneficial effects for many viewers from this location.

13.7.2.2 Viewpoint 2 – Cadha Riach

Location	Representative of views from the Garafad footpath
Grid Reference	NG 495 676
Viewpoint Elevation	90m AOD
Bearing to Centre	355°
Horizontal Field of View	60°
Distance to Site Boundary	660m
Notable Elements	Breakwater, Slipway, Sheds, Vehicles and vessels.
Receptor Types	Recreational
Receptor Sensitivity	Medium This may be considered a valued view and is likely to have few-moderate viewers. Sensitivity also relates to baseline and the existing harbour.
Impact Description	Existing views are framed by the cliffs and dominated by the seascape of the North Minch. In the foreground the land slopes steeply to the grazings below with the existing harbour in the middle of the view. Coastal islands lead the eye up to the horizon. The existing breakwater is notable and is clearly man-made in its form. Existing activity at the

	harbour is visible, including storage containers, vehicles and vessels. The access road is visible but not noticeable as it follows the coastal strip northwards (left of image). The Garafad path from which the view is attained is noticeable but acceptable to viewer as tends to be the way with access affording views, most of the path is not within the image presented due to the steep nature of the ground. The proposal includes a longer breakwater, albeit curving around the harbour and respecting the natural coastal form to a greater degree than the existing structure which appears to jut out and is somewhat incongruous. The development footprint extends man's influence within this view although the concentration of activity and accommodation for larger vessels may reduce clutter in the wider seascape, removing berths from the channel towards Staffin Island. The development will also introduce a greater level of activity associated with SCH. New buildings will be more noticeable than the existing containers although the intension to completement local vernacular aims to make this more acceptable and may be seen as beneficial by some viewers. The natural form of Breun Phort at lower tide states will not be significantly affected. The effect of the breakwater at high tide will be more pronounced. Activity levels will be variable and the construction phase will certainly influence this view to a greater extent. This view is representative of transient receptors, the potentially more sensitive of which are tourists who as noted above are less likely to be subject to repeated exposure. It is likely that for some viewers the redevelopment of SCH will be seen as beneficial. This is a scale of development which is generally absent from this coastline and yet this use has historically been established at this site.
Impact Magnitude	Medium-High for construction phase. Medium for operational life. The proposal is limited in extent but will increase the envelope of the previously developed area. The additional impact on the existing baseline is assessed as being of moderate scale from this elevated viewpoint and number of viewers may be moderate, their focus is likely to be on the landscape.
Impact Significance	Moderate-Major during construction. Moderate, although associated with beneficial effects for some viewers.

13.7.2.3 Viewpoint 3 – Road to Slipway

Location	An Corran
Grid Reference	NG 491 684
Viewpoint Elevation	11m AOD
Bearing to Centre	131°
Horizontal Field of View	74°
Distance to Site Boundary	310m
Notable Elements	Breakwater, Slipway, Sheds, Vehicles and vessels.
Receptor Types	Recreational, Road users
Receptor Sensitivity	Medium This may be considered a valued view and is likely to have few-moderate viewers. The existing harbour is less apparent in this view.
Impact Description	Existing views towards the SCH are dominated by the cliffs of Sgeir Bhan and the influence of the sea. Panoramic views are afforded to the east towards Rona, and to Applecross, Torridon and Gairloch beyond. In the foreground the access road leads the eye towards the harbour. The existing breakwater is not particularly noticeable at lower tides being surrounded by natural rock of similar colour. Existing activity at the harbour is visible, including storage containers, vehicles and vessels, as is the Garafad path. At low tides the proposed longer breakwater will appear within the natural sheltered bay west of Sgeir nam Faoileann. At high tide it will appear to extend into the marine environment. As noted previously this may be considered acceptable, even positive, to those who benefit directly or indeed in relation to the established cultural associations and practical implications of provision of a safe harbour. The development footprint extends the harbour infrastructure and will intensify its use. New buildings will be more noticeable than the existing containers as will the new slipway. Activity levels will be variable, and the construction phase will certainly influence this view to a greater extent. This view is representative of transient receptors, the potentially more sensitive of which are tourists who as noted above are less likely to be subject to repeated exposure. It is likely that for some viewers the redevelopment of SCH will be seen as beneficial. This is a scale of development which is generally absent from this coastline and yet this use has historically been established at this site.
Impact Magnitude	Medium-High for construction phase.

	Medium for operational life. The proposal is limited in extent but will increase the envelope of the previously developed area. The additional impact on the existing baseline is assessed as being of moderate scale from this elevated viewpoint and number of viewers may be moderate, their focus is likely to be on the landscape.
Impact Significance	Moderate-Major during construction. Moderate although associated with beneficial effects for some viewers.

13.7.2.4 Viewpoint 4 – Borrow Pit Entrance

Location	An Leth-allt footpath
Grid Reference	NG 518 605
Viewpoint Elevation	85m AOD
Bearing to Centre	357°
Horizontal Field of View	76°
Distance to Site Boundary	0m (Borrow Pit)
Notable Elements	Bare ground, Bare rock, Bunding.
Receptor Types	Recreational
Receptor Sensitivity	Low-Medium This view is affected by historic quarry operations and is not highly valued itself. It is representative of worst-case views into the Borrow Pit and is *en-route* to a recognised viewpoint, likely to have few-moderate viewers.
Impact Description	Most visitors will focus on views to the coast rather than dwelling on this view into a previously worked quarry. Existing views include the upper quarry face, low bunding above this and bare ground in the foreground. Some visitors may be interested in the history of the site and its association with the works at Tote, and Inver Tote. Interpretation is provided at various viewpoints. The proposal will not significantly alter the landform or land cover visible from this location. Borrow Pit operations will however introduce significant short-term, reversible disturbance to this view. These impacts will include stockpiles of armour stone in the foreground, movement of plant and haulage vehicles, as well as operations within the Borrow Pit itself. Fencing will also be established with safety signage. Detail of these changes is not illustrated in the visualisation.

	Extractive operations and processing of aggregates will be majorly screened from this location although the existing vegetated bunds and the quarry faces below will be altered during phase 1 of operations. Activity levels will be variable throughout the construction phase of the SCH project and will certainly influence this view while the Borrow Pit is active. This view is representative of transient receptors, the most sensitive of which are tourists who as noted above are less likely to be subject to repeated exposure.
Impact Magnitude	Medium for construction phase. Low at cessation of Borrow Pit operations. Disturbance associated with Borrow Pit operations will affect this view. The residual impact magnitude upon cessation of operations is however low.
Impact Significance	Moderate effects are anticipated during the construction phase (i.e. during Borrow Pit operation). Effects at cessation of operations are considered Negligible.

13.7.2.5 Viewpoint 5 – Road to Lower Tote

Location	Lower Tote access
Grid Reference	NG 516 599
Viewpoint Elevation	86m AOD
Bearing to Centre	011°
Horizontal Field of View	52°
Distance to Site Boundary	600m (Borrow Pit)
Notable Elements	Bare rock
Receptor Types	Residential, Road users
Receptor Sensitivity	Low-Medium This view is affected by historic quarry operations. The former quarry is not however particularly noticeable, set as it is against the sea cliffs adjacent to the north-east. It is representative of residential property as well as viewers on the A855, it therefore represents a moderate number of viewers.
Impact Description	Residential viewers are likely to be most sensitive to developments of this type. There are two properties at Lower Tote, one of which appears to have primary views towards the Borrow Pit. The property is at a lower elevation than the viewpoint and intervisibility from within the quarry

	indicates less of the Borrow Pit site will be visible from residential properties themselves. As such this represents a worst-case view. Most road users able to focus on the landscape (i.e. passengers) will likely be drawn to the awesome scale and form of key landscape features such as the Trotternish Ridge. Intermittent views towards the Borrow Pit are likely to be possible. The existing view include the upper quarry face, and an area of the existing quarry void, other site elements are not apparent at this distance and from this angle of view. Some visitors may be interested in the history of the site and its association with the works at Tote, and Inver Tote. Interpretation is provided at various viewpoints. The proposal will not significantly alter the landform or land cover visible from this location. The upper quarry face will be realigned and worked back away from the viewer, minor changes to the bunding above will only be apparent during and immediately after these operations, vegetation will soon be established and this minor alteration to landform will not be noticeable. As the quarry floor is reduced in height the landform beyond will be revealed. Stepped moorland and the rock outcrops lining the ravine immediately east of the Borrow Pit. As noted above the rock is closely associated with the sea cliffs and the residual permanent effect of this change is not seen as detrimental to the view. Borrow Pit operations will introduce short-term, reversible disturbance to part of this view. This will include stockpiles of armour stone, movement of plant and haulage vehicles, as well as operations within the Borrow Pit itself. Extractive operations will be majorly screened from this location and processing and aggregate stockpiles will be entirely hidden from view. Activity levels will be variable throughout the construction phase of the SCH project and will certainly influence this view while the Borrow Pit is active. This view is representative of residential receptors but also transient receptors on the road, the most sensitive of which are tourists who as noted above are less likely to be subject to repeated exposure.
Impact Magnitude	Low-Medium for construction phase. Low at cessation of Borrow Pit operations. Disturbance associated with Borrow Pit operations will affect this view. The residual impact magnitude upon cessation of operations is however low.
Impact Significance	Slight-Moderate effects are possible during the construction phase (i.e. during Borrow Pit operation). Although likely to be Slight for some residential receptors represented and Negligible for road users.

	Effects at cessation of operations are considered Negligible.

13.7.2.6 Viewpoint 6 – A855 at Upper Tote

Location	Layby on A855
Grid Reference	NG 517 591
Viewpoint Elevation	141m AOD
Bearing to Centre	004°
Horizontal Field of View	29°
Distance to Site Boundary	1,390m (Borrow Pit)
Notable Elements	Bare rock, Bare ground
Receptor Types	Road users, Residential
Receptor Sensitivity	Low-Medium This view is affected by historic quarry operations. Despite affording a better view into the quarry than VP5 being a more elevated viewpoint, the visible extent of landscape beyond is also far greater, a wider expanse of sea cliffs and the stepped smooth moorland and linear crofting. Both the diversity and specifically the extent of sea cliffs more readily accommodating the historic operations and changes to the landform and land cover. The view is representative of road users and of residential property at Upper Tote which is located below the road to the east. It represents a moderate number of viewers.
Impact Description	As noted above, most road users able to focus on the landscape (i.e. passengers) will likely be drawn to the awesome scale and form of key landscape features such as the Trotternish Ridge. Intermittent views towards the Borrow Pit are likely to be possible. Residential viewers are likely to be most sensitive to developments of this type. In considering intervisibility from within the quarry it seems primary views are out to the coast and not northwards towards the Borrow Pit. The existing view include the upper quarry face, and most of the existing quarry void, other site elements are not apparent at this distance. The proposal, while altering the visible landform will not change the extent of bare rock visible. As the faces of the Borrow Pit are worked and the historic quarry floor level is reduced the extent of this bare rock will remain constant from this angle. Borrow Pit operations will introduce short-term, reversible disturbance to part of this view. This will include stockpiles of armour stone, movement of plant and haulage vehicles, as well as operations within the Borrow Pit itself.

	Extractive operations will not be well screened from this location although they will be at a considerable distance from the viewer. Activity levels will be variable throughout the construction phase of the SCH project and will certainly influence this view while the Borrow Pit is active. This view is representative of transient receptors on the road, the most sensitive of which are tourists who as noted above are less likely to be subject to repeated exposure.
Impact Magnitude	Medium for construction phase. Low at cessation of Borrow Pit operations. Disturbance associated with Borrow Pit operations will affect this view. The residual impact magnitude upon cessation of operations is however low.
Impact Significance	Slight-Moderate effects are possible during the construction phase (i.e. during Borrow Pit operation). Likely to be greatest for any residential receptors with this elevated view. Negligible for road users. Effects at cessation of operations are considered Negligible.

13.8 Summary

The proposal shall have direct impacts on landscape within the Stepped Smooth Moorland landscape character type. No effects are identified on the landscape character itself; there are changes to landform and land cover as well as to several existing landscape components. New elements are introduced, although all are considered complementary to the established land use.

No adverse effect is predicted on the special qualities of the NSA or on its integrity.

No adverse effect is predicted on the special qualities of the SLA.

The use of an established quarry (currently disused) as a Borrow Pit does not introduce new elements to the landscape.

Landscape impacts on individual components range from Negligible to Moderate, landform impacts are assessed as Slight-Moderate, effect on landscape character is assessed as Slight.

Temporary disturbance during the project construction phase is unavoidable and will impact on landscape and visual amenity at the proposed SCH development as well as the Borrow Pit.

Views will be available for visual receptors including residents (Borrow Pit only), recreational users of the area, travellers on the road network and at sea, as well as commercial marine operators; many users of the proposed SCH development are not considered sensitive to the development, or indeed are likely to view this development as beneficial.

Visual effects are assessed as likely to be significant during construction, some are likely to be Moderate-Major. It is possible that effects of the proposed SCH development, once operational, will be Moderate and therefore also significant, although these effects may be considered positive/beneficial by many.

For many future visitors to the proposed SCH development the effects of intensification of use are likely to be unnoticed (as they will have no baseline for comparison) or certainly acceptable to the majority, this being linked to the provision of appropriate infrastructure for their needs.

For some local users of the site development may be seen as detrimental to their own experience of the location. As a community led project, it is clear however that on balance the proposal is seen as beneficial to the area.

It is not appropriate to combine, or aggregate, visual impact significance from a range of viewpoints and it is important to note that the viewpoints are representative of visual receptors in the area, i.e. individual people. Personal preferences and perceptions do determine the individual receptor's opinion on the impacts of such a development. The design and mitigation measures seek to minimise adverse impacts and where possible derive benefit for the majority.

Some residual effects of the proposal are noted as being Moderate, and therefore significant in EIA terms. Most of these may be considered beneficial, and none of the identified impacts adversely affect the most valued components of this landscape.

Table 13.9.1 provides a summary of impacts, mitigation and residual effects.

Table 13.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction							
Landform (Borrow Pit)	Extension of quarried void	Low	Low	Negligible	All mitigation is embedded/by design	Low	Negligible
Land cover (Borrow Pit)	Modest extension to bare ground	Low	Low	Negligible	All mitigation is embedded/by design	Low	Negligible
Landscape Character (Borrow Pit)	Temporary operations	Low	Low	Negligible	All mitigation is embedded/by design	Low	Negligible
SLA (Borrow Pit)	None on Special Qualities	High	Low	Negligible	All mitigation is embedded/by design	Low	Negligible
Viewers at VP 1		Low	Medium-High	Slight-Moderate	None	Medium-High	Slight-Moderate
Viewers at VP 2		Medium	Medium-High	Moderate-Major	Mitigation to reduce effects; construction works will however remain highly visible	Medium-High	Moderate-Major
Viewers at VP 3		Medium	Medium-High	Moderate-Major	Mitigation to reduce effects; construction works will however remain highly visible	Medium-High	Moderate-Major
Viewers at VP 4		Low-Medium	Medium	Moderate	Mitigation to reduce effects; Borrow Pit will however remain visible	Medium	Moderate
Viewers at VP 5		Low-Medium	Low-Medium	Slight-Moderate	Mitigation to reduce effects; Borrow Pit will however remain visible	Low-Medium	Slight-Moderate
Viewers at VP 6		Low-Medium	Medium	Slight-Moderate	Mitigation to reduce effects; Borrow Pit will however remain visible	Medium	Sight-Moderate
Operation							
Landform (SCH)	Introduction of new landforms	Low-Medium	Low-Medium	Slight-Moderate	All mitigation is embedded/by design	Low-Medium	Slight-Moderate

Receptor	Nature of Impact	Receptor Sensitivity	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Land cover (SCH)	Introduction of new land cover	Medium	Medium	Moderate	Use of natural rock, minimise impermeable surfaces, quality built design	Low-Medium	Slight-Moderate
Landscape Character (SCH)	Redevelopment of SCH Intensification of use	High	Low	Moderate	Sensitive design, appropriate scale and form. Use of local vernacular and natural finishes where possible, minimal 'clutter'	Low*	Slight-Moderate
NSA	None on Special Qualities	High	Low	Negligible	All mitigation is embedded/by design	Low	Negligible
Viewers at VP 1		Low	Medium	Slight	Use of natural materials, minimise impermeable surfaces, local vernacular, minimal 'clutter'	Medium	Slight
Viewers at VP 2		Medium	Medium	Moderate^{+}	Use of natural materials, minimise impermeable surfaces, local vernacular, minimal 'clutter'	Medium	Moderate^{+}
Viewers at VP 3		Medium	Medium	Moderate^{+}	Use of natural materials, minimise impermeable surfaces, local vernacular, minimal 'clutter'	Medium	Moderate^{+}
Viewers at VP 4		Low-Medium	Low	Negligible	All mitigation is embedded/by design	Low	Negligible
Viewers at VP 5		Low-Medium	Low	Negligible	All mitigation is embedded/by design	Low	Negligible
Viewers at VP 6		Low-Medium	Low	Negligible	All mitigation is embedded/by design	Low	Negligible

* Sensitivity changes as sensitivity is relative to specific proposal which changes, but not in magnitude. $^{+}$ may be considered positive

Key

Significant Effect
Non-significant effect

13.9 References

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13.10 Glossary

Acronym	Definition
3D	3-Dimensional
ca.	Circa, approximately
cu.m	Cubic metres
EIA	Environmental Impact Assessment
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GPS	Global Positioning System
GRP	Glass Reinforced Plastic
HGV	Heavy Goods Vehicles
HSE	Health and Safety Executive
i.e.	Id est, that is
IEMA	Institute of Environmental Management and Assessment
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LI	Landscape Institute
LLA (SLA)	Local Landscape Area (formerly Special Landscape Area)
LSS	3D terrain modelling software, developed by McCarthy Taylor Systems Ltd
LVIA	Landscape and Visual Impact Assessment
mm	Millimetres

Acronym	Definition
NSA	National Scenic Area
OS	Ordnance Survey
PIR	Passive Infrared Sensor
SLR	Single-lens reflex
SNH	Scottish Natural Heritage, now NatureScot
VP	Viewpoint
WC	Water closet
ZTV	Zone of Theoretical Visibility

Chapter 14: In-Air Noise and Vibration

Document Control

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Author	Rob Latimer	Director	[redacted]	16/09/21
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Contents

14 In–Air Noise and Vibration

14.1 Introduction

In order to evaluate the potential noise impact from the proposed Borrow Pit operations, Vibrock Ltd, a national independent firm of environmental consultants, was commissioned to undertake a study of the ambient noise levels at nearby sensitive locations. Noise levels were predicted based on probable plant deployment for the proposed operations. The noise assessment has been provided as Appendix N.1.

14.1.1 The Measurement of Noise

Noise levels are expressed in decibels (dB). The levels are adjusted in terms of frequency to reflect the sensitivity of the human ear and expressed as dB(A). Table 14.1.1 gives typical noise levels in terms of dB(A) for common situations.

Table 14.1.1: Common Noise Levels

Approximate Noise Levels dB(A)	Example
0.0	Threshold of hearing
30.0	Rural area at night, still air
40.0	Public library
50.0	Quiet office, no machinery
60.0	Normal Conversation
70.0	Inside a saloon car
80.0	Vacuum cleaner
100.0	Pneumatic drill
120.0	Threshold of pain

The decibel scale is a logarithmic scale and therefore when two noise sources each of 40dB act together the resultant is not 40 + 40 = 80dB, but rather 40 + 40 = 43dB. This 3dB increase represents a doubling of sound energy but would only just be perceptible to the human ear.

Additional information with regard to noise terminology is provided in Section 3 of Appendix N.1.

14.2 Policy and Guidance

Scottish Planning Policy requires that sufficient information be provided to enable a full assessment to be made of the likely effects of development together with appropriate control, mitigation and monitoring measures.

Planning Advice Note (PAN) 50 Annex A was published in October 1996 and provides advice on how the planning system can be used to keep noise emissions from surface mineral workings within environmentally acceptable limits without imposing unreasonable burdens on mineral operators.

PAN 50 recommends the setting of absolute values for noise limits, linked to day-time and night-time working periods, defined as 07:00-19:00 hours and 19:00-07:00 hours respectively. It also identifies evening and dawn periods as being typically 19:00-22:00 hours and 06:00-07:00 (or 08:00) hours respectively.

PAN 50 introduces the concept of a maximum fixed acceptable noise level of $55dBL_{Aeq,1h}$ for daytime operation during the working week and states, in paragraph 33, that this is generally found to be a tolerable level. It also introduces a nominal night-time limit of $42dBL_{Aeq,1h}$.

Paragraph 36 also recognises that in some circumstances, e.g. in quieter rural areas, the setting of nominal limits lower than those quoted above may be considered. This may be considered for example where the nominal $55dB_{LAeq,1h}$ level is more than 10dB above the measured background level.

However, in paragraph 37, the document goes on to say that where the daytime background level is below 35 dB(A), a condition limiting operators to a 10 dB(A) increase over the existing background is unduly restrictive and difficult to achieve. The paragraph concludes, "It would not normally be appropriate to require a daytime limit below $45dBL_{Aeq, 1h}$ as such a limit should prove tolerable to most people in rural areas".

PAN 50 states in paragraph 41 that: "It will often be necessary to raise the noise limits to allow temporary but exceptionally noisy phases in the mineral extraction operation which cannot meet the limits set for routine operations. A prime example would be to allow for the construction of baffle mounds. Other activities which would also merit a temporary raised limit, include soils-stripping, removal of spoil heaps and construction of new permanent land forms". In paragraph 60 of the document it is suggested that $70dB_{LAeq, 1h}$ (free field) for periods of up to 8 weeks in a year should be considered by Planning Authorities to facilitate this. The report also suggests that Planning Authorities and mineral operators may negotiate trade-offs between shorter periods and higher noise limits and vice versa.

14.3 Method of Assessment

Environmental noise nuisance can be considered to be caused when unwanted noise intrudes into the existing environment. Potential noise arising from the proposals must therefore be considered in terms of the existing situation, which may vary at different locations around the area of the proposals.

Vibrock Ltd has identified potentially noise sensitive properties in the vicinity of the proposed operations (Figure 1 of Appendix N.1) and predictions have been made of noise levels which could occur at these locations due to soils handling, drilling and blasting, extraction operations, material processing and despatch.

Recreational receptors have also been considered.

Predictions of noise from the proposed development were made in accordance with the guidance given in PAN 50 Annex A, that is following methods recommended in BS 5228-1: 2009 "Code of practice for noise and vibration control on construction and open sites – Part 1: Noise".

Site operational conditions are set out in detail in Section 14.4.1 of this report. It is proposed that the operational hours shall be 7.00am to 7.00pm Monday to Friday inclusive and 7.00am to noon on Saturdays. No operations shall be undertaken outwith these hours with the exception of essential maintenance operations or emergency works.

Knowing the sound powers of individual noise sources, the distance of operation from the nearest property and the topography of the site, the resultant sound pressure levels in the community can be calculated in terms of $L_{Aeq,1h}$.

14.4 Baseline

14.4.1 Site Context

The former Lealt Quarry site is located some 1km to the east of the hamlet of Lealt, immediately adjacent to the east side of A855. The quarry is located between the highway and the coast. The closest residential properties are Lealt Falls House and no.2 Tote, located some 460m to the south-west (shown as numbers 1 and 2 on figure 1, Appendix N.1).

14.4.2 The Proposed Development

The initial works on site will be the stripping of the material overlying the rock deposit, the material being used to slightly increase the existing mounds at the northern end and western side of the development.

The first stage in the extraction process will be the drilling of blast shot holes, an operation that will take place for two to three days in advance of each blast.

The larger rock in the blast pile, suitable for use as rock armour, will be extracted by an excavator and moved to the armour stone stockpile by loading shovel until required at the slipway site.

Once the above segregation has taken place there may be material that requires to be broken as it would be too large for processing. This size reduction would be undertaken by an excavator mounted hydraulic breaker. The excavator used would most likely be the same plant item that segregated the larger rock from the blast shot pile.

The remaining mineral in the blast pile would be moved by the loading shovel to the rock processing and storage area. Once a sufficient volume of material had been accumulated mobile plant would be brought to site to prepare crushed aggregates. This would comprise a crusher and, possibly, a screen.

The armour stone and crushed aggregates would be hauled to the slipway site by Heavy Goods vehicle (HGV); the tipper type for the crushed aggregates and flatbed vehicles for the larger armour stone.

Noise from the proposed operations could have an impact on the noise environment and the quality of life of the surrounding community.

14.5 Impact Assessment

Table 14.5.1 provides worst case predicted noise levels at four locations around the development which includes the closest residential properties. More detailed phase by phase predictions are provided in Tables 2.1-2.4 of the Vibrock report (Appendix N.1).

Table 14.5.1: Predicted Worst Case Noise Levels

Description of Operation		Predicted Worst Case dB $L_{Aeq,1h}$	Difference dB(A)	
Location	**Activity**		**PAN 50 45 L_{Aeq}**	**PAN 50 70 L_{Aeq}**
1 Lealt Falls House	Soil stripping and overburden handling	39	N/A	-31
	Drilling Phase 1	44	-1	N/A
	Sorting and Despatch	42	-3	N/A
	Rock Breaking and Despatch	43	-2	N/A
	Processing and Despatch	45	0	N/A
	Drilling, Processing and Despatch	47	+2	N/A
	Despatch only	36	-9	N/A
2 No.2 Tote	Soil stripping and overburden handling	38	N/A	-32
	Drilling Phase 1	43	-2	N/A
	Sorting and Despatch	42	-3	N/A
	Rock Breaking and Despatch	44	-1	N/A
	Processing and Despatch	45	0	N/A
	Drilling, Processing and Despatch	47	+2	-6N/A
	Despatch only	36	-9	N/A
3 No. 10 Culnacnock	Soil stripping and overburden handling	33	N/A	-37
	Drilling Phase 1	35	-10	N/A
	Sorting and Despatch	30	-15	N/A
	Rock Breaking and Despatch	30	-15	N/A
	Processing and Despatch	38	-7	N/A
	Drilling, Processing and Despatch	30	-15	N/A
	Despatch only	25	-20	N/A
4 No. 2 Lealt	Soil stripping and overburden handling	33	N/A	-37
	Drilling Phase 1	39	-6	N/A
	Sorting and Despatch	33	-12	N/A
	Rock Breaking and Despatch	32	-13	N/A
	Processing and Despatch	36	-9	N/A
	Drilling, Processing and Despatch	38	-7	N/A
	Despatch only	28	-17	N/A

The estimated worst-case noise levels from soil and overburden handling operations, often considered to be the most intrusive if short lived operations on developments of this type, without exception, do not exceed the PAN 50, 70dB$L_{Aeq,1h}$ temporary operation criterion.

With the exception of the very short periods of time during the working of Phase 2, when processing and drilling take place simultaneously, the calculated worst case noise levels from quarrying operations do not exceed the 45dB$L_{Aeq,1h}$ the lowest limit given in PAN 50 Annex A.

It should be noted that worst case scenario predictions summarised in Table 14.2 above are of operations being undertaken at their closest distances or most exposed positions when considered in relation to sensitive properties and therefore have the greatest influence on the noise levels at these locations. As noted in the Vibrock Report the levels experience in most phases of the development will be lower and even the predicted worst-case levels may only last for a short period throughout the envisaged working life of specific phases of the proposed quarry.

The predicted noise levels at public open spaces where people may spend some time, the picnic area and the waterfall viewing point, do not exceed the level for these types of locations given in PAN 50 Annex A; 65dB$L_{Aeq,1h}$.

14.6 Mitigation Measures

The following mitigating actions are proposed, to minimise noise nuisance:

- Operational hours shall be restricted to 7.00am to 7.00pm Monday to Friday inclusive and 7.00am to noon on Saturdays;
- Broad spectrum white noise vehicle reversing alarms shall be fitted to all plant; and
- All plant shall be properly maintained to ensure the integrity of silencers, lubrication of bearings etc.

The Site Manager shall be responsible for ensuring that noise mitigation measures are enforced at all times.

All site operatives shall receive appropriate training in order to ensure compliance with mitigation measures and the need to be noise vigilant at all times.

14.6.1 Control Measures

Having due consideration of PAN 50 Annex A, the following noise limits are proposed:

- During normal daytime working hours, temporary operations (including soil and overburden stripping, mound formation and removal, and final restoration), and for a total of no more than eight weeks in any calendar year, the free-field Equivalent Continuous Noise Level ($L_{Aeq,1h}$) shall not exceed 70dB$_{LAeq,1h}$ as recorded at any existing third-party noise sensitive properties.
- During normal daytime working hours the free-field Equivalent Continuous Noise Level ($L_{Aeq,1h}$) for the period of quarry operations shall not exceed a noise level of 45dB$_{LAeq,1h}$ as recorded at any existing third-party noise sensitive properties. This will be achieved by ensuring that drilling and processing does not occur simultaneously during Phase 2.

14.7 Cumulative Impacts

The closest development relates to ground excavation works on land to the south-east of 2 Tote, Scorrybreck, these works being some 700m to the south of the proposed Borrow Pit. It is understood that the excavation works are now proposed over a period of some 10 years with some 4,400m^3 being excavated over this period.

The development of site at Tote Scorrybreck is anticipated to be intermittent with operations being of a very small scale. Having regard to the separation distance to the Borrow Pit and the small scale and duration of the two developments, the potential for any cumulative noise impact is assessed as negligible.

No cumulative effects are predicted.

14.8 Residual Impacts

Site operations shall meet the relevant best practice as detailed within PAN 50 Annex A. The proposed noise control measures along with effective day to day site management shall ensure that the proposed development is undertaken without significant noise impact.

There shall be no residual impacts from the development in terms of noise climate.

14.9 Summary

Table 14.9.1 provides a summary of impacts, mitigation and residual effects.

Table 14.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction							
Lealt Falls House	Environmental noise nuisance	Medium-High	Low Adverse	Minor: Non-Significant Adverse	Operational hours shall be restricted to 7.00am to 7.00pm Monday to Friday inclusive and 7.00am to noon on Saturdays; broad spectrum white noise vehicle reversing alarms shall be fitted to all plant; and all plant shall be properly maintained to ensure the integrity of silencers, lubrication of bearings etc.	Negligible-Low Adverse	Negligible-Minor: Non-significant Adverse
No.2 Tote	Environmental noise nuisance	Medium-High	Low Adverse	Minor: Non-significant	Operational hours shall be restricted to 7.00am to 7.00pm Monday to Friday inclusive and 7.00am to noon on Saturdays; broad spectrum white noise vehicle reversing alarms shall be fitted to all plant; and all plant shall be properly maintained to ensure the integrity of silencers, lubrication of bearings etc.	Negligible-Low Adverse	Negligible-Minor: Non-significant Adverse
No. 10 Culnacnock	Environmental noise nuisance	Medium-High	Low Adverse	Minor: Non-significant	Operational hours shall be restricted to 7.00am to 7.00pm Monday to Friday inclusive and 7.00am to noon on Saturdays; broad spectrum white noise vehicle reversing alarms shall be fitted to all plant; and all plant shall be properly maintained to ensure the integrity of silencers, lubrication of bearings etc.	Negligible-Low Adverse	Negligible-Minor: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
No. 2 Lealt	Environmental noise nuisance	Medium-High	Low Adverse	Minor: Non-significant Adverse	Operational hours shall be restricted to 7.00am to 7.00pm Monday to Friday inclusive and 7.00am to noon on Saturdays; broad spectrum white noise vehicle reversing alarms shall be fitted to all plant; and all plant shall be properly maintained to ensure the integrity of silencers, lubrication of bearings etc.	Negligible-Low	Negligible-Minor: Non-significant Adverse
Lealt Car Park, Picnic Area and Paths	Environmental noise nuisance	Medium	Medium Adverse	Minor: Non-significant Adverse	Operational hours shall be restricted to 7.00am to 7.00pm Monday to Friday inclusive and 7.00am to noon on Saturdays; broad spectrum white noise vehicle reversing alarms shall be fitted to all plant; and all plant shall be properly maintained to ensure the integrity of silencers, lubrication of bearings etc.	Medium	Minor: Non-Significant Adverse

Key

	Significant Effect
	Non-Significant Effect

14.10 References

BSI British Standards. 2009. Code of practice for noise and vibration control on construction and open sites – Part 1:Noise. BS 5228-1:2009.

Scottish Office Development Department: Controlling the Environmental Effects of Surface Mineral Workings (PAN 50, PAN 50 Annex A) 1996

14.11 Glossary

Acronym	Definition
BS	British Standard
dB	Unit of measurement of sound power.
dB(A)	'A-weighted', adjusted sound power level to reflect the sensitivity of the human ear
HGV	Heavy Goods Vehicle
km	Kilometre
L_{Aeq}	Equivalent continuous sound level. The sound level in decibels, having the same total sound energy as the fluctuating level measured over a period of time.
m	metres
PAN	Planning Advice Note

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Chapter 15: Traffic and Access

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Contents

15 Traffic and Access

15.1 Introduction

This chapter considers the likely effects of the proposed upgrade of the existing Staffin Slipway by developing the Staffin Community Harbour (SCH) (hereafter referred to as the 'proposed SCH development') on receptors along the transport routes resulting from vehicle movements associated with the construction phase of the proposed SCH development. The specific objectives of the chapter are to:

- Review the relevant policy and legislative framework;
- Describe the baseline transport conditions;
- Describe the assessment methodology and significant criteria used in undertaking the assessment;
- Describe potential effects, including direct, indirect and cumulative effects;
- Describe the mitigation measures proposed to address likely significant effects; and
- Assess the residual effects remaining following implementation of mitigation.

The assessment has been undertaken by Pell Frischmann and effects have been considered in accordance with the Institute of Environmental Assessment (now Institute of Environmental Management and Assessment (IEMA)) Guidelines for the Environmental Assessment of Road Traffic (1993). The document is referred to as the IEMA Guidelines in this chapter.

15.2 Regulations, Guidance and Sources of Information

15.2.1 National Legislation

15.2.1.1 Planning Advice Note 75 (2005)

Planning Advice Note (PAN) 75: Planning for Transport provides advice on the requirements for Transport Assessments. The document notes that:

"*… transport assessment to be produced for significant travel generating developments. Transport Assessment is a tool that enables delivery of policy aiming to integrate transport and land use planning*."

"*All planning applications that involve the generation of person trips should provide information which covers the transport implications of the development. The level of detail will be proportionate to the complexity and scale of the impact of the proposal…For smaller developments the information on transport implications will enable local authorities to monitor potential cumulative impact and for larger developments it will form part of a scoping exercise for a full transport assessment. Development applications will therefore be assessed by relevant parties at levels of detail corresponding to their potential impact*."

15.2.1.2 Transport Assessment Guidance (2012)

Transport Scotland's (TS) Transport Assessment Guidance was published in 2012. It aims to assist in the preparation of Transport Assessments (TA) for development proposals in Scotland such that the likely transport impacts can be identified and dealt with as early as possible in the planning process. The document sets out requirements according to the scale of development being proposed.

The document notes that a TA will be required where a development is likely to have significant transport impacts but that the specific scope and contents of a TA will vary for developments, depending on location, scale, and type of development.

15.2.1.3 National Transport Strategy (2020)

In 2020, the Scottish Government released an updated version of the 2006 National Transport Strategy (NTS2). NTS2 is noted as being:

"*…a Strategy for the whole transport system (people and freight) and it considered why we travel and how those trips are made, by including walking, wheeling, cycling, and travelling by bus, train, ferry, car lorry and aeroplane. It is a Strategy for all users: those travelling to, from and within Scotland*."

In relation to island communities, the NTS2 notes that:

"*Island communities face similar issues to those living in remote and rural areas, but in many cases the challenges can be greater.*

Island communities can also face additional freight costs, such as getting goods, including farming and seafood produce, to market or importing energy sources or building materials and labour."

15.2.2 Other Guidance

15.2.2.1 Local Policy

Highland-wide Local Development Plan (2012)

The Highland-wide Local Development Plan (LDP) was adopted by The Highland Council (THC) in April 2012 and is the established planning policy for the Highlands. It sets out a settlement strategy and spatial framework for how the Council foresees development occurring in the forthcoming twenty-year period.

The LDP does not contain any specific policy guidance for the Proposed Development. However, Policy 56 is relevant with regards to general transport policy. The relevant transport elements from this policy are:

"*Development proposals that involve travel generation must include sufficient information with the application to enable the Council to consider any likely on- and off- site transport implications of the development and should:*

- *be designed for the safety and convenience of all potential users;*
- *incorporate appropriate mitigation on site and/or off site, provided through developer contributions where necessary, which might include improvements and enhancements to the walking/cycling network and public transport services, road improvements and new roads; and*
- *incorporate an appropriate level of parking provision, having regard to the travel modes and services which will be available and key travel desire lines and to the maximum parking standards laid out in Scottish Planning Policy or those set by the Council.*

When development proposals are under consideration, the Council's Local Development Strategy will be treated as a material consideration.

The Council will seek the implementation and monitoring of Green Travel Plans in support of significant travel generating developments."

West Highland and Islands Local Development Plan (2019)

West Highland and Islands Local Development Plan's (WestPlan), Chapter 3 Skye and Raasay Settlements outlines that placemaking priorities for Staffin include:

"*Support improvements to harbour facilities, including the slipway and breakwater to provide greater depth and protection for harbour users*."

This is discussed in Section 4.6.2.1 of Chapter 4: Statutory Context & Policy.

Guidance on the Preparation of Transport Assessments (2014)

THC has prepared guidance on how TA's should be prepared for development sites within The Highlands. The guidance was published by THC in November 2014.

15.3 Method of Assessment

15.3.1 Baseline Methodology

The baseline review focused on the nature of the surrounding road infrastructure and the current level of traffic use and was informed by desktop studies and field surveys.

15.3.1.1 Desk Study

The desk study included reviews and identification of the following:

- Relevant transport planning policy;
- Accident data;
- Sensitive location;
- Any other traffic sensitive receptors in the area (core paths, routes, communities etc.)
- Ordnance Survey (OS) plans; and
- Potential origin locations of construction staff and supply locations for construction materials to inform the extent of local area road network to be included in the assessment.

The methodology adopted within this assessment has been developed from guidance given in the Institute of Highways and Transportation (IHT) 'Guidelines for Traffic Impact Assessment' and also the IEMA 'Guidelines for the Environmental Assessment of Road Traffic'. Methodologies detailed in the IHT guidelines recommend that Environmental Impact Assessments (EIAs) for large developments should be assessed in accordance with the IEMA guidelines noted above.

15.3.2 Method of Assessment

15.3.2.1 Scope of Assessment

The assessment of effects concentrates on the effects of the proposed SCH development construction phase on the transport impacts in the baseline review of the desk-based information.

The operational impact of the proposed SCH development is detailed in the Transport Assessment.

The methodology adopted in this assessment involved the following key stages:

- Determine baselines;
- Review development for impacts;
- Evaluate significance of effects on receptors;
- Identify mitigation; and
- Assess residual effects.

15.3.2.2 Sensitivity / Importance Value

The IEMA 'Guidelines for Environmental Impact Assessment' (2005) notes that the separate 'Guidelines for the Environmental Assessment of Road Traffic' (1993) document should be used to characterise the environmental traffic and transport effects (off-site effects) and the assessment of significance of major new developments. The guidelines intend to complement professional judgment and the experience of trained assessors.

In terms of traffic and transport impacts, the receptors are the users of the roads within the study area and the locations through which those roads pass.

The IEMA Guidelines includes guidance on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement was used to develop a classification of sensitivity for users based on the characteristics of roads and locations. This is summarised in Table 15.3.1.

Table 15.3.1: Classification of Receptor Sensitivity

Receptor	Sensitivity			
	High	**Medium**	**Low**	**Negligible**
Users of Roads	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs. Includes roads with traffic control signals, waiting and loading restrictions, traffic calming measures.	Where the road is a local A or B class road, capable of regular use by HGV traffic. Includes roads where there is some traffic calming or traffic management measures.	Where the road is Trunk or A-class, constructed to accommodate significant HGV composition. Includes roads with little or no traffic calming or traffic management measures.	Where roads have no adjacent settlements. Includes new strategic trunk roads that would be little affected by additional traffic.
Users / Residents of Locations	Where a location is a large rural settlement containing a high number of community and public services and facilities.	Where a location is an intermediate sized rural settlement, containing some community or public facilities and services.	Where a location is a small rural settlement, few community or public facilities or services.	Where a location includes individual dwellings or scattered settlements with no facilities.

Where a road passes through a location, users are considered to the highest level of sensitivity defined by either the road or location characteristics.

15.3.2.3 Magnitude of Impact

The following rules, also taken from IEMA Guidelines are used to determine which links within the study area should be considered for detailed assessment:

- Rule 1 – include highway links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles is predicted to increase by more than 30%); and
- Rule 2 – include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

The IEMA Guidelines identify the key impacts that are most important when assessing the magnitude of traffic impacts from an individual development: the impacts and levels of magnitude are discussed below:

- **Severance** – the IEMA Guidance states that, "*severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery*." *Further, "Changes in traffic of 30%, 60%, and 90% are regarded as producing 'slight', 'moderate', and 'substantial' [or minor, moderate, and major] changes in severance respectively". However, the Guidelines acknowledge that "the measurement and prediction of severance is extremely difficult*". (Para 4.28);

- **Driver delay** – the IEMA Guidelines note that these delays are only likely to be "*significant [or major] when the traffic on the network surrounding the development is already at, or close to, the capacity of the system*." (Para 4.32);
- **Pedestrian delay** – the delay to pedestrians, as with driver delay, is likely only to be major when the traffic on the network surrounding the development is already at, or close to, the capacity of the system. An increase in total traffic of approximately 30% can double the delay experienced by pedestrians attempting to cross the road and would be considered major;
- **Pedestrian amenity** – the IEMA Guidelines suggests that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or its lorry component) is halved or doubled (Para 4.39). It is therefore considered that a change in the traffic flow of -50% or +100% would produce a major change in pedestrian amenity;
- **Fear and intimidation** – there are no commonly agreed thresholds for estimating levels of fear and intimidation, from known traffic and physical conditions. However, as the impact is considered to be sensitive to traffic flow, changes in traffic flow of 30%, 60% and 90% are regarded as producing minor, moderate and major changes respectively; and
- **Accidents and safety** – professional judgement would be used to assess the implications of local circumstances, or factors which may elevate or lessen risks of accidents.

While not specifically identified, as more vulnerable road users, cyclists are considered in similar terms to pedestrians.

15.3.2.4 Significance of Effects

To determine the overall significance of effects, the results from the receptor sensitivity and magnitude of change assessments are correlated and classified using a scale set out in Table 2.4 of Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB) and summarised in Table 15.3.2.

The DMRB defines the potential change in effect as follows:

- **Large:** These effects are considered to be material in the decision -making process;
- **Moderate:** These effects may be important but are not likely to be material factors in decision making. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a receptor;
- **Slight:** These effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in improving the subsequent design of the project; and
- **Neutral:** No effects or those that are imperceptible.

Table 15.3.2: Significance of Effects

Magnitude of Impact	Sensitivity/Value of Resource/Receptor			
	High	Medium	Low	Negligible
Large	Major	Moderate	Minor	Negligible
Moderate	Moderate	Moderate	Minor	Negligible
Slight	Minor	Minor	Negligible	Negligible
Neutral	Negligible	Negligible	Negligible	Negligible

Key

(yellow)	Significant Effect
(grey)	Non-Significant Effect

In terms of the EIA Regulations, effects would be considered of significance where they are assessed to be moderate or major. Where an effect could be one of Major/Moderate or Moderate/Minor, professional judgement would be used to determine which option should be applicable.

15.3.2.5 Assessment Limitations

The assessment is based upon an assumed construction programme for the proposed SCH development. Alterations in the programme may increase or decrease traffic flows per month.

The assessment is based upon average traffic flows. There may be localised peaks during construction days where flows can be higher for a specific hour, such as a shift change on site.

Baseline traffic flows information were not available for Staffin Road due to travel restrictions associated with the Covid 19 pandemic affecting travel patterns, however, an informed estimation of the traffic flows was calculated based on TRICS[1] information and an estimation of daily trips associated with visitors to An Corran Beach.

15.4 Baseline

15.4.1 Traffic and Access

15.4.1.1 Local Road Network

The proposed SCH development would take access directly from the existing Staffin Road connecting the slipway with the A855. Rock materials which will be used in the construction of the proposed SCH development will be sourced from a nearby quarry in Lealt, discussed in detail in Chapter 2: Project Description, which is accessed from the south via the A855. Hence, the baseline specifically considers the access road and the A855 south to Lealt.

[1] TRICS® - is the system of trip generation analysis for the UK and Ireland. It is a comprehensive database of traffic and multi-modal transport surveys, covering a wide range of development types (TRICS, 2021)

Access Road / Staffin Road

The existing Staffin Road is a single track which comprises passing places along its length of the track towards Staffin Slipway and is accessed via the A855 through a priority junction.

The A855

The A855 is a two-way single carriageway which is subject to the national speed limit in the vicinity of the junction with the unclassified road that leads to Staffin Slipway. There is a footway located along the western boundary of the carriageway that leads to Staffin Village.

The speed limit of the A855 reduces to 40mph through the settlement of Staffin to the south of the access junction.

The A855 between Staffin and Lealt is a local distributor road subject to the national speed limit. There are no footways along its length.

15.4.1.2 Baseline Traffic Flows

Due to travel restrictions associated with the Covid-19 outbreak, the collection of meaningful traffic count data within a neutral flow period has not been possible.

Traffic data used in the assessment has therefore been sourced from historic traffic count data provided by the UK Department for Transport (DfT). These sources have been factored to provide future year traffic flows using Low Growth National Road Traffic Forecasts (NRTF) to a 2021 baseline (2019/2021 = 1.016).

The counts sites used were as follows:

- DfT Site 40945, A855 located near the Rigg south of Lealt Quarry; and
- DfT Site 1131, A87, south of Portree.

The traffic count data allowed the traffic flows to be split into vehicle classes. The data was summarised into cars / light goods vehicles (LGVs) and heavy goods vehicles (HGVs) (all goods vehicles > 3.5 tonnes gross maximum weight). A summary of the results for the average 24-hour weekday period is provided in Table 15.4.3.

Table 15.4.3: 2021 Existing Traffic Conditions (Weekday Average Two-Way Flows)

Survey Location	Cars & LGV	HGV	Total
Staffin Road	84	2	86
A855, south of Lealt Quarry	845	36	881
A87, south of Portree	3,940	137	4,077

15.4.1.3 Accident Review

Road traffic accident data for the three-year period commencing 01 January 2018 through to 31st December 2020 was obtained from the online resource crashmap.co.uk which uses data collected by the police about road traffic crashes occurring on British roads where someone is injured.

Analysis of the CrashMap website showed that there were no recorded accidents along the A855 between Lealt and the site over the latest three-year period between 2018 and 2020.

A summary of the recorded accidents indicates that:

- Five accidents were recorded along the A855 between Portree Village and the Site of which four were classified as 'Slight' and one was classified as 'Serious';
- One of the accidents involved a bus and resulted in four casualties which were recorded as 'Slight'; and
- One of the accidents was recorded as 'Serious'. The accident, involving one car, occurred near the parking area at Loch Leathan, and resulted in one casualty.

The data from CrashMap does not suggest any apparent trend in relation to accidents on the local road network.

15.4.1.4 Active Travel Links

There are no footways along Staffin Road / the access track from the site towards the A855 access junction.

A review of THC's Core Path plan has been undertaken and this indicated that there is one Core Path located in the immediate vicinity of the proposed development. Core Path SL25.01 is located near the site and provides a connection from Staffin Slipway to the village of Staffin. Core Path SL25.01 is a constructed path which is 1.4km in length.

Pedestrian facilities throughout the study area are limited and reflect the rural nature of the road network within the study area.

A review of the Sustrans cycle map indicates that the A855 is not a recognised part of the National Cycle Route (NCR) network. The roads in the vicinity of the site are generally lowly trafficked and are therefore considered suitable for cycling.

15.4.1.5 Future Year Baseline

Construction of the project could commence during 2022 (likely to continue into 2023) if consent is granted and is anticipated to take up to 12 months.

To assess the likely effects during the construction phase, base year traffic flows were determined by applying a NRTF high growth to the DfT traffic flows.

The NRTF low growth for 2019 to 2023 is 1.016. These factors were applied to the 2019 DfT traffic flows to estimate the 2023 Base traffic flows which are shown in Table 15.4.4.

Table 15.4.4: 2023 Baseline Traffic Flows (Weekday Average Two-Way Flows)

Survey Location	Cars & LGV	HGV	Total
Staffin Road	85	2	87
A855, south of Lealt Quarry	854	36	890
A87, South of Portree	3,983	139	4,121

15.4.2 Receptor Identification

Based on the classifications set out in Table 15.3.2 the following receptors have been classified as being:

- Users of the A855: Low Sensitivity; and
- Users and residents living along the access track: Low / Medium Sensitivity.

15.5 Impact Assessment

15.5.1 Construction

During the 12-month construction period, the following traffic will require access to the site:

- Staff transport, either cars or minibuses; and
- Construction equipment and materials, deliveries of machinery and supplies of cement.

Average monthly traffic flow data were used to establish the construction trips associated with the proposed SCH development and are detailed in the TA contained in Appendix O.1, in Volume 3 of the Environmental Impact Assessment Report (EIAR). The trip estimates have been based upon first principle estimates of traffic movements to and from the site, having established the likely volumes of construction materials, resources and components.

Trip estimates have been assigned to the proposed construction programme to allow the identification of the peak construction traffic to be established. The construction programme is also provided in the TA.

The peak traffic flows associated with the proposed SCH development construction phase results in an average of 74 movements per day (37 trips in and 37 trips out), of which 26 would be made by light vehicles (13 inbound and 13 outbound) and 48 by HGV (24 inbound and 24 outbound).

The construction traffic was compared against the future baseline traffic to estimate the increase in traffic associated with this phase of the proposed SCH development. Table 15.5.1 illustrates the potential traffic impact at the peak of construction activity.

Table 15.5.1: Traffic Impact Summary

Survey Location	Cars & LGV	HGV	Total	Cars & LGV % Increase	HGV % Increase	Total Traffic % Increase
Staffin Road	111	50	161	30.6%	2,387.9%	84.8%
A855 between Lealt Quarry and Staffin Road	880	84	964	3.0%	132.7%	8.3%
A855 south of Lealt Quarry	880	44	924	3.0%	21.9%	3.8%
A87 South of Portree	3983	147	4130	0.0%	5.7%	0.2%

During the construction period, it is anticipated that traffic movements will increase along Staffin Road by more than 30%.

It is anticipated that the total HGV traffic movements along the A855 between Lealt Quarry and Staffin Road will increase by over 30%. Whilst this increase is statistically significant, it is generally caused by the relatively low HGV flows on this road which will see an additional 48 HGV journeys per day (24 inbound and 24 outbound). This represents less than five inbound HGV journey every hour during construction activities, which is not considered significant in overall operational terms.

A review of existing road capacity has been undertaken using the DMRB, Volume 15, Part 5 "The NESA Manual". The theoretical road capacity has been estimated for each of the road links that makes up the study area. The results are summarised in Table 15.5.2.

Table 15.5.2: Traffic Impact Summary

Survey Location	2023 Baseline Flow	2023 Base + Development Flows	Theoretical Road Capacity (12hr)	Spare Road Capacity %
Staffin Road	87	161	3360	92%
A855 between Lealt Quarry and Staffin Road	890	964	21600	91%
A855 south of Lealt Quarry	890	924	21600	91%
A87 South of Portree	4122	4130	21600	62%

The results indicate that there are no road capacity issues with the proposed SCH development and that ample spare capacity exists within the local road network.

With regards to Rule 1 of the IEMA Guidelines, the impact will exceed 30% increases along Staffin Road and also along the A855 between Lealt Quarry and Staffin Road and as such should be assessed.

The assessment of the significance of the potential impact on the areas is summarised in Table 15.9.1, at the end of this Chapter.

As discussed in Section 15.3.2.3, the key impacts that are to be assessed are severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation and accidents and safety for residents and users of the A855 and Staffin Road. Table 15.5.1 provides assessment of these impacts taking into account the receptor sensitivity, as discussed in Section 15.3.2.2, and magnitude of impact, as discussed in 15.3.2.3 to determine the significance of these effects in line with Section 15.3.2.4.

Table 15.5.1: Significance of impacts for residents and users of the A855 and Staffin Road

Receptor	Receptor Sensitivity	Magnitude	Significance
Severance	Low	Slight Adverse	Negligible: Non-Significant Adverse
Driver Delay	Low	Slight Adverse	Negligible: Non-Significant Adverse
Pedestrian Delay	Low	Slight Adverse	Negligible: Non-Significant Adverse
Pedestrian Amenity	Low	Slight Adverse	Negligible: Non-Significant Adverse
Fear and Intimidation	Low	Slight Adverse	Negligible: Non-Significant Adverse
Accidents and Safety	Medium	Moderate Adverse	Moderate: Significant Adverse

As demonstrated in Table 15.5.2 there is sufficient capacity on the roads that there will only be slight effects on driver and pedestrian delay. The increase in HGV movements, may cause slight adverse effects on pedestrian amenity due to noise and dust, while some drivers may feel slightly intimidated meeting HGV's, on a single track road especially. The risk of accidents particularly on the Staffin Road gives rise to a moderate adverse effect, the risks are due to the lack of intervisibility between passing places which may lead to additional reversing manoeuvres being required.

15.5.2 Operation

It is predicted that during the operation of the proposed SCH development there would be up to 21 vehicle movements per day. Given the low traffic generation (less than 30%), further assessment has been scoped out of the assessment.

The proposed mitigation for the construction stage includes upgrades to passing places on the access road (see Section 15.6.1.1) these will remain post construction. As such there is a slight beneficial magnitude of impact on users of the Staffin Road in terms of driver and pedestrian delay due to improved visibility between passing places. Fear and intimidation will be reduced due to having appropriately sized passing places to allow for large vehicle passing. The improved invisibility and passing place size will both help to reduce the chance of accidents occurring. These **slight** benefits will give rise to permanent **negligible/minor: non-significant** effects.

15.6 Mitigation Measures

15.6.1 Construction

15.6.1.1 Access Road

Some minor alterations will be undertaken along the access road to proposed SCH development which will improve safety along the track. Further details of the required improvements are provided in the TA (Appendix O.1., in Volume 3 of the EIAR).

A series of passing place upgrades along the Staffin Road would be provided to assist in traffic movements along the road. The suggested passing place enhancements would significantly enhance access along the road for construction traffic, harbour users and other existing and future users. A planning application to all these works to be undertaken prior to the main construction works has been submitted to THC.

15.6.1.2 Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) would be prepared and agreed with the THC and TS prior to construction works commencing.

The following measures could be included within CTMP during the construction phase.

- Where possible the detailed design process would minimise the volume of material to be imported to site to help reduce HGV numbers;
- A site worker transport and travel arrangement plan, including transport modes to and from the worksite (including pick up and drop off times);
- All lorries carrying crushed aggregates shall be sheeted to reduce dust and stop spillage on public roads (as discussed in Chapter 5: Air Quality;
- Co-ordination between the site and the quarry to ensure that HGV do not cross on the Staffin Road;
- Enhanced signage on Staffin Road including formal passing place signage, no parking road markings and construction traffic warning signage;
- Specific training and disciplinary measures should be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway;
- Wheel cleaning facilities may be established at the site entrance, depending the views of THC;
- Normal site working hours would be limited to between 0700 and 1900 (Monday to Saturday;
- Provision of 15 layby enhancements, as detailed within Chapter 2: Project Description, along the Staffin Road to ease access for all road users. These will greatly ease and improve the safety of the road and will provide a significant access benefit for all road users;
- Works to improve forward visibility along Staffin Road through verge vegetation trimming, branch lopping and reprofiling a rocky outcrop;
- Enhanced road signage for laybys and engagement with the THC on what innovative options could be introduced to restrict inappropriate large vehicle access whilst still keeping service access open for the slipway;

- Appropriate traffic management measures would be put in place on the A855 to avoid conflict with general traffic, subject to the agreement of the roads authority. Typical measures would include HGV turning and crossing signs and/ or banksmen at the site access and warning signs;
- Provide construction updates on the project website and or a newsletter to be distributed to residents within an agreed distance of the site;
- Adoption of a voluntary speed limit of 15 mph for all construction vehicles through Staffin Village; and
- All drivers would be required to attend an induction to advise on road safety issues relevant to the site and the access network.

15.6.1.3 Information and General Measures

Information regarding the construction vehicles would be provided to the local media outlets to help assist the public. These could include:

- Local Newspapers;
- Community Councils; and
- Appropriate websites/social-media outlets.

An agreement on wear and tear on road infrastructure caused directly be construction traffic would be established prior to construction commencing. The agreement will set out the area of review, scope and response requirement of any dilapidations that can be proven to be linked to construction traffic.

An inspection of any traffic management measures and road signage around the site access junction would be undertaken by the site manager on a regular basis. During the access junction construction works, there would be a daily road inspection and the public road will be kept clear of debris and mud.

15.7 Cumulative Impacts

The use of High NRTF growth assumptions has provided a basis for general local development growth within the study area.

There is one consented development (19/02172/FUL) which is to be located via the access track from the A855. The development involves converting an agricultural shed to a farm shop and catering facility. Within THC's Delegated Report of Handling (available on THC's Planning Application Portal for 19/02172/FUL planning documents) it is reported, in relation to the access track leading to the proposed SCH development that:

"*This road already handles large amounts of vehicular traffic from the A855 down to the bay all of which passes the front of this property. Once completed and open it is considered likely that many of the customers of the new retail unit and café will be drawn from this existing traffic*."

As traffic associated with the consented development is considered to be mainly pass-by traffic from vehicles travelling along the existing unclassified road towards the proposed SCH development, cumulative traffic flows are not to be included in the assessment.

With regards to the construction of the consented development, any crossover of traffic with the proposed SCH development flows would be addressed via a traffic management plan. The inclusion of further traffic flows in the base line would dilute the potential impact that the proposed SCH development would have. As such, the approach taken is considered to be an overly robust assessment. Hence no additional effects are predicted.

15.8 Residual Impacts

This section considers the assessment of traffic impacts following the incorporation of the identified mitigation measures. The construction mitigation will reduce the magnitude of impact on accidents and safety to **slight** giving rise to a **minor**: non-significant effect.

15.9 Summary

The proposed SCH development will lead to increased traffic volumes on the A855 and Staffin Road in the vicinity of the Site during the construction phase. These will be of a temporary timescale and transitory in nature.

The maximum traffic impact associated with the construction period is expected to occur in Month 8 of the programme with 74 journeys (26 Car / Lights and 48HGV journeys).

No significant capacity issues are expected on any of the roads within the study area due to the additional construction traffic movements associated with the proposed SCH development, as background traffic movements are low, the links are of reasonable standard and appropriate mitigation is proposed.

Traffic levels during the operational phase of the proposed SCH development would be approximately 65 movements per day.

With the implementation of appropriate mitigation, no significant residual effects are anticipated in respect of traffic and transport issues. The residual effects are all assessed to be minor or negligible: non-significant but as they will occur during the construction phase only, they are temporary and reversible.

Table 15.9.1 provides a summary of impacts, mitigation and residual effects.

Table 15.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction							
Residents and users of the A855 and Staffin Road	Severance	Low	Slight Adverse	Negligible: Non-Significant Adverse	CTMP proposals.	Negligible Adverse	Negligible: Non-Significant Adverse
	Driver Delay	Low	Slight Adverse	Negligible: Non-Significant Adverse	CTMP Proposals, layby improvements on Staffin Road and improved signage.	Negligible Adverse	Negligible: Non-Significant Adverse
	Pedestrian Delay	Low	Slight Adverse	Negligible: Non-Significant Adverse	CTMP proposals.	Negligible Adverse	Negligible: Non-Significant Adverse
	Pedestrian Amenity	Low	Slight Adverse	Negligible: Non-Significant Adverse	CTMP proposals.	Negligible Adverse	Negligible: Non-Significant Adverse
	Fear and Intimidation	Low	Slight Adverse	Negligible: Non-Significant Adverse	CTMP Proposals and road improvements along Staffin Road to THC standards.	Negligible Adverse	Negligible: Non-Significant Adverse
	Accidents and Safety	Medium	Moderate Adverse	Moderate: Significant Adverse	CTMP proposals and layby enhancements on Staffin Road.	Slight Adverse	Minor: Non-Significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Operational							
Staffin Road Users	Driver Delay	Low	Slight Beneficial	Negligible: Non-Significant Beneficial	CTMP Proposals, layby improvements on Staffin Road and improved signage.	Slight Beneficial	Negligible: Non-Significant Beneficial
	Pedestrian Delay	Low	Slight Beneficial	Negligible: Non-Significant Beneficial	CTMP proposals.	Slight Beneficial	Negligible: Non-Significant Beneficial
	Fear and Intimidation	Low	Slight Beneficial	Negligible: Non-Significant Beneficial	CTMP Proposals and road improvements along Staffin Road to THC standards.	Slight Beneficial	Negligible: Non-Significant Beneficial
	Accidents and Safety	Medium	Slight Beneficial	Minor: Non-Significant Beneficial	CTMP proposals and layby enhancements on Staffin Road.	Slight Beneficial	Minor: Non-Significant Beneficial

Key

Significant Effect
Non- Significant

15.10 References

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15.11 Glossary

Acronym	Definition
CTMP	Construction Traffic Management Plan
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
HGV	Heavy Goods Vehicle
IEMA	Institute of Environmental Management and Assessment
IHT	Institute of Highways and Transportation
LDP	Local Development Plan
LGV	Light Goods Vehicle
mph	Miles per hour
NCR	National Cycle Route
NPF3	Scotland's National Planning Framework 3
NRTF	National Road Traffic Forecasts
NTS2	2006 National Transport Strategy
OS	Ordnance Survey
PAN	Planning Advice Note
SCH	Staffin Community Harbour

Acronym	Definition
TA	Transport Assessment
THC	The Highland Council
TS	Transport Scotland
WestPlan	West Highland and Islands Local Development Plan

Chapter 16: Navigation

Document Control

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Contents

16 Navigation

16.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) addresses the potential impact of the proposed Staffin Community Harbour (SCH) development on navigation. Impacts during the construction and operational phases have been considered. Impacts have been identified, quantified and, if necessary, mitigated through the introduction of measures to control or reduce adverse effects arising.

16.2 Regulations, Guidance and Sources of Information

16.2.1 National Legislation

16.2.1.1 Port Marine Safety Code

From a navigation perspective, it is recommended that harbour operators (which are not harbour authorities) work to the Port Marine Safety Code (PMSC) (Department for Transport and Maritime & Coastguard Agency, 2016). This code lays out the harbour operators' accountability for marine safety, the key measures required to secure marine safety, and their duties and powers. The Marine Safety Management System (MSMS) described in the PMSC is the principal mechanism to ensure operations are safely managed. This is based on formal risk assessments and refers to an appropriate approach to incident investigation.

16.2.2 Other Guidance

The Northern Lighthouse Board is responsible for authorising the installation of Aids to Navigation (AtoN) via the Statutory Sanction process and provides guidance and support to harbour operators in this respect, including notification of AtoN installations to the UK Hydrological Office.

16.2.3 Sources of Information

Data on the type and volume of marine traffic in and out of Staffin has been collected from current users and potential future users. Bathymetry data for the area has also been considered.

16.3 Method of Assessment

The navigation assessment considers effects on receptors at a strategic level. It is not a navigation risk assessment (NRA).

16.3.1 Baseline Methodology

Baseline conditions have been derived through site visits, desktop surveys and review of data collected from current and potential future users of the Harbour.

16.3.2 Method of Assessment

A desk-based review of information with regard to the facilities available, projected types and volumes of marine traffic, and navigation information was conducted.

16.3.2.1 Evaluation of Receptors

Potential receptors have been identified, and their sensitivity assessed in line with Table 16.3.1.

Table 16.3.1: Navigation Receptor Sensitivity

Sensitivity	Criteria
High	Perennial contributors to the local economy: • commercial fishing vessels; or • fish farm support vessels. Lifeline Services – ferry, lifeboat, essential deliveries.
Medium	Seasonal contributors to the local economy: • marine tourism vessels; • local non-commercial fishing vessels; • commercial deliveries; or • Recreational flotilla. Local seasonal recreational users.
Low	Individual visiting recreational vessels. Recreational users – paddlers, wild swimmers.

16.3.2.2 Magnitude of Impact

Potential impacts on navigation associated with the construction and operational phases of the project have been identified. The magnitude of the impacts has been assessed utilising the criteria provided in Table 16.3.2.

Table 16.3.2: Magnitude of Impact Criteria

Magnitude of Impact	Characteristics
High	Substantial deterioration / improvement in: • Access; • Services; • Navigational issues/risks for vessels.; or • Risks to life.
Medium	Noticeable deterioration / improvement in: • Access; • Services; • Navigational issues/risks for vessels; or • Risk to life or injury
Low	Slight deterioration / improvement in: • Access, • Services; • Navigational issues for vessels; or • Risk to life or injury
Negligible	No noticeable alterations to the current situation.

16.3.2.3 Significance Evaluation

For each impact identified, a determination of whether it will result in a significant effect will be made by taking into account the sensitivity of receptor and magnitude of impact. Table 16.3.3 will therefore be used to determine the overall significance category. Those giving rise to moderate or major risk are considered significant in EIA terms.

Table 16.3.3: Magnitude of impact Evaluation

Magnitude of Impact	Sensitivity of Receptor		
	High	Medium	Low
High	Major	Moderate	Minor
Medium	Moderate	Moderate	Minor
Low	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible

Key

(yellow)	Significant
(grey)	Non-significant

16.3.3 Mitigation

Where necessary mitigation has been identified in line with the approach detailed in Chapter 3: Methodology.

16.4 Baseline Information

The existing slipway is owned and maintained by The Highland Council. There is no statutory harbour authority and no formal management of the facilities.

16.4.1 Staffin Facilities

As discussed in Section 2.2. of Chapter 2: Project Description, the existing slipway is narrow, at 4m in width and 113m in length, and has a shallow gradient (1 in 20), this restricts the tide states that the slipway can be used for launching and the size of craft that can be launched.

Boats can berth alongside the slipway, but this is tidally restricted and exposed to northerly winds, so primarily utilised for loading and unloading activities in fair weather. There is also a single tie up berth on the return leg of the breakwater, which is available for temporary use only.

Fishing and fish farm vessels moor off the southern edge of Staffin Island. Small tenders are used to access vessels at moorings.

There are no facilities for visiting vessels to berth overnight.

16.4.2 Accessibility

Access to the Staffin Slipway at Òb nan Ron is from Staffin Bay to the north, past the west side of Staffin Island. There is no safe access directly from the east due to a reef that runs from the southern end of Staffin Island to the Skye shore, east of the harbour.

As show on Drawing: 73.16.01Proposed AtoN water depths in the region of -2m Chart Datum (CD) are available between Staffin Bay and Òb Nan Ron, however vessels have to navigate between a number of areas of lower water depths.

16.4.3 Aids to Navigation

Currently there are no AtoN deployed near the slipway or between Staffin Bay and Òb nan Ron. Vessels are reliant on charts, onboard navigational equipment (depth sounders) and local knowledge to access the Staffin slipway safely.

16.4.4 Facility Users

Perennial commercial users are Organic Sea Harvest, who currently operate two salmon farms within the Staffin area, utilise the Slipway for their support vessels (<10m length overall (LOA)). In addition, there are up to three local creel fishing vessels (<10m LOA) that utilise the slipway. These vessels are typically kept on swinging moorings within Òb nan Ron to the south of Staffin Island. Small tenders are used to ferry fish farm staff and the creel fishermen to their boats on a daily basis.

Local non-commercial use is typically restricted to the summer months (May to September). The majority of the vessels utilised are less than 7m LOA, they are dry-sailed (launched and hauled each day). Around 20 individual local boats may use the slipway each season, with typically no more than 12 sailing on any single day. The majority of these boats are engaged in non-commercial fishing.

Occasional marine tourist vessels utilise the slipway for launching, hauling, landing, and temporary berthing during the summer months, typically no more than one vessel is present at a time.

Local and visiting recreational vessels use the slipway for launching, hauling, landing, and temporary berthing during the summer months, typically no more than four vessels per day.

16.5 Impact Assessment

16.5.1 Construction

During the construction works there is a potential for interaction between construction plant, equipment and vessels, and other vessels utilising the existing slipway and the waters in the vicinity of the proposed SCH development. This could give rise to risks of collision or impinge on access to the slipway, both of which are discussed below. As discussed in Section 2.6 of Chapter 2: Project Description, the majority of the construction works will be carried out by land-based plant and deliveries of materials are mainly by road. Hence construction vessels will be limited to safety boats and small workboats to assist with the works. As such, impacts on vessels outwith the immediate vicinity of the proposed SCH development area are not considered.

16.5.1.1 Collision Risks

During the majority of the marine construct works there will be movement of workboats, safety boats, machinery, and materials in close proximity to the navigational route to the existing slipway. Works will be carried out during daytime hours, if works during the winter are ongoing into the hours of darkness, they will need to be suitably lit to allow work to be completed safely.

The new breakwater and slipway structures may also act as a hazard to navigation especially elements not fully out of the water. The new breakwater starts to the east of the existing slipway, as vessels will be travelling from the north the construction would only be expected to cause a collision risk during the later northern sections of the breakwater construction, where it turns westward towards the most obvious routes into the existing slipway. It is assumed that a navigational buoy will temporarily be placed to demarcate the end of the construction works to highlight the hazard to vessel users.

Collision risks apply to all potential slipway users with sensitivities from **low to high.** The area is relatively lightly trafficked, the waters are shallow and vessels in the area wouldn't expect to be moving quickly. The majority of users utilise the slipway during daylight hours, especially the seasonal and recreational users who may be less experienced boatman, which will reduce chance of collisions. An **adverse, low short-term** magnitude of impact is predicted for risk of collision without additional mitigation giving rise to **negligible to minor: non-significant** effects.

16.5.1.2 Access to Slipway Reduced

As discussed in Section 2.6, Chapter 2: Project Description, works on the existing slipway include:

- Dismantling the steel berthing structure and breaking out the concrete ledge that runs from the end of the slipway to the berthing structure;
- The toe of the existing breakwater and slipway as well as the berthing structure will need to be dismantled;
- Removal of the rock armour for reuse in the new breakwater; and
- Concrete works to extend the slipway and to modify the east side to make it suitable for berthing.

For safety reasons it would not be appropriate for non-construction works related vessels to utilise the slipway while machinery and vessels are working on the slipway. The nature of the works required is such that works can be stopped and 'made safe' to allow vessels to utilise the slipway. Frequent stops would impact upon the construction works and hence, there will be a need for some limitations to be placed on slipway use during these construction works.

The fish farm and commercial fishing vessels who are **high** sensitive receptors utilise the slipway most and hence they are most likely to be affected by works on the slipway. That said they typically utilise the slipway at the beginning and end of their working day and as such it should be possible to work with them to make appropriate arrangements to minimise impacts on the commercial fishing sectors while allowing construction to progress. In alignment with Chapter 3; Methodology, this assessment has been completed without taking account of secondary mitigation i.e. no arrangements have been assumed. As such the magnitude of impact is **adverse, medium short term** due to the noticeable deterioration in access giving rise to a **moderate: significant** effect.

The seasonal users of the slipway as discussed in Section 16.4.4 include non-commercial fish, the occasional marine tourism vessels, and local recreational users they have a **medium** sensitivity. Impacts on them and visiting recreational vessels which have a **low** sensitivity will be similar. As their use of the harbour is more sporadic, they may be impacted less often however, they may wish to access the harbour at any time of day. This could lead to them having to wait or not being able to utilise the slipway at that visit. There will be a noticeable deterioration in access hence the magnitude of impact will be **adverse, medium short-term** giving rise to **moderate: non-significant** and **minor: non-significant** to the respective user groups.

16.5.2 Operation

16.5.2.1 Grounding of Vessels

Once the proposed SCH development is operational, there is likely to be an increase in marine traffic in and out of Òb nan Ron via the narrow, shallow channel to Staffin Bay. There is potential for skippers, who are unfamiliar with the route, to run aground. As discussed in Chapter 2: Project Description, this has been taken account of in the proposed SCH development plans. The project specifically includes positioning six aids to navigation in the form of cones and cans to mark a channel in the deeper area of water between Staffin Bay and Òb nan Ron. Appendix P.1 show's an example of the cones and cans proposed. Drawing JC4929 shows the location of the cones and cans in relation to the proposed SCH development. Drawing 73.16.01 Proposed AtoN shows the locations in relation to the water depths and the main route vessels would take through them.

The aids to navigation will be day markers i.e. they are not lit. As the SCH development is only suitable for shallow drafted vessels it is anticipated that there will be very few non-local vessels arriving during hours of darkness. The additional cost of installation and maintenance of lit aids to navigation is therefore not warranted in this instance.

The proposals for the aids to navigation have been discussed with the National Lighthouse Board (NLB), and it is understood that a Statutory Sanction forms for the aids to navigation will need to be submitted to the NLB prior to installation. The resultant Sanction letter will be provided by the NLB to the UK Hydrographic Office (UKHO), confirmation of installation will then be made by Staffin Community Trust (SCT) to allow the charts to be appropriately updated by the UKHO.

Although grounding could affect any users, it is recognised that visiting skippers are most likely to run aground due to their lack of familiarity with the local area. As visiting skippers could be part of a flotilla or on their own, hence the receptor values are **low** to **medium**. The increased vessel numbers could increase the risk of grounding, however taking account of the aids of navigation the safety of all vessels heading to and from Òb nan Ron will be noticeably improved giving rise to a **beneficial, medium permanent**, magnitude of impact giving rise to a **minor: non-significant** to **moderate: significant** effect.

16.5.2.2 Collisions with Other Vessels

The proposed SCH development will be able to accommodate 30 boats between 15m and 5m LOA, and will have 2 slipways for the launching and temporary berthing of boats. As such, it can be assumed that the number of vessels moving in and out of the harbour will increase substantially. It is assumed that skippers are competent in the handling of their own vessels and that the 'rules of the sea' will be followed with regard to manoeuvring within the SCH area.

Although the number of vessels utilising the area is a substantial increase on current numbers it is not a large number when compared to other harbours and marinas as such the risk of collision is only a slight deterioration in risk to life or injury and hence of **adverse, low permanent** impact magnitude. It applies to all potential user groups of **low to high** sensitivity giving rise to **negligible** to **minor: non-significant** effects.

16.5.2.3 Collision with New Breakwater

During periods of darkness or very poor visibility, skippers attempting to enter the proposed SCH development who are not familiar with the new harbour layout, may collide with the new infrastructure (breakwater, slipway, or pontoons).

As this is limited mostly to recreational or visiting vessels either individually or in flotillas, their sensitivity is classed as **low/medium**. The magnitude of the impact is considered **adverse, low permanent** as it's a slight deterioration in navigation risk without mitigation, giving rise to a **negligible: non–significant** effect.

16.5.2.4 Safe Berthing

One of the main aims of the proposed SCH development was to provide safe berthing, as discussed in Section 16.5.2.2 berthing for up to 30 vessels is provided by the pontoons. As discussed in Chapter 2: Project Description and Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes, the proposed SCH development, specifically the location of the breakwater has been designed to provide safe berthing conditions. It is predicted to create the ideal wave climate for safe berthing on the pontoons even during storm events with a 1 in 50 year return period.

The provision of safe berthing will benefit all users from **low** to **high** sensitivity. The fish farm and fishing vessels will be able to berth in the harbour. This avoids the need to travel out to moorings each day by dinghy, saving time and reducing risk of accident, during bad weather and transferring between crafts. It also allows for simpler loading and unloading of equipment and catch.

Seasonal users will benefit from being able to leave their boats in the water and not have to launch and recover them each day. While visitors will be able to overnight at Staffin, allowing them to enjoy onshore aspects of the area also.

Overall safe berthing is seen as a **beneficial, high permanent** magnitude of impact on all users, giving rise to **minor: non-significant** and **medium/major: significant** effects.

16.5.2.5 Improved Launching and Hauling of Boats

With the construction of the new slipway and upgrades to the existing slipway, there is additional capacity and improved launching, hauling, loading, and unloading, for all types of vessels up to 20m LOA in all weathers at all states of the tide. In addition, there are more sheltered opportunities for landing and temporary berthing alongside the upgraded existing slipway.

As this benefits all users of the proposed SCH development the sensitivity is considered **low** to **high**, with a noticeable improvement to access, the magnitude is therefore deemed **beneficial, medium, permanent**. This gives rise to a **minor: non-significant** to **moderate: significant** effect.

16.6 Mitigation Measures

16.6.1 Construction

The contractor shall implement the following mitigation measures during the construction phase to minimise collision risks:

- Local liaison officer in place.
- Appropriate notice to mariners will be posted prior to and as required during the construction works.
- Installation and maintenance of temporary safe water marks (day and night) around the perimeters of the existing and new breakwaters for the duration of the works.
- Ensure that the commercial and community slipway users are informed of any works that may impact on navigation to and from the slipway.

The contractor shall implement the following mitigation measures during the construction phase to maximise access to slipway:

- Local liaison officer in place with published contact details for all skippers.
- Scheduled access times on the use of the existing slipway while construction/dismantling works are being undertaken on the existing slipway, the timings and duration of access to be agreed in advance with commercial vessel operators and co-ordinated by a local liaison officer.
- Scheduled access times will be appropriately published to allow non-commercial users to safely utilise the slipway.
- If it can be safely accommodated by the construction programme, concrete works on the existing slipway will not be undertaken until the new slipway is available.

16.6.2 Operation

A Marine Safety Management Plan will be produced and implemented by the Harbour Manager. In addition, the following operational mitigation measures must be implemented on site:

1. Discussions with the NLB, will be concluded with regard to the design of and install of markers on the breakwater;
2. Notices advertising the new facilities and the new aids to navigation shall be supplied to the publishers of charts and sailing directions that are commonly used on the west coast of Scotland, including the NLB, UKHO and the Royal Yacht Association (RYA).

16.7 Cumulative Impacts

As detailed in Chapter 3: Methodology, no cumulative effects were identified associated with navigation.

16.8 Residual Effects

The inclusion of mitigation detailed in Section 16.6.1 is sufficient to reduce the magnitude of impact of the reduced access to the slipway from medium to **low**, which in turn reduces the impacts on **medium** and **high** sensitive receptors to **minor: on-significant**.

All other effects were non-significant prior to secondary mitigation being identified however; the other mitigation laid out in Section 16.6. reduces some adverse impact magnitudes further, as detailed in Table 16.9.1.

16.9 Summary

There is a potential for significant adverse effects during construction due to the need to carry out works on the existing slipway limiting access to it to user groups, however these are temporary and can be mitigated to non-significant levels. The development has been designed to provide improved access to the sea and sheltered berthing, this is recognised in significant permanent operational benefits being identified. Risks to navigation associated with additional vessels including visiting vessels navigating from Staffin Bay into Òb nan Ron, has been recognised at the design stage and hence the aids to navigation included to the benefit of all users.

The increase in vessels in the area will increase collision risk but these are unlikely to be significant. Table 16.9.1 provides a summary of impacts, mitigation and residual effects associated with the proposed SCH development on navigation.

Table 16.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction							
Commercial fishing vessels and Fish farm support vessels.	Construction Collision Risk	High	Low Adverse Short term	Minor: non-significant Adverse	Local liaison officer in place. Notice to mariners. Temporary safe water marks (day and night) around the perimeters of the works. Inform users of works affecting navigation.	Negligible Adverse Short term	Negligible: non-significant Adverse
Marine tourism vessels; Local non-commercial fishing vessels; and Local seasonal recreational users.	Construction Collision Risk	Medium	Low Adverse Short term	Minor: non-significant adverse	Local liaison officer in place. Notice to mariners. Temporary safe water marks (day and night) around the perimeters of the works. Inform users of works affecting navigation.	Negligible Adverse Short term	Negligible: non-significant Adverse
Individual visiting recreational vessels.	Construction Collision Risk	Low	Low Adverse Short term	Negligible: non-significant adverse	Local liaison officer in place. Notice to mariners. Temporary safe water marks (day and night) around the perimeters of the works. Inform users of works affecting navigation.	Negligible Adverse Short term	Negligible: non-significant Adverse
Commercial fishing vessels and Fish farm support vessels.	Access to Slipway Reduced	High	Medium Adverse Short term	Moderate: significant Adverse	Agree and communicate schedule of access to slipway. If practicable make new slipway available prior to concrete works on existing slipway.	Low Adverse Short term	Minor: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
					Local liaison officer in place.		
Marine tourism vessels; Local non-commercial fishing vessels; and Local seasonal recreational users.	Access to Slipway Reduced	Medium	Medium Adverse Short term	Moderate: Significant Adverse	Local liaison officer in place. Publish schedule of access. If practicable make new slipway available prior to concrete works on existing slipway.	Low Adverse Short term	Minor: Non-significant Adverse
Individual visiting recreational vessels.	Access to Slipway Reduced	Low	Medium Adverse Short term	Minor: non-significant Adverse	Local liaison officer in place. Publish schedule of access. If practicable make new slipway available prior to concrete works on existing slipway.	Low Adverse Short term	Negligible: Non-significant Adverse
Operations							
Recreational Flotilla	Grounding of Vessels	Medium	Medium Beneficial Permanent	Moderate: significant Beneficial	Appropriately communicate new arrangements.	Medium Beneficial Permanent	Moderate: significant Beneficial
Individual visiting recreational vessels.	Grounding of Vessels	Low	Medium Beneficial Permanent	Minor: non-significant Beneficial	Appropriately communicate new arrangements.	Medium Beneficial Permanent	Minor: non-significant Beneficial
Commercial fishing vessels and Fish farm support vessels.	Collisions with Other Vessels	High	Low Adverse Permanent	Minor: non-significant Adverse	Marine Safety Management Plan to be developed and implemented. Harbour manager to be employed.	Negligible Adverse Permanent	Negligible: Non-significant Adverse
Marine tourism vessels; Local non-commercial fishing vessels;	Collisions with Other Vessels	Medium	Low Adverse Permanent	Minor: non-significant Adverse	Marine Safety Management Plan to be developed and implemented.	Negligible Adverse Permanent	Negligible: Non-

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Recreational flotilla; and Local seasonal recreational users.					Harbour manager to be employed.		significant Adverse
Individual visiting recreational vessels.	Collisions with Other Vessels	Low	Low Adverse Permanent	Negligible: non-significant Adverse	Marine Safety Management Plan to be developed and implemented. Harbour manager to be employed.	Negligible Adverse Permanent	Negligible: Non-significant Adverse
Marine tourism vessels; Local non-commercial fishing vessels; Recreational flotilla; and Local seasonal recreational users.	Collision with new breakwater	Medium	Low Adverse Permanent	Negligible: non-significant Adverse	Design and install of markers on the breakwater agreed with NLB. Appropriately communicate new arrangements. Marine Safety Management Plan to be developed and implemented. Harbour manager to be employed.	Negligible Adverse Permanent	Negligible: Non-significant Adverse
Individual visiting recreational vessels.	Collision with new breakwater	Low	Low Adverse Permanent	Negligible: non-significant Adverse	Design and install of markers on the breakwater agreed with NLB. Appropriately communicate new arrangements. Marine Safety Management Plan to be developed and implemented. Harbour manager to be employed.	Negligible Adverse Permanent	Negligible: Non-significant Adverse
Commercial fishing vessels and fish farm support vessels.	Safe Berthing	High	High Beneficial Permanent	Major: significant Beneficial	No mitigation required.	High Beneficial Permanent	Major: significant Beneficial

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Marine tourism vessels; Local non-commercial fishing vessels; Recreational flotilla; and Local seasonal recreational users.	Safe Berthing	Medium	High Beneficial Permanent	Moderate: significant Beneficial	No mitigation required.	High Beneficial Permanent	Moderate: significant Beneficial
Individual visiting recreational vessels.	Safe Berthing	Low	High Beneficial Permanent	Minor: non-significant Beneficial	No mitigation required.	High Beneficial Permanent	Minor: non-significant Beneficial
Commercial fishing vessels and fish farm support vessels.	Improved Launching and Hauling of Boats	High	Medium Beneficial Permanent	Moderate: Significant Beneficial	No mitigation required.	Medium Beneficial Permanent	Moderate: Significant Beneficial
Marine tourism vessels; Local non-commercial fishing vessels; Recreational flotilla; and Local seasonal recreational users.	Improved Launching and Hauling of Boats	Medium	Medium Beneficial Permanent	Moderate: Significant Beneficial	No mitigation required.	Medium Beneficial Permanent	Moderate: Significant Beneficial
Individual visiting recreational vessels.	Improved Launching and Hauling of Boats	Low	Medium Beneficial Permanent	Minor: non-significant Beneficial	No mitigation required.	Medium Beneficial Permanent	Minor: non-significant Beneficial

Key

Significant Effect
Non-Significant

16.10 References

Department of Transport and Maritime & Coastguard Agency. 2016. Port Marine Safety Code.

16.11 Glossary

Acronym	Definition
AtoN	Aids to Navigation
CD	Chart Datum
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
LOA	Length overall
MSMS	Marine Safety Management System
NLB	Northern Lighthouse Board
NLB	National Lighthouse Board
NRA	Navigation risk assessment
PMSC	Port Marine Safety Code
RYA	Royal Yacht Association
SCH	Staffin Community Harbour
SCT	Staffin Community Trust
UKHO	UK Hydrographic Office

Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes

Document Control

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17 Hydrology, Hydrogeology, Water Quality and Coastal Processes

17.1 Introduction

This chapter provides an assessment of effects on hydrology including water quality, hydrogeology, and coastal processes associated with the construction and operation of the proposed Staffin Community Harbour (SCH) development and the operation of the Borrow Pit. Mitigation measures to minimise negative effects have been identified.

The chapter includes consideration of the project in terms of the Water Framework Directive (WFD) and satisfies the requirement for a Drainage Impact Assessment. The mitigation measures identified constitute a Water Management Plan.

17.2 Legislative Framework

17.2.1 Water Framework Directive

The Water Framework Directive (2000/60/EC) and associated daughter directives' primary purpose is to create a framework to protect groundwater, coastal waters, transitional and inland surface waters. The framework details multiple aims which include:

- Prevention and protection of aquatic environments and enhancement of their ecosystem status in regard to the water needs of wetland and terrestrial ecosystems which rely upon aquatic environments;
- Enhancement of aquatic environments through the introduction of measures to reduce discharges, emissions, and losses of hazardous substances; and
- Continuation of progressive reduction of groundwater pollution and further prevention of its pollution.

Under the WFD, member states are to achieve "good ecological status" for their coastal, transitional, and inland waters. Protection and restoration of member states' ground waters to maintain the dependent surface water and terrestrial ecosystems are also required.

In Scotland, the Water Environment and Water Services (Scotland) Act 2003 transposed the Directive into Scottish Law. The Directive also requires that classified waterbodies are given legal protection. In Scotland this was incorporated into law under the Environmental Liability (Scotland) Regulations 2009, making it an offence to adversely affect a classified waterbody so that its status or potential under the WFD is deteriorated. Hence, despite Brexit the WFD requirements apply as they have been transposed into National legislation.

17.2.2 Bathing Water Directive (2006/7/EC)

The Bathing Water Directive 76/160/EC came into force in 1975 and is a further piece of European legislation that is still applicable having been transposed into Scots law. The main objective of the directive is to protect public health and that of the aquatic environment including coastal and inland areas, which include rivers and lakes, from pollution. It placed a mandatory duty upon member states to conduct regular monitoring of designated bathing sites which must comply with specific standards set out within the Directive. In 2006 the Directive was revised (2006/7/EC), introducing higher standards but simplifying classifications of designated bathing sites by only considering two measurements (19 laboratory tests previously), intestinal enterococci and Escherichia coli (Mansilha et al., 2009). New compliance categories which included excellent, good, sufficient and poor were also introduced while placing a duty upon the member state to ensure that all bathing waters at least meet the criteria categorised as sufficient, in addition to taking action to increase numbers of designated sites to categories of excellent and good. In Scotland, the revised Directive was transposed into law through the Bathing Waters (Sampling & Analysis) Direction 2008 and the Bathing Waters Regulations 2008.

17.2.3 The European Floods Directive (2007/60/EC)

The Directive was approved in 2007, aiming to reduce and manage the risk that floods pose to human health, the environment, cultural heritage and economic activity. The Directive is transposed into Scots Law by the Flood Risk Management (Scotland) Act 2009.

17.2.4 The European Mining Waste Directive (2006/21/EC)

The Mine Waste Directive (2006/21/EC) is transposed to Scots Law under The Management of Extractive Waste (Scotland) Regulations 2010. The Directive is intended to reflect the commerce of working minerals for sale. The Regulations are not therefore taken to apply to borrow pits. Irrespective, it is worth noting that any waste from Borrow Pit operations (soils or processing fines) will be retained on site and utilised for the reinstatement of the Borrow Pit site.

17.2.5 The Environmental Protection Act 1990 (as amended)

The Environmental Protection Act 1990 (as amended) applies throughout the United Kingdom (UK). The Act defines the fundamental structure and authority for waste management and control of emissions into the environment.

17.2.6 The Environmental Authorisations (Scotland) Regulations 2018

The Regulations, "aim to deliver an integrated authorisation framework, which will integrate, as far as possible, the authorisation, procedural and enforcement arrangements relating to:

- Water;
- Waste management;
- Radioactive substances; and
- Pollution prevention and control."

17.2.7 The Pollution Prevention and Control (Scotland) Regulations 2012

The Regulations apply an integrated environmental approach to the regulation of certain industrial activities. This means that emissions to air, water and land must be considered together. These regulations cover installations and the use of mobile plant; mobile plant associated with some Borrow Pit operations fall under these regulations.

17.2.8 The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (As Amended)

The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) are intended to control activities which have the potential to cause pollution to the water environment. Such activities are controlled at three different levels depending on the potential risks. These are:

- General Binding Rules (GBRs) – cover low-risk activities for which there is no need to contact the SEPA. However, a person undertaking an activity controlled by the GBRs must abide by any rule in the Regulations which is applicable to the activity;
- Registration – also covers low-risk activities, but those which may cause a cumulative risk to the water environment. Such activities must be registered with SEPA, who may impose conditions but only so far as to describe the activity; and
- Licensing – for higher risk activities which require site-specific rules, or where constraints on an activity are required. Such activities will be regulated through a CAR license which must be sought through SEPA.

2017 amendments to CAR included the requirements for oil storage, previously provided for in the Water Environment (Oil Storage) (Scotland) Regulations. These requirements are now included as GBR.

It should be noted that CAR does not apply to activities licenced through the Marine (Scotland) Act 2010, hence CAR is only applicable to construction activities above Mean High Water Springs (MHWS).

17.2.9 The Water Environment (Shellfish Water Protected Areas: Environmental Objectives etc.) (Scotland) Regulations 2013

The Water Environment (Shellfish Water Protected Areas: Designation) (Scotland) Order 2016 identifies waters as 'shellfish water protected areas'. 85 waters have been identified under the order. Under the Shellfish Regulations, specific environmental objectives are placed upon the identified designated sites with regular monitoring of the water quality conducted by the Scottish Environment Protection Agency (SEPA).Additional Guidance

The following guidance documents are relevant and were utilised in the development of this Chapter:

- Planning Advice Note 50 (PAN50) – Controlling the Environmental Effects of Surface Mineral Workings;
- Planning Advice Note 51 (PAN51) – Planning, Environmental Protection and Regulation (2006);
- Planning Advice Note 61 (PAN61) – Planning and Sustainable Urban Drainage Systems (2001);
- Planning Advice Note 79 (PAN79) – Water and Drainage (2006);
- PPG01 – General guide to the prevention of pollution;
- GPP02 – Above ground oil storage tanks;
- GPP05: Works and maintenance in or near water (Environment and Heritage Service, SEPA, & Environment Agency, 2017);
- GPP21 – Pollution Incident response Planning; and
- GPP22 – Dealing with Spills.
- CIRIA publication – the SUDS Manual (C753) 2015;
- CIRIA publication – Site handbook for the construction of SUDS (C698);
- Health & Safety at Quarries: Quarries Regulations 1999, Approved Code of Practice (Health & Safety Executive) (as amended 2013);
- Guidance on Safe Face Management Operations in Quarries (Quarries National Joint Advisory Committee, 2009);

- Handbook on the Design of Tips and Related Structures (Geoffrey Walton Practice, HMSO, 1991);
- Hydrology in Practice (E.M. Shaw, 1994; 3rd Edition);
- Field Hydrology (R Brassington, 2007; 3rd Edition); and
- Hydrology – an Introduction (W. Brutsaert, 2005).
- Guidance on Marine Non-Native Species (The Green Blue, 2020);
- Marine Biosecurity Planning: Guidance for Producing Site and Operation-Based Plans for Preventing the Introduction of Non-native Species (Payne, Cook, & Macleod, 2014);
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission, 1999).

17.3 Method of Assessment

17.3.1 Baseline

A desk-based review has identified relevant information with regards to water quality, hydrology and hydrogeology. The following data sources were consulted to identify the baseline water quality conditions:

- Ordnance Survey topographical mapping, current and historical;
- SEPA mapping of aquifers and groundwater vulnerability;
- British Geological Survey (BGS) published geological mapping and other resources available online;
- British Geological Survey hydrogeological mapping;
- Scotland's Soils website (2021);
- SEPA Water Classification Hub (2021);
- Centre for Ecology and Hydrology Flood Estimation Web Service (2021);
- Archive data held by Dalgleish Associates Limited (DAL);
- SEPA Bathing Waters;
- SEPA Shellfish Waters; and
- RPS Staffin Harbour Hydraulic Modelling for the Radical East Option Scheme.

A site inspection has been undertaken at both the proposed SCH development and the Borrow Pit, noting existing drainage features on and surrounding the site. The existing conditions at the site are described to allow the potential risks that may be associated with the proposed development to be identified and assessed.

17.3.2 Method of Assessment

Potential impacts were identified taking account of the source – pathway - receptor model, where sources took into account both physical substances and processes. Specifical consideration was given to risk of flooding.

Potential impacts upon hydrology, water quality, hydrogeology and coastal processes resulting from the proposed SCH development and Borrow Pit have been assessed utilising the methodology below.

17.3.2.1 Magnitude of Impact

To determine the risk associated with the construction and operation of the SCH with regards to water quality and coastal processes, a risk-based approach that uses probability and impact magnitude to determine the significance of impact has been utilised. Table 17.3.1 provides levels of impact and examples of what would constitute these levels.

Table 17.3.1: Definitions of Magnitude of Impact

Magnitude of Impact	Examples of Impact Magnitude
High	Fundamental changes in the hydrological or hydrogeological regimes; or Material change in water quality, coastal processes or flood risk. Characteristics may include: • Large increase/decrease in diffuse pollution levels; • Ecological impact, increase/decrease in mortality figures; • Medium to long-term impacts on the coast; or • Significant increase/decrease in flood risk.
Medium	Material but non-fundamental changes in the hydrological or hydrogeological regimes; or Change in water quality, coastal processes or flood risk. Characteristics may include: • Minor increase/decrease in diffuse pollution levels; • Measurable changes in water quality; • Minor harm to the ecosystem, increase/decrease in productivity; • Medium term reversible impacts on water quality or coast; or • Minor increase/decrease flood risk.
Low	Slight but noticeable changes in the hydrological or hydrogeological regimes; or Small changes to the water quality, coastal processes or flood risk. Characteristics may include: • Increase/decrease in localised pollution levels; • Short term reversible impacts on water quality or coast; • No impacts on the ecosystem; or • Minor localised increase/decrease in flood risk.
Negligible	No perceptible changes in the hydrological hydrogeological regimes; or No measurable change in localised pollution levels

17.3.2.2 Likelihood of Impact Occurring

The likelihood of an impact occurring is also assessed. A qualitative approach is taken to predict the likelihood of an impact based on the probability of an impact occurring and professional judgement rather than data frequency. In this chapter, the likelihood categories are displayed in Table 17.3.2 with their definition.

Table 17.3.2: Likelihood Categories and their Definitions

Likelihood	Definition
Certain/near-Certain	> 1 in 1 year
Probable	< 1 in 1 year but > 1 in 10 years
Unlikely	< 1 in 10 years but > 1 in 100 years
Extremely Unlikely	< 1 in 100 years

17.3.2.3 Significance of Effect

The significance of effect is derived by considering the magnitude of the impact and probability of the impact occurring. Determination of whether the identified effect was categorised as significant or non-significant utilised the matrix set out in Table 17.3.3.

Table 17.3.3: Significance of Effects Matrix

Magnitude of Impact	Probability			
	Certain	Probable	Unlikely	Extremely Unlikely
High	Major	Moderate	Moderate	Minor
Medium	Moderate	Moderate	Minor	Negligible
Low	Minor	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Key

(yellow)	Significant Effect
(grey)	Non-Significant Effect

17.3.2.4 Modelling

RPS were commissioned to carry out modelling, to understand effects of the development on the coastline and sedimentation. Coastal processes and sediment modelling utilised the MIKE coastal process modelling software developed by the Danish Hydraulic institute. The RPS modelling report is provided in Appendix Q.1, in Volume 3 of the Environmental Impact Assessment Report (EIAR).

17.3.3 Identification and Assessment of Mitigation

The methodology utilised for the identification of mitigation is as per that described in Chapter 3: Methodology. With regard to the source-pathway- receptor model preference was given to removing the source, where this was not practicable mitigation to block pathways is identified.

17.3.4 Assessment of Residual Effects

Where mitigation has been identified, the magnitude and likelihood of the impact will be reassessed as per Table 17.3.1 and Table 17.3.2 and the overall significance of the effect reassessed in line with Table 17.3.3 to understand the resultant residual effect.

17.3.5 Water Framework Directive Assessment

In the absence of Scottish guidance, the Environment Agency's WFD Assessment guidance (Environmental Agency, 2017) was utilised where appropriate. As there is a potential for the proposed SCH development to give rise to potential impacts on water quality, an Environment Agency's WFD assessment scoping template was completed included within the Scoping Report, attached as Appendix C.1 in Volume 3 of this EIAR, to provide an understanding of the need for WFD assessment topic areas.

Table 17.3.4 identifies the receptors and issues identified during the WFD scoping as requiring additional assessment. Where the issue has been assessed in another chapter of the EIAR it is sign posted in Table 17.3.4.

Table 17.3.4: WFD Issue Sign Posting to Where Considered

Receptor	Risk issue	Where Considered
Hydromorphology	Coastal Processes.	Considered within this Chapter
Biology: Habitats	Destruction of higher sensitivity habitats specifically subtidal kelp beds.	Chapter 8: Benthic Ecology
Water Quality	Loss of containment of contaminants during construction and operations.	Considered within this Chapter.

17.4 Baseline

17.4.1 Climate and Meteorology

Climatological information for the site is based on data from the Meteorological Office (Met. Office) supplemented by information from the Flood Estimation Handbook produced by the Centre for Ecology and Hydrology (Web Service, 2021).

The site area is located within the Western Scotland regional climate area. Western Scotland experiences a maritime climate, due to its geographical location at the eastern edge of the Atlantic Ocean in a predominantly south-westerly air stream. It is classed as fairly warm and moist, with typically between 1800mm and 2400mm of rainfall per year.

The Standard Percentage Runoff (SPR), a measure of the amount of rainfall within the catchment that is converted into surface water runoff, can be estimated from the local soil data. For the catchment that the site lies within, the SPRHOST is 54%, indicating infiltration, evapotranspiration and through-flow are important for the site. The proportion of the time that the catchment is wet (PROPWET) is estimated to be 75%; this indicates the amount of time that the soil moisture deficit is equal to or less than 6mm.

17.4.2 Waterbody Status

17.4.2.1 Proposed SCH Development

The coastal water surrounding the proposed SCH development is the North Skye (200493) coastal water body, covering an area of 356.6km^2. The condition of the waterbody within this zone was categorised as 'good' overall in 2014, with the next assessment anticipated to review the status in 2021 (SEPA, 2020b). When the variables which contribute to status of the condition of the waterbody were broken down, it was identified that the physical condition of the waterbody had a 'high' quality status, the degree of freedom from invasive species was classified as 'high', and water quality itself was classified as 'good' (SEPA, 2020a).

The closest notable river body is the Stenscholl River (20701) in the Scotland river basin district, located approximately 1km from the proposed SCH development. The main stem of the river is 13.5km in length. This watercourse had a 'high' overall classification for waterbody condition, with a high overall ecology, biological elements, fish, fish barrier, hydromorphology and hydrology classifications (SEPA, 2021a).

17.4.2.2 Borrow Pit

The coastal water immediately east of the Borrow Pit is the Sound of Raasay (200492). This coastal water body covers 173.7km^2 and is classified with overall status 'good'.

The Borrow Pit is located within the Lealt River catchment (20702). The main stem of the river is 11.3km in length. This watercourse had a 'high' overall classification for waterbody condition (SEPA, 2021a).

The development is located within the groundwater body 'Skye North' (150688), which has an overall status classified as 'good'. The groundwater body covers an area of 1132.0km^2.

The site is not within a Nitrate Vulnerable Zone Action Programme.

17.4.3 Hydrology

17.4.3.1 Proposed SCH Development

There are a number of drainage ditches which allow water in the area surrounding the proposed SCH development to be channelled to the foreshore and into the sea. At present surface water at the site discharges naturally into the drainage ditches already present in the vicinity of the development, flowing downhill towards the sea.

17.4.3.2 Borrow Pit

The existing surface water drainage at the Borrow Pit is illustrated in Drawing 73.17.01. The site and surrounding area can be spilt into two sub-catchment areas (labelled Sub-Catchments A and B).

Sub-Catchment A comprises the main historic hard rock quarry void. Incident rainfall and any minor groundwater seepages are collected within the void, whereby the water either infiltrates through underlying strata or is discharged via a drainage ditch into the minor unnamed watercourse that bounds the site to the east, which flows directly into the sea, some 120m to the south-east of the site. These flows do not contribute to the Lealt River catchment.

Sub-Catchment B comprises the access track, car parking areas and associated former quarry periphery to the south and west of the site. Incident rainfall currently infiltrates through underlying strata or sheds via natural overland flow to the south and east of the site into the Lealt River catchment, or directly to the sea.

17.4.4 Flood Risk

17.4.4.1 Proposed SCH Development

As shown in Drawing 2297-111B, the MHWS is at +5.3m CD and the Highest Astronomical Tide (HAT) is +6.0m CD. Staffin is not considered a Potentially Vulnerable Area for flooding (SEPA, 2021e).

17.4.4.2 Borrow Pit

SEPA's Indicative River and Coastal Flood Map of Scotland (SEPA, 2021a) shows that the Borrow Pit application boundary does not lie within any areas indicated to be at risk of flooding from riverine or coastal sources.

The flood map indicates that two very small areas of the historic quarry void are prone to surface water flooding, reflecting the act that, in a storm event, surface water collects within the quarry void.

The Lealt River, to the south of the Borrow Pit, is shown on the flood map to be at high risk of flooding. The minor unnamed watercourse to the east of the Borrow Pit is not shown to be at risk from any form of flooding.

17.4.5 Hydrogeology

Due to the nature of the proposed SCH development Hydrogeology has only been considered for the Borrow Pit.

17.4.5.1 Superficial Deposits

Drift geology at surface is shown on published BGS mapping to comprise glacial diamicton till to the west of the site. The central and eastern sections of the site are documented as having no significant superficial cover; bedrock is at or near surface. Peat is shown to be present to the north-east of the Lealt Quarry site, but not within the proposed Borrow Pit site boundary.

17.4.5.2 Solid Geology

The solid geology underlying the Borrow Pit site is shown on published BGS mapping to comprise intrusive igneous strata, predominantly sills of the Little Minch Sill Complex, within the North Britain Palaeogene Sill Suite, of Palaeogene age. These consist of undivided microgabbro, olivine basalt and dolerite. Observations during the site visit show that the average dip of the strata within the site is approximately 7° (1:8 or 12%) in a westerly direction. The dip represents surfaces of the individual lava intrusions within the igneous sill structure.

Immediately to the east and south-east of the proposed Borrow Pit site, strata belonging to the Elgol Sandstone Formation are exposed, directly underlying the igneous sill. This material is documented as comprising bioturbated, clay-rich sandstone, intercalated with silty fissile mudstone. Some 120m to the west of the site, strata from the Lealt Shale Formation are documented, comprising limestone, sandstone, siltstone and mudstone.

The solid strata within the region are cut by several parallel faults, trending from the north-north-west to the south-south-east, with direction of displacement unknown. One of these fault lines is documented to lie immediately to the east of the Borrow Pit site, along the line of the incised burn channel.

The BGS Hydrogeological Map of Scotland (1988) indicates that the general area of the site forms part of an aquifer (concealed) of limited potential, in regions without significant groundwater: *"Small isolated deposits occur of the west coast and islands. They have variable lithology, and are of little hydrogeological importance."*

Bedrock and superficial aquifer mapping (BGS/SEPA) indicates that the site area has low bedrock aquifer productivity: *"small amounts of groundwater in near surface weathered zone and secondary fractures and from rare springs"*, with negligible superficial aquifer productivity.

Under the Vulnerability of Groundwater in the Uppermost Aquifer classification (BGS, Macaulay Land Use Research Institute & SEPA, 2011), the site area has been assigned vulnerability class 4b (vulnerable to those pollutants not readily adsorbed or transformed).

SEPA's Water Classification Hub indicates one groundwater body associated with the site; Skye North.

17.4.6 Water Resources

17.4.6.1 Proposed SCH Development

There is a spring located approximately 80m southwest of the proposed SCH development. The spring currently gravity feeds water to a tap behind the existing storage shed.

The nearest dwellings to the Harbour development are located in the small formal residential area of Garafad, located approximately 500m southwest of the proposed SCH development. Garafad is located beyond the cliff tops above the Harbour and therefore the proposed SCH development is down gradient of on any private water supplies.

17.4.6.2 Borrow Pit

There are no water resource features within the Borrow Pit.

The closest residential properties to the Borrow Pit are Lealt Falls House and No.2 Tote, some 460m to the south-west, the Hamlet of Lealt, some 970m to the west and No.10 Culnacnock, some 650m to the north.

Any potential properties within the vicinity of the site that may have independent active Private Water Supplies (PWS) would not be affected by the proposed Borrow Pit development, due to the significant separation distances and direction of surface and groundwater flows, being away from the site towards the east.

SEPA records have been consulted with regards to registered water supply features in the vicinity of the Borrow Pit. There are three records for licenced CAR activities within a 1km radius of the site; two being at Lealt Falls House and No.2 some 460m to the south-south-west, one Simple CAR Licence and one CAR Registration; and one CAR Registration at No.10 Culnacnock, some 650m to the north. As a worst case scenario, it is assumed that all of these CAR activities are related to private water supplies or sewerage outfalls; none of the activities would be adversely affected by the proposed Borrow Pit operations due to separation distance, and direction of surface or groundwater flows.

17.4.7 Bathing Waters

No designated bathing waters are located in the vicinity of the proposed SCH development (SEPA, 2021c). The nearest SEPA monitored bathing is Sand Beach to the west of Gairloch (SEPA, 2021c) on the west coast of mainland Scotland, approximately 35km away from Staffin (via sea).

17.4.8 Shellfish Waters

Shellfish waters are used for commercial shellfish cultivation and the water quality in designated areas is regularly monitored by SEPA. The three closest designated shellfish waters are Loch Snizort, Loch Sligachan and Upper Loch Torridon. Both Loch Snizort and Upper Loch Torridon are located approximately 35km from the proposed Harbour and therefore are too far to potentially be affected by the construction and operation of the proposed SCH development. While Loch Sligachan is only located approximately 15km from the proposed SCH development, the designated site is geographically separated by the Northly Point of the Trotternish peninsula and is therefore unlikely to be affected by the proposed SCH development.

Shellfish Harvesting Areas are classified by the Food Standards Scotland (FSS), The classification of a production area determines the treatment required before Live Bivalve Molluscs (shellfish) may be marketed for human consumption (Food Standards Agency, 2021). The closest classified Shellfish Harvesting Areas are in Kyles of Scalpay (located approximately 42km southeast of the proposed SCH development) and is a production area for common cockles. The second is Loch Harport (located approximately 40km southwest of the development) and is a production for both common cockles and pacific oysters. Both sites are located too far from the proposed SCH development and are therefore unlikely to be affected by the proposed SCH development.

17.4.9 Invasive Non- Native Marine Species

As discussed in Section 17.3.2.1 the North Skye (200493) coastal water body, which the proposed SCH development sits partly within, is classed as high in terms of freedom from invasive species. No invasive non-native marine species (INNMS) were recorded during the benthic survey within the areas of the proposed SCH development (Ocean Ecology Limited, 2021). Baseline information regarding the presence of INNMS is detailed in Chapter 8: Benthic Ecology.

17.4.10 Coastal Processes

The north of Skye lies between the Little Minch and the Sound of Raasay in the Sea of Hebrides, which is directly connected to the Atlantic Ocean. Hence the proposed SCH development seas is subject to tidal and wave regimes characteristic of open sea. According to the RPS Report (Appendix Q.1 in Volume 3), storm waves from the North Minch and the North Atlantic approach Staffin harbour from the east side of Staffin Island and the waves are highly modified by the reefs which lie immediately offshore of the proposed SCH development.

17.5 Impact Assessment

17.5.1 Construction

17.5.1.1 Potential loss of Containment

A number of potential pollution sources will be present on the proposed SCH development construction site utilised in the construction process, and at the Borrow Pit including:

- Fuel oil/diesel associated with construction plant and vehicles;
- Hydraulic fluids and oils associated with construction plant;
- Concrete (at the proposed SCH development only); and
- Cement wash (at the proposed SCH development only).

If a loss of containment were to happen then there could be harm caused to the environment. As such the risk of pollution impacts on water quality are assessed in Table 17.5.1 and Table 17.5.2. It utilises the source, pathway, receptor model with Òb nan Ron being the receptor considered for proposed SCH development (Table 17.5.1). For Borrow Pit operations depending on the location of the issue it could potentially reach the Lealt River, an unnamed minor watercourse, and coastal waters at Inver Tote, for the purpose of assessment it is assumed that release would be to the Lealt River or Minor water course as these would be most sensitive to pollutants. The effect of changes in water quality on ecological receptors are considered within the Ecology Chapters 8 to 11.

Table 17.5.1: Loss of Containment Assessment into Òb nan Ron

Source	Scenario	Pathway	Probability	Impact Magnitude	Impact Significance
Fuel Storage Bowser ($20m^3$ of Diesel)	Loss of full containment.	Spillage to ground potential to reach water.	**Unlikely** Oil will be stored in line with the CAR GBRs hence loss of all $20m^3$ is unlikely.	**Medium** Medium term reversible impacts on water quality.	**Minor: Non-Significant**
Refuelling Activities	Loss of full containment during refuelling (<100l) machinery and equipment.	Spillage to ground potential to reach water.	**Probable** Multiple refuelling activities carried out, increasing probability of human error.	**Low** Short term localised reversible impacts on water quality.	**Minor: Non-Significant**
Vehicles or Plant	Accidental damage to fuel tank, loss of contents (<100l).	Spillage to ground with potential to reach water. Or directly to water from plant working over or in water.	**Unlikely** Appropriately trained and certified drivers / operators. Banksmen in place when reversing or carrying out difficult manoeuvres.	**Low** Short term localised reversible impacts on water quality.	**Negligible: Non-Significant**
Plant – Hydraulic Fluids	Loss of hydraulic fluid, due to pipe burst.	Spillage to ground with potential to reach water. Or directly to water from plant working over or in water.	**Certain** Hydraulic pipes fail from time to time.	**Low** Short term localised reversible impacts on water quality.	**Minor: Non-Significant**
COSHH Store: Hydraulic Fluids, Maintenance Oils, Chemicals.	Loss of containment during handling of maintenance oils, chemicals, will all be small	Spillage to ground with potential to reach water. Or directly to water from marine plant.	**Unlikely** Appropriate storage and usage of materials in line with COSHH assessments.	**Low** Short term localised reversible impacts on water quality.	**Minor: Non-Significant**

Source	Scenario	Pathway	Probability	Impact Magnitude	Impact Significance
	volumes of 5l to 200l.				
Cement and Cement Wash Outs	Loss of cement during pours (especially over water) Loss of containment of cement washing.	Spillage directly to sea or overland and into water.	**Unlikely** Cement pours and wash out are normal construction practices. Sealing of shuttering and best construction practice regarding washouts reduce probability.	**Low** High pH associated with cement and sedimentation. However, seawater will buffer pH and cement will drop out. Hence localised reversible impacts.	**Negligible: Non-significant**

Table 17.5.2: Loss of Containment Assessment into the Unnamed Minor Water Course or River Lealt

Source	Scenario	Pathway	Probability	Impact Magnitude	Impact Significance
Fuel Storage Bowser ($20m^3$ of Diesel)	Loss of full containment, due to collision or other significant event.	Spillage runs over ground towards a watercourse.	**Highly Unlikely** Oil will be stored in line with the CAR GBRs, unlikely to reach watercourse die length of pathway and time to recover from an event.	**High** Medium term reversible impacts on water quality.	**Minor: Non-Significant**
Refuelling Activities	Loss of full containment during refuelling (<100l) machinery and equipment.	Spillage to ground potential to travel overland to reach water.	**Unlikely** Multiple refuelling activities carried out, increasing probability of human error. Unlikely to	**Low** Short term localised reversible impacts on water quality.	**Negligible: Non-Significant**

Source	Scenario	Pathway	Probability	Impact Magnitude	Impact Significance
			reach a water course.		
Vehicles or Plant	Accidental damage to fuel tank, loss of contents (<100l).	Spillage to ground with potential to reach water.	**Unlikely** Appropriately trained and certified drivers / operators. Banksmen in place when reversing or carrying out difficult manoeuvres.	**Low** Short term localised reversible impacts on water quality.	**Negligible: Non-Significant**
Plant – Hydraulic Fluids	Loss of hydraulic fluid, due to pipe burst.	Spillage to ground with potential to reach water. Or directly to water from plant working over or in water.	**Unlikely** Hydraulic pipes fail from time to time. Unlikely to reach a water course	**Low** Short term localised reversible impacts on water quality.	**Negligible: Non-Significant**
COSHH Store: Hydraulic Fluids, Maintenance Oils, Chemicals.	Loss of containment during handling etc. of hydraulic fluids, maintenance oils, chemicals, will all be small volumes of 5l to 200l.	Spillage to ground with potential to reach water. Or directly to water from marine plant.	**Unlikely** Appropriate storage and usage of materials in line with COSHH assessments.	**Low** Short term localised reversible impacts on water quality.	**Minor: Non-Significant**

Without secondary mitigation measures in place, the potential impact of contamination from fuels, oils and other substances is assessed as being **adverse negligible** to **minor: non-**significant.

17.5.1.2 Introduction of Invasive Non – Native Marine Species

The introduction of INNMS has the potential to result in severe ecological impacts which, in turn, can result in major costs due to the difficulty in trying to eradicate a species once it has been introduced. As discussed in Chapter 2: Project Description, the construction activities associated with the proposed SCH development will only require the use of small boats which will probably be launched from the existing Staffin slipway or other local harbour. There is also the potential that equipment could introduce INNMS's via sediment trapped in the equipment from previous deployments.

The probability of INNMS being introduced via sediments trapped in equipment mobilised to facilitate the construction phase or on vessels is considered to be **unlikely** with the magnitude of the impact **low**. This is due to the fact that the sediment and surfaces which could act as a source are likely to dry during transit to site, greatly reducing the probability of an INNMS surviving the transit to the development site. Furthermore, small boats are likely to sourced locally and hence unlikely to have been in areas where INNMS are present to contaminate them. The resultant effect is therefore assessed as **negligible: non-significant**.

17.5.1.3 Litter

Waste arising during construction may include various materials, such as wood utilised for shuttering, off-cuts of rebar metals and packaging materials associated with both the construction works and the welfare facilities. Where the waste streams are not appropriately managed, they may enter the marine environment and give rise to marine litter.

Marine litter poses a variety of short and long term adverse environmental impacts such as loss of biodiversity and degradation of ecosystem function (Potts & Hastings, 2011). Marine litter of lesser bio or photodegradability, in particular plastics, also provide dispersal opportunities for INNMS (Potts & Hastings, 2011).

Appropriate waste segregation and receptacles will be provided on the construction site to allow the waste hierarchy to be implemented. The likelihood of litter reaching the marine environment without secondary mitigation is assessed as **probable**. The quantities will be small; hence the impact magnitude is deemed to be **low**. Litter could include plastics; hence the effects are long-term, constituting to a **minor: non-significant** effect.

17.5.1.4 Changes to Overland Drainage

The Lealt River to the south, and an unnamed minor watercourse to the east, of the Borrow Pit, will not be affected in any way by the proposed Borrow Pit; either from physical disturbance from channel removal or re-routing, or by direct disturbance to the watercourse bed.

There will only be minor alterations to the surface water flows as a consequence of Borrow Pit operations; during operations any incident rainfall will be managed within the site (Drawing 73.17.02).

Sub-Catchment A shall increase slightly in size, due to the Borrow Pit excavation area being extended laterally to the west and north-west. Incident rainfall shall continue to collect within the proposed excavation void, and either disperse via infiltration, or be directed to a collection sump and be utilised for dust suppression and processing, as required, or discharged under controlled conditions into the minor watercourse to the east of the site, as occurs at present.

Sub-Catchment B comprises the existing access and yard area which will be used for armour stone stocks and loading. Soil mounds are proposed on the western and north-western boundaries of the excavation area (Drawing 73.02.03 refers). Overland flow from the north and west will be diverted around the headwalls of the excavation. This is in order to avoid flow of surface water over quarry faces and into the excavation void and will help to maintain geotechnical stability of the strata. This is an accepted and common mitigation measure within the UK quarry industry.

Following cessation of extraction, surface water within the Borrow Pit will largely be held on site, aiding flood water attenuation (refer Section 17.5.6, below). A shallow waterbody will likely form in the north-western area of the final void (Drawing 73.02.06 refers).

The impact of physical changes to overland drainage is **certain**, due to landform alteration, and of **low** magnitude, the significance is assessed as **minor: non-significant**.

17.5.1.5 Changes to Hydrogeology

17.5.1.5.1 Borrow Pit

Probable changes to the hydrogeological regime relate to the effects of Borrow Pit excavation operations within the hard rock reserve. There are potential impacts on hydrogeology related to deepening the excavation, including modification to the hydraulic gradient and therefore groundwater inflow to the void.

Water contamination, potential flood risk and changes in water resources/supply are considered elsewhere in this chapter.

Borrow Pit operations will have very little impact with respect to the historic excavation void, other than slight increase in the excavation area and depth of the void, and likely a minor increase in groundwater flows into the Borrow Pit.

Groundwater is predominantly contained within isolated joints and fissures within the rock mass. Incident rainfall will be the predominant method of groundwater recharge, therefore, the flow of groundwater through these joints and fissures will not constitute significant flows but will be slight seepages that will induce a possible localised and steep drawdown of groundwater table around the excavation, of **negligible** magnitude.

Impacts on the groundwater regime beneath the site due to Borrow Pit operations are assessed as **negligible: non-significant**.

On completion of Borrow Pit operations, slight groundwater seepages will continue. With regards to drawdown in the relatively impermeable strata, only natural dewatering of the faces is expected. Due to slight seepages and incident rainfall it is anticipated that, over time, water will collect and ultimately form a shallow waterbody in the north-western area of the final void (Drawing 73.02.06 refers).

Impacts on groundwater upon completion of Borrow Pit operations are **probable** with an impact magnitude of **negligible** and are assessed as **negligible: non-significant**.

17.5.1.6 Particulates and Suspended Solids

Surface water from the catchments surrounding the Borrow Pit will be prevented from entering the operational area, owing to the local topography, and by appropriate use of peripheral bunding and soil mounds. It is not, therefore, necessary to consider particulate matter and suspended solids from the surrounding catchment areas.

The Borrow Pit consists of a total area of around 2.6 hectares. As peripheral soil stripping and soil storage areas are established, temporary blind catch ditches will be constructed on the outer margins of these areas, in order to ensure that runoff from soils operations will be contained and prevented from entering the existing field drainage network and from there into nearby watercourses.

The groundwater table on a hillside roughly mirrors the surface topography, falling from the high points to the west and north-west of the Borrow Pit towards the lower ground to the south-east. Historical quarrying has encountered some very minor groundwater seepages which are likely to continue as operations progress.

All groundwater and surface water collected within the Borrow Pit area will be diverted to a sump, to allow infiltration into underlying strata via joints and fissures. The sump may use collected water for dust suppression on haul roads during drier periods during spring and summer, as necessary. If required, surface water within the sump will be allowed to discharge into the unnamed burn to the east of the site, as it does at present. The Applicant understands the requirement to obtain any necessary permits or licences from SEPA for any associated activity.

There are **no identified potential negative impacts** relating to particulates and suspended solids within the proposed development.

17.5.1.7 Impacts on Flood Risk from the Borrow Pit

During extreme storm events, the operational excavation area will temporarily be allowed to flood. Following the abatement of the storm and the resumption of normal flow in the nearby watercourses, in order to resume quarrying operations, excess surface water from within the void may be directed to a discharge point into the minor watercourse to the east of the Borrow Pit site.

There will be no discharge of water into the Lealt River during quarrying operations and shall therefore, not increase the likelihood of flooding within the river.

The proposed development will not increase the potential for flooding at any of the identified vulnerable receptors (residential properties), as flows from the site do not directly flow to any of the receptor locations, and the development will not increase flows within field drains or watercourses. It is therefore not considered necessary to undertake any quantitative modelling of the watercourse flow channels downstream of the site or to undertake a full flood risk assessment.

The main impact that development of the site will have on the hydrological regime of the area is that storage capacity within the catchment area will be slightly increased. The extraction of hard rock from the site will effectively increase the potential surface water storage volumes within the hydrological catchment area, thereby slightly reducing flood risk to land downstream of the site. This is a probable impact resulting from the **certain** changes in landform, however, given the size of the site and the proximity to the coast, this is only considered to constitute a **negligible** magnitude impact, and is therefore assessed as being **negligible: non-significant** beneficial impact.

17.5.2 Operation

17.5.2.1 Surface water

Due to the nature of the proposed SCH development, no formal sustainable urban design system (SUDs) will be constructed. All rainwater falling on the permeable hardstanding areas of the reclaimed/levelled area will percolate down through the land and ultimately to the sea.

There will be an area of impermeable surfacing constructed adjacent to the storage tank, which will drain to an oil interceptor. The outlet from the interceptor will connect to the outfall pipeline, associated with foul drainage (see Chapter 2: Project Description), after the septic tank. The clean water from the interceptor will be discharged through a pipe below MLWS. Any oil or solids accumulating in the interceptor will be removed by an appropriately licenced waste contractor for treatment and disposal offsite. The impact of the outfall on water quality has been assessed in section 17.4.2.2.

Rainwater falling on the roofs of the buildings will be directed to the permeable hardstanding and will be percolate down through the land. Rainwater is deemed 'clean' water and as this is no different to the existing water runoff **no change** in water quality is anticipate.

17.5.2.2 Discharges

The new toilet and shower facilities will be connected to a septic tank for disposal through a marine outfall pipeline. In addition, the surface water which has passed through the oil interceptor will be discharged through the outfall. The connection to the outfall pipe will be after the septic tank, so as not to affect the operations of the tank. As discussed in Chapter 2: Project Description, the size and details of the septic tank developed during detailed design will be aligned to the predicted demand and the requirements of the CAR.

The foul effluent from these facilities will be discharged to sea (below MLWS) and therefore it is **certain** that this impact will occur, however, the effluent will be treated prior to discharge and meet all relevant SEPA requirements. The discharge point is below MLWS hence, the effluent will be subject to prompt dilutions. The outfall discharge will not give rise to measurable changes in water quality hence, it will have a **negligible** magnitude of impact, giving rise to a **negligible: non-significant** effect.

17.5.2.3 Flooding

As discussed in Section 16.4.8, Flood Risk, the MHWS is at a hight of +5.3m CD and the HAT is predicted at a height of +6.0m CD. The West Highland River Basin Sea Level Rise allowance is 0.89m by the year 2100 (SEPA, 2019). Hence, by 2100 the MHWS is predicted to be at a height of 6.19m CD and the HAT is predicted to be at a level of 6.89m CD.

The onshore elements of the proposed SCH development have been designed to the following heights:

- Reclaimed area (parking etc.): 6.65m CD
- Storage units: 7.0m CD
- WCs and office: 7.6m CD

With the predicted HAT of 6.89m, there is a possibility that by the year 2100 flooding of the onshore elements could occur, although it is anticipated to only impact on the reclaimed area, utilised as parking. The height of the storage units and WCs and Office buildings are sufficient that it is unlikely to flood.

Therefore, it is **probable** that flooding will occur by the year 2100, however it is anticipated that only the reclaimed area, used as a car park will be impacted and therefore the magnitude will be **low**, giving rise to a **minor: non-significant** effect.

17.5.2.4 Coastal Processes

RPS utilised the Mike21 Spectral Waves (SW) wave model to simulate the growth, decay and transformation of wind-generated waves and swell from offshore to the proposed SCH development and then Mike 21 Boussinesq harbour distance model was used to simulate the wave conditions around the proposed pontoons and slipway.

The wave model looked at the significant wave height during 1 in 50 year return period storm from the North Atlantic (located to the west of the Skye) and North Minch (north east of the Skye) during the operational phase of the project. It is noted that waves from all storm events (i.e. from North Atlantic and North Minch) approach the proposed SCH from the East of Staffin Island.

Figure 7 of the RPS Modelling Report, Appendix Q.1 shows that during the 1 in 50 year return period storm event from the North Atlantic:

- The significant wave height at the proposed pontoons is predicted to be below 0.4m;
- The significant wave height at the existing slipway will be 0.47m but only 0.28m at the new slipway; and
- The wave period be 15.73 seconds (s).

Figure 8 of the in the RPS Hydraulic Modelling Report (Appendix Q.1), shows that during the 1 in 50 year return period storm event from the North Minch:

- The significant wave height at the proposed pontoons is predicted to be below 0.4m;
- The significant wave height at the existing slipway will be 0.42m but only 0.3m at the new slipway; and
- The wave period will be about 11.5s.

Figure 9 of the Hydraulic Modelling Report (Appendix Q.1) shows that during the 1 in 1 year return period storm from the North Atlantic:

- Significant wave heights at the proposed pontoons is predicted to vary between approximately 0.33m to 0.16m;
- The significant wave height at the existing slipway is predicted to be up to 0.32m, but only approximately 0.16 to 0.22m at the new slipway; and
- The wave period is anticipated to be 11.96s.

Figure 10 of the Hydraulic Modelling Report (Appendix Q.1) showed that during the 1 in 1 year return period storm from the North Minch:

- Significant wave heights at the proposed pontoons is predicted to vary between approximately 0.30m and 0.15m;
- The significant wave height at the existing slipway is predicted to be up to 0.33m, but only anticipated to be 0.16m and 0.22m at the new slipway; and
- The wave period is anticipated to be approximately 9.2s.

These results show that even during storm events wave heights within the proposed SCH breakwater are suitably sheltered to facilitate safe berthing.

The comparison of the existing conditions and the conditions following the construction of the proposed SCH development during spring tide with annual average wave climate (Figures 20 and 21 of Appendix Q.1), show very minor difference in the current regime, with the only difference being slight increases in speed to the north of the proposed breakwater. However, the speed of the current is not impacted in the wider Òb nan Ron or Staffin Bay area.

The likelihood that the proposed SCH development will impact on coastal processes is therefore **unlikely** as there is very little change in wave climate along the coastline both above and below the proposed SCH development. In addition, the proposed breakwater will not significantly change the current speeds in the wider Staffin area. Therefore, the impact of magnitude is **low** giving rise to **negligible: non–significant** effects.

17.5.2.5 Sediment Transport

RPS assessed the impact of the proposed SCH development on the sediment transport regime. Due to the complexity of the seabed within the Harbour area, the assessment was undertaken by modelling the wave climate and littoral regime for both the existing breakwater and slipway and the proposed SCH development design, in order to determine the impact of the proposed SCH development on the overall sediment transport. As waves are significant drivers for the movements of sediments in the area, the analysis was assessed over a neap tidal cycle for three different 1 in 1 year return period storm directions namely 15°, 60° and 105°. In addition, the assessment considered the effect of the littoral current generated by the neap and spring tides combined with the annual average wave on sediment transport.

A comparison of the 1 in 1 year return period storm from the various degrees at high water neap tide and spring tide the mean littoral current regime of the existing and the proposed concluded that:

- 15°N (Figure 12 and 13 of Appendix Q.1) - for both the existing slipway and proposed SCH development, there are a high littoral currents at the entrance to Staffin Bay, over the reef and along the foreshore. This results in a clockwise circulation around the bay to the north of the existing slipway and proposed new breakwater. While the overall current patterns between the existing and proposed development are similar, the difference is that for the proposed development the southern end of the clockwise gyre is a little further north due to the location of the new breakwater.
- 60°N (Figures 15 and 16 of Appendix Q.1) - the existing slipway and the proposed SCH development experience similar conditions as from 15°N, with the difference between the existing and the proposed SCH development is that for the proposed SCH development the southern end of the clockwise gyre is a little further north due to the location of the new breakwater.
- 105°N (Figure 18 and 19 of Appendix Q.1) - the direction of the littoral currents generally flows from east to west across the bay to the north of the existing slipway and are noticeably lower than that with larger storm waves from the 15° and 60° directions. There is no difference in the overall current patterns between the existing slipway and the proposed SCH development for the 105°N storm direction.

As there are low levels of suspended solids within the waters around Staffin Bay (RPS, 2021) any changes to sediment movements will be of **low** magnitude. The only real difference between the existing conditions and the conditions resulting from the proposed SCH development, is southern end of the clockwise gyre being a little further north due to the location of the proposed new breakwater during storms from certain directions. It is **unlikely** that there will be a noticeable change in sediment movements as a result of the proposed SCH development, hence, the overall effects on sediment transport are assessed as **negligible: non-significant**.

17.5.2.6 Potential Loss of Containment

As discussed in Chapter 2, Project Description, once operational, the proposed SCH development is anticipated to be able to support activities for boat owners and operators. This includes the refuelling of small leisure vessels and crew boats associated with the fish farms. In order to provide refuelling services the proposed SCH development will require a fuel storage tanks. It is proposed that two tanks with a combined storage capacity of 30m^3 are installed.

17.5.2.6.1 Loss of Containment from Storage Tanks

The tanks will be installed on impermeable hardstanding and will be double skinned to contain up to 110% of the total volume of the tank. The requirements of GBR28 for the storage of oil under CAR will be implemented to which will mitigate any potential risks associated with the fuel storage.

It is therefore, **extremely unlikely** that there will be a significant loss of containment directly from the tanks however, should the content of a tank be released it could reach the marine environment. Although there will be an oil interceptor in which some of the oil will drain, it is likely to be overwhelmed and therefore not sufficiently contain the spill. Assuming the full 15m^3 of full was lost from a tank, the magnitude of the spill event on the local marine environment would be **medium**, giving rise to a **negligible: non-significant** effect.

17.5.2.6.2 Loss of Containment During Refuelling of the Storage Tanks

The storage tanks will need to be filled on a regular basis, which will be done by pumping the fuel from an oil tanker into the tanks using a hose. There is a potential for fuel to spill or leak during tank refuelling. As discussed in Chapter 2, Project Description, the area adjacent to the storage tanks will be concrete paved, which drains into an oil interceptor. The clean water will be discharged through marine outfall pipeline.

It is therefore **unlikely** that any spills during refuelling will enter the marine environment. As refuelling is a manned activity carried out by trained personnel the amount lost will be minimised by stopping the transfer. Hence no more than 200l of fuel should be lost which will be captured in the oil interceptor hence, the impact magnitude will be **low** giving rise to a **negligible: non-significant** effect.

17.5.2.6.3 Loss of Containment During Vessel Fuelling

The oil storage tanks will be connected by pipework to the pontoons to allow for boats to be refuelled while berthed within the proposed SCH development. There is the potential for overfilling of fuel tanks lead to releases to the marine environment, or for drips to occur from the pump. Individual events are likely to very small having a negligible impact, however repeat events over the lifetime of the SCH could give rise to **low** impact through an increase in localised pollution levels. Without proper mitigation in place it is **probable** that leaks and spills will occur. The significance is deemed **minor: non-significant**.

17.5.2.7 Litter

Litter arising during operation of the proposed SCH development is anticipated to originate from harbour users and members of the public associated with berthing vessels, boat cruises and sightseeing activities. However, appropriate waste management will be in place including the provision of bins. The likelihood of marine litter is **probable**; the magnitude of the impact will be **low**. Giving rise to **minor: non–significant** effects on the marine environment

17.5.3 Water Framework Directive Assessment

As discussed in Section 17.5.2. The WFD scoping assessment included as Appendix A in the Scoping Report, (provided as Appendix C.1, in Volume 3), identified the need to assess morphology, habitats and water quality.

The Joint Nature Conservation Committee's (JNCC's) Pressure-Activity Database has been utilised to identify potential impacts associated with construction and operational activities The pressures have been assessed within other sections of this report, which have informed the deterioration assessment provided in Table 17.5.3.

No significant chemical, biological or hydro-morphological affects are predicted. As such there will be no reduction in the status of the water body.

Table 17.5.3: Deterioration Assessment

Activity	Pressure Theme	Pressure	Chapter No.	Deterioration Assessment	Significance of Residual Effect
Navigation markers/lights	Physical change (to another sediment type)	Placement of structure(s) can lead to permanent loss of habitat.	16	The footprint of the Aids to Navigation (AtoN) are extremely small and no known sensitive seabed receptors (e.g. reefs) present.	Negligible: Non-significant
Outfalls/Intake pipes (maintenance/ construction/usage)	Abrasion/disturbance of the substrate on the surface of the seabed	Pipelines are installed onto or into the seabed. This requires the movement of heavy machinery and vehicles across the surface of the surface of the seabed or coastal habitat.	8 & 17	Small pipeline diameter with majority of work being undertaken on rocky substrate.	Negligible: Non-significant
	Physical change (to another seabed type)	The seabed currents and the type of sediment will affect the accumulation and scouring of the sediment around the pipeline.	17	The pipeline will be laid on rocky substrate and therefore scouring of sediment is unlikely.	None
Port and Harbour structures: Construction	Abrasion/disturbance of the substrate on the surface of the seabed.	A variety of ports and harbour activities can result in abrasion/disturbance of the seabed; including structures placed (e.g. geotextile bags or rocks used in breakwaters) or driven (e.g. piles) into the seabed.	17	The seabed comprises largely of rocky substrate with minimal fine substrate so any disturbance (remobilisation of sediments) is likely to be minimal and settle quickly (i.e. very localised).	Negligible: Non - significant
	Changes in suspended solids (water clarity)	Construction activities and the placement of structures in the marine environment can cause localised and temporary changes in suspended sediments, including those driven	17	The seabed comprises largely of rocky substrate with minimal fine substrate so any disturbance (remobilisation of sediments) is likely to be	Negligible: Non - significant

Activity	Pressure Theme	Pressure	Chapter No.	Deterioration Assessment	Significance of Residual Effect
		into the seabed (such as piles used in berths) or placed on the seabed (such as geotextile bags or rocks used in breakwaters.		minimal and settle quickly (i.e. very localised).	
	Introduction or spread of invasive non-indigenous species	Artificial structures in the marine environment e.g. breakwaters and jetties, have the potential to act as 'stepping stones' for the spread of non-native species.	17	The introduction of INNMS is considered to be unlikely, however, appropriate mitigation has been identified in line with best practice.	Negligible: Non-significant
	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion.	A variety of ports and harbour activities can result in penetration/disturbance/abrasion of the seabed; including structures placed (e.g. geotextile bags or rocks used in breakwaters) or driven (e.g. piles) into the seabed.	17	The seabed is largely rocky substrate so disturbance / abrasion is likely to be minimal. No piles required in the design.	Negligible: Non-significant
	Physical change (to another seabed type)	The materials used for construction or placement activities can alter seabed type, materials used include: timber; iron and steel; concrete; clay, silt, sand, gravel or stone/rock; plastic or other synthetic materials. Construction and presence of structures in ports and harbours will cause a change in habitat type, typically from soft sediment to a hard substratum type; examples include		Rock armour and concrete slipway already present in the area hence no new habitat type being introduced.	No Change

Activity	Pressure Theme	Pressure	Chapter No.	Deterioration Assessment	Significance of Residual Effect
		steel piles used in berths/jetties, concrete and rock used in breakwaters/quays.			
Port and harbours: Operation	Abrasion/disturbance of the substrate on the surface of the seabed	A variety of ports and harbour activities can result in abrasion/disturbance of the seabed; including structures placed (e.g. geotextile bags or rocks used in breakwaters) or driven (e.g. piles) into the seabed.	17	The seabed comprises largely of rocky substrate with minimal fine substrate so any disturbance (remobilisation of sediments) is likely to be minimal and settle quickly (i.e. very localised).	Negligible: Non - significant
	Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	Pressure associated with vessels and vessel movements associated with this sub-activity, also presence of relevant underwater structures. Vessels are documented to have collided with mobile marine species (particularly marine mammals).	10	Minor increase in vessel traffic, the proposed SCH development is in shallow water where cetaceans are unlikely to be present hence low chance of interaction.	Negligible: Non - significant
Reclaim and land take (e.g. the footprint of coastal defences)	Physical change (to another seabed type)	Coastal developments can result in the loss of marine habitat through land claim to create freshwater or terrestrial habitat. The footprint of any land claim is dependent on the scale of the project.	8	Whilst there will be a loss of biotopes, as detailed in Chapter 8, within the land reclamation footprint, it is not expected that this will have population level effects on the wider area and are therefore impacts are localised.	Minor: Non-significant

Activity	Pressure Theme	Pressure	Chapter No.	Deterioration Assessment	Significance of Residual Effect
Slipway: Maintenance and construction	Litter	The construction and subsequent usage of the slipway will result in an increase in vessels, vehicles and people in the area which in turn increases the risk of litter being introduced.	17	Sources of litter have been identified with appropriate mitigation; litter effects can be minimised.	Negligible: Non-significant
	Physical change (to another seabed type)	The materials used for construction or placement activities can alter seabed type, materials used include: timber; iron and steel; concrete; clay, silt, sand, gravel or stone/rock; plastic or other synthetic materials.		Rock armour and concrete slipway already present in the area hence no new habitat type being introduced.	No Change

17.6 Mitigation Measures

17.6.1 Construction

17.6.1.1 Potential Loss of Containment

Fuels, Oils and Chemicals

The fuel bowser will be under strict management controls to prevent pollution incidents. It will be kept secure and locked when not in use to protect it from oil thefts, and to comply with the requirements of GBR28, of the CAR, it will be double skinned and stored in an appropriate area away from watercourses and drains where it cannot be 'crashed into'. Refuelling will be carried out in designated areas by trained operatives following site refuelling procedures. The refuelling procedure will take into account best practice laid out in PPG6 (Environmental Agency, NIEA, & SEPA, 2012).

Where practicable, bio-degradable hydraulic fluids will be utilised in machinery during construction. All oils and chemicals will be subject to Control of Substances Hazardous to Health (COSHH) assessments under the COSHH Regulations 2002. All COSHH assessments will include a section on the environment to highlight any precaution or mitigation requirements.

Appropriately bunded chemical storage cabinets will be provided on site. These will be kept locked, with the key under management control to ensure appropriate use and accountability.

Concrete works and wash

Concrete works are also required underwater as discussed in Chapter 2. For these works only concrete specified for underwater works will be utilised to reduce the risk to the marine environment.

Cement washings will be carried out in a designated area. Washing arisings will be collected for onsite treatment. This will include settlement and, if required, pH correction. The liquids will be reused onsite if possible or tankered off site for appropriate disposal. The solids will be disposed of as solid waste or reused as aggregate within the development.

Site Spillage & Emergency Procedures

The Site Spillage and Emergency Procedures will be prominently displayed, and operatives will be trained in their application. The procedures document will incorporate guidance from the relevant SEPA Guidance Notes (GPP 22).

Maintenance procedures and checks will ensure the minimisation of leakage of fuels or oils from plant and, where vehicle maintenance is necessary within the excavation at the Borrow Pit, owing to breakdown, additional precautions will be taken to contain contaminants, such as spill trays or absorbent mattresses.

In the event of any spillage or discharge that may be harmful or polluting to the water environment, all necessary measures shall be taken to remedy the situation. These measures shall include:

- Identifying and stopping the source of the spillage;
- Preventing the spillage spreading or entering watercourses by means of suitable material and equipment;
- Absorbent material, including oil absorbent material, will be available on site to mop up spillages. This will be in the form of oil booms and pads, and for smaller spillages at the Borrow Pit quantities of proprietary absorbent materials;
- Where it is considered that an oil/fuel spillage may have soaked into the ground, the contaminated ground shall be excavated and removed from site by a licensed waste carrier to a suitable landfill facility;
- The emergency contact telephone number of a specialist oil pollution control company shall be displayed on site; and
- Sub-contractors shall be made aware of guidelines for the handling of oils and fuels and of the spillage procedures at the site.

SEPA shall be informed of any discharge or spillage that may be harmful or polluting to the water environment. Written details of the incident shall be forwarded to SEPA no later than 14 days after the incident.

17.6.1.2 Introduction of Invasive Non-Native Marine Species

Although there are no predicted significant effects with regard to the introduction of INNMS, best practice should still be implemented to minimise the risks posed. Contractors will be required to ensure all plant, equipment and vessels brought to site is properly cleaned prior to arrival. All equipment will be inspected prior to mobilisation on site and any equipment carrying excessive sediment deposits will be returned to the supplier.

17.6.1.3 Litter

Prior to construction works on site commencing, a litter sweep will be conducted to prevent the escape of existing litter on site into the marine environment. All personnel working on the project will undertake site induction. This will include a section on waste management and the use of the waste receptacles provided. It will be made clear that littering will not be tolerated. Waste receptacles shall be covered. Construction staff will be encouraged to collect any litter they see in the construction areas and, if deemed necessary, litter sweeps will be carried out. The use of single use plastics will be discouraged, reusable water bottles supplied to all personnel and reusable crockery and cutlery will be provided in the welfare facilities. All generated waste will be segregated to facilitate appropriate recycling.

17.6.1.4 Groundwater Management

Groundwater management relating to the Borrow Pit will follow the policies and guidelines set out by the Water Framework Directive (200/60/EC), the Groundwater Directive (80/68/EEC) and the Groundwater Daughter Directive (2006/118/EC) and their translations into Scottish law under the Water Environment and Water Services (Scotland) Act 2003 and the Water Environment (Controlled Activities) Regulations 2011. All aspects of groundwater management will be in accordance with current best practice techniques.

All collected water (predominantly comprising incident rainfall and potential minor groundwater seepages) shall be directed to a sump, and allowed to infiltrate through underlying strata. Water shall be used, as necessary, for dust suppression and operational processing.

17.6.1.5 Surface Water Management

Soil mounds will be seeded at the earliest opportunity to ensure maximum stability and early establishment of vegetation cover.

Settlement of site generated particulates and solids in settlement sumps, encourage infiltration within site.

17.6.2 Operations

All operational mitigation will be included with the management system which will be developed and maintained by the Harbour Manager.

17.6.2.1 Discharges

The septic tank will be emptied at a suitable frequency and the oil interceptor will be checked and emptied as required. An appropriately licenced waste contractor will be employed to carry out septic tank and oil interceptor emptying activities.

17.6.2.2 Pollution Prevention

Appropriate spill prevention and response procedures will be developed.

Spill kits will be available near the fuel tanks and at the refuelling point, with instructions on how to use them in case of a spill.

Oil storage will be undertaken in accordance with the CAR GBR28.

Measures for safe refuelling at the pontoons will include:

- Educational signage regarding correct refuelling procedure to prevent overfilling;
- Install nozzles which have safety features which prevent overfilling; and
- Visual inspections of the nozzles and hoses to ensure that they are in good working order to prevent leaks.

17.6.2.3 Litter

Installation of waste receptacles, located away from the seafront. These receptacles will be of suitable design to hold waste during strong winds, ensuring litter is not blown around the site. Waste receptacles will be emptied on a regular basis to prevent overflowing.

Signage will be erected on site to encourage harbour users and members of the public to dispose of waste in bins to prevent litter on site.

17.7 Cumulative Assessment

As detailed in Chapter 3 no cumulative effects are predicted for the proposed SCH development in terms of hydrology, hydrogeology, water quality and coastal processes.

17.8 Residual Effects

There are no negative significant effects on hydrology, hydrogeology, water quality and coastal processes identified and therefore no residual effects need to be considered. The mitigation identified in Section 17.6 will minimise negative effects and reduce risks to the environment.

17.9 Summary

This assessment is based on a site-specific risk assessment method following recommended environmental impact assessment techniques. Potential impacts, both positive and negative, to the hydrological and hydrogeological regime, water quality and on coastal processes, have been identified and assessed.

All potential impacts on the hydrological and hydrogeological regime at the site have been assessed as negligible with the exception of coastal flooding which is assessed as minor. Potential effects on coastal processes have been assessed as negligible. Table 17.9.1 provides a summary of impacts, mitigation and residual effects.

Table 17.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction: Proposed SCH Development							
Òb nan Ron	Loss of Containment: Fuel Storage Bowser (20m^3 of diesel)	Unlikely	Medium Adverse	Minor: Non-significant Adverse	Compliance with CAR GBR28. Adoption of appropriate spill prevention and response procedures.	Low Adverse	Negligible: Non-significant Adverse
	Loss of Containment: Refuelling Activities	Probable	Low Adverse	Minor: Non-significant Adverse	Compliance with CAR GBR28. Adoption of appropriate spill prevention and response procedures. Refuelling RAMS to be put in place aligned with GPP2.	Low Adverse	Negligible: Non-significant Adverse
	Loss of Containment: Vehicles or Plant	Unlikely	Low Adverse	Negligible: Non-significant Adverse	Appropriately maintained plant and equipment. Adoption of appropriate spill prevention and response procedures.	Low Adverse	Negligible: Non-significant Adverse
	Loss of containment: Plant – Hydraulic Fluids	Certain	Low Adverse	Minor: Non-significant Adverse	Appropriately maintained plant and equipment. Adoption of appropriate spill prevention and response procedures.	Low Adverse	Negligible: Non-significant Adverse
	Loss of Containment: COSHH Store: Hydraulic Fluids, Maintenance Oils, Chemicals.	Unlikely	Low Adverse	Negligible: Non-significant Adverse	Compliance with the COSHH Regulations 2002 Adoption of appropriate spill prevention and response procedures.	Low Adverse	Negligible: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
	Loss of Containment: Cement and Cement Wash Outs	Unlikely	Low Adverse	Negligible: Non-significant Adverse	Sealing of shuttering and appropriate cement washout and treatment implemented in line with PPG6.	Low Adverse	Negligible: Non-significant Adverse
	Introduction of INNMS – Contaminated Plant and Equipment.	Unlikely	Low Adverse	Negligible: Non-significant Adverse	All plant and equipment will be thoroughly cleaned prior to mobilisation to site.	Low Adverse	Negligible: Non-significant Adverse
Òb nan Ron	Litter	Probable	Low Adverse	Minor: Non-significant Adverse	Waste receptacles will be covered, and littering will not be tolerated.	Low Adverse	Negligible: Non-significant Adverse
Construction: Borrow Pit							
Inver Tote Lealt River Unnamed minor watercourse	Loss of Containment: Fuel Storage Bowser (20m^3 of diesel)	Highly Unlikely	High Adverse	Minor: Non-significant Adverse	Compliance with CAR Adaption of appropriate spill prevention and response procedures.	Low Adverse	Negligible: Non-significant Adverse
	Loss of Containment: Refuelling Activities	Unlikely	Low Adverse	Minor: Non-significant Adverse	Compliance with CAR. Adoption of appropriate spill prevention and response procedures. Refuelling RAMS to be put in place aligned with GPP2.	Low Adverse	Negligible: Non-significant Adverse
	Loss of Containment: Vehicles or Plant	Unlikely	Low Adverse	Negligible: Non-significant Adverse	Appropriately maintained equipment. Adoption of appropriate spill prevention and response procedures.	Low Adverse	Negligible: Non-significant Adverse
	Loss of containment: Plant – Hydraulic Fluids	Unlikely	Low Adverse	Minor: Non-significant Adverse	Adoption of appropriate spill prevention and response procedures.	Low Adverse	Negligible: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
	Loss of Containment: COSHH Store: Hydraulic Fluids, Maintenance Oils, Chemicals.	Unlikely	Low Adverse	Negligible: Non-significant Adverse	Compliance with the COSHH Regulations 2002 Adoption of appropriate spill prevention and response procedures.	Low Adverse	Negligible: Non-significant Adverse
Surface Water	Physical changes to overland drainage	Certain	Low Adverse	Minor: Non-significant Adverse	Minimise changes to sub-catchment areas, use peripheral mounds, utilise collected water for operations.	Low Adverse	Negligible: Non-significant Adverse
Ground Water	Changes to hydrogeology	Probable	Negligible Adverse	Negligible: Non-significant Adverse	All collected water shall be directed to a sump and allowed to infiltrate through underlying strata.	Negligible Adverse	Negligible: non-significant adverse
Ground Water / Surface Water	Water Contamination	Unlikely	Low Adverse	Negligible: Non-significant Adverse	Site spillage and emergency procedures in place.	Low Adverse	Negligible: Non-significant Adverse
Surface Water	Flood Risk	Certain	Negligible Adverse	Negligible: non-significant beneficial	Temporarily allow the site to flood during extreme events, increase storage capacity within operational void.	Low Adverse	Negligible: Non-significant Adverse
Operation							
Òb nan Ron	Discharges	Certain	Negligible Adverse	Negligible: Non-significant Adverse	Septic tank will be emptied at a suitable frequency and the oil interceptor will be checked and emptied as required.	Negligible Adverse	Negligible: Non-significant Adverse
Infrastructure	Flooding	Probable	Low Adverse	Minor: Non-significant Adverse	Onshore elements have been designed to consider the flood risk due to rising sea levels.	Low Adverse	Minor: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Staffin Coastline	Coastal Processes	Unlikely	Low Adverse	Negligible: Non-significant Adverse	No mitigation required.	Low Adverse	Negligible: Non-significant Adverse
Staffin Coastline	Sediment Transport	Unlikely	Low Adverse	Negligible: Non-significant Adverse	No mitigation required.	Low Adverse	Negligible: Non-significant Adverse
Òb nan Ron	Potential loss of Containment: 30 000L fuel storage tank	Extremely Unlikely	Medium Adverse	Negligible: Non-significant Adverse	Compliance with CAR GBR28. Adoption of appropriate spill prevention and response procedures. Spill kits on site.	Low Adverse	Negligible: Non-significant Adverse
	Potential loss of Containment: leaks / spills during refuelling	Unlikely	Low Adverse	Negligible: Non-significant Adverse	Compliance with CAR GBR28. Adoption of appropriate spill prevention and response procedures. Spill kits on site.	Low Adverse	Negligible: Non-significant Adverse
	Leaking and spills during refuelling at the pontoon	Probable	Low Adverse	Minor: Non-significant Adverse	Compliance with CAR GBR28. Adoption of appropriate spill prevention and response procedures. Signage regarding correct refuelling procedure to prevent overfilling. Nozzles which have safety features to prevent overfilling installed. Visual inspections of the nozzles and hoses.	Low Adverse	Negligible: Non-significant Adverse
Òb nan Ron	Litter	Probable	Low Adverse	Minor: Non-significant Adverse	Installation of waste receptacles away from the seafront and of a suitable design to hold waste during strong winds. Waste	Low Adverse	Negligible: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
					receptacles emptied on a regular basis. Harbour users will be encouraged to dispose of waste appropriately to prevent litter.		

Key

Significant Effect
Non-Significant

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17.11 Glossary

Acronym	Definition
2000/60/EC	Water Framework Directive
2006/21/EC	Mine Waste Directive
2006/7/EC	Bathing Water Directive
AOD	Above ordnance datum
BGS	British Geological Survey
CAR	Controlled Activities Regulations
COSHH	Control of Substance Hazardous to Health
EIAR	Environmental Impact Assessment Report
GBR	General Binding Rules
GPP	Guidance for Pollution Prevention
HAT	Highest Astronomical Tide
INNMS	Invasive non-native marine species
km	Kilometres
m	metres
MHWS	Mean High Water Springs
s	Seconds
SAC	Special Area of Conservation
SCH	Staffin Community Harbour
SEPA	Scottish Environment Protection Agency
S-P-R	Standard Percentage Runoff
UK	United Kingdom
WFD	Water Framework Directive

Chapter 18: Population and Socioeconomics

Document Control

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Contents

18 Population and Socioeconomics

18.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) describes the baseline conditions, identifies potential impacts and assess the significance of effects which may arise from the construction and operation of the proposed Staffin Community Harbour (SCH) development on the population from a social and economic perspective. Where required, mitigation measures to avoid, reduce or offset potential adverse effects or further enhance the potential beneficial effects are identified. It should be noted that human health is not specifically considered within this chapter, as effect which could affect human health namely reductions in air quality, road traffic accidents and navigational risks are covered in Chapters 6, 15 and 16 respectively.

18.2 Regulations, Guidance and Sources of Information

18.2.1 National Legislation

The regulatory framework relevant to access which has informed this document is The Land Reform (Scotland) Act 2016 (as amended), and associated Scottish Outdoor Access Code, which provides a practical guide to access users.

18.2.2 Sources of Information

- Skye and Lochalsh population and demography (Directorate of Public Health, 2019);
- Lochaber, Skye and Wester Ross Key Statistics (Highlands and Islands Enterprise, 2019);
- Common Grazing Regulations;
- Highlands Factsheet (VisitScotland, 2019); and
- Impact of tourism on the Isle of Skye and Isle of Raasay (SkyeConnect, 2020).

18.3 Method of Assessment

18.3.1 Baseline Methodology

A desktop review of relevant information was carried out to assess the baseline socio-economic environment within the Staffin area, as well as the wider Highlands and Islands areas.

18.3.2 Method of Assessment

Potential impacts on the population and socio – economics resulting from the proposed SCH development have been assessed utilising the methodology below.

18.3.2.1 Evaluation of Receptors

Standard Environmental Impact Assessment (EIA) methodology has been applied in the evaluation of receptors. Chapter 3: Methodology lays out the general approach to the impact assessment. Table 18.3.1 sets out the criteria which have been applied within this Chapter to determine the value of the identified receptors.

Table 18.3.1: Value of Receptors

Value	Definition
International	International Level
National	Scotland
Regional	Highland region
High Local	Skye
Moderate Local	Villages surrounding the development e.g. Flodigarry, Culnaknock, Lealt, and Staffin.
Low Local	Immediate vicinity and rural residences in Staffin.

18.3.2.2 Magnitude of Impact

Table 18.3.2 provides definitions with regard to the magnitude of impacts for socioeconomic receptors. Note those associated with employment, marked with an asterisk(*), will be taken to reflect directly to effect levels with high being equivalent to major, medium to moderate and low to minor and hence Tables 18.3.1 and 18.3.3 do not apply to them.

Effects can also be defined as having a negative or a positive outcome for the receptors assessed.

Table 18.3.2: Definition of Magnitude of Impacts for Socioeconomic Receptors

Magnitude of Impact	Definition
High	A permanent or long-term measurable effect on the economy. A short-term large effect on the economy. Permanent substantial increase/decrease in recreational facilities. Permanent large effect on the community. *A permanent increase/decrease in employment by ≥20 Full Time Equivalent (FTE). *A short term increase/decrease in employment by ≥150 FTE.
Medium	A permanent or long-term effect on the economy. A short-term moderate effect on the economy. Permanent increase/decrease in recreational facilities. Permanent effect on the community. Short term large effect on the community. *A permanent increase/decrease in employment by >5 FTE. *A short-term increase/decrease in employment by ≥ 50 FTE.
Low	A short term low effect on the economy. Short-term increase/decrease in recreational facilities. Short-term effect on the community. *A permanent increase/decrease in employment by 1-5 FTE. *A short-term increase/decrease in employment by ≥ 5 FTE.
Negligible	A short-term but reversible effect on the socioeconomics, tourism or recreation of the area, and that is within standard levels of variation.

18.3.2.3 Significance Evaluation

To assess whether there are any significant effects on the identified receptors, a matrix approach has been adopted. The receptor value and magnitude of impact are combined to determine the significance, as shown in Table 18.3.3.

Table 18.3.3: Significance of Effects Matrix

Magnitude of Impact	Receptor Value				
	International	National	Regional	Moderate Local/ High Local	Low Local
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible	Negligible

Key

Significant Effect
Non – Significant Effect

Those effects which are defined as being moderate or above have been regarded as significant and therefore further attention and mitigation measures are to be applied if they are of adverse significance.

18.4 Baseline

18.4.1 Existing Slipway

The existing slipway has a long history of servicing the local community since it was commissioned in the early 1900's. The slipway is used by members of the local community for launching of fishing boats and leisure boats during summer months (i.e. May to September). Throughout the year, the Slipway is used by the commercial fish farms operator to access their sites which are located south of Òb nan Ron.

The existing slipway is located 500m south of An Corran Beach, a popular tourist attraction known for the dinosaur footprints identified in 2002, located approximately. Over the peak season (May - September) the area is popular amongst tourists, especially day trippers who visit the existing slipway to enjoy the view, walk along the breakwater and even fish off the end of it. It's also a popular area for people in campervans, who utilise the hardstanding above the slipway to park campervans. This can limit the use of the area by the local community and can impede access to the slipway.

Currently boats, which are not removed from the water daily, are moored outside of the bay between the existing slipway and Staffin Island. Small tenders are used to ferry people from the slipway to their boats and back. However, when the sea is too rough, the tenders cannot leave the slipway area, preventing access to the vessels moored offshore. Further information with regard to the existing users of the slipway area provided in Section 16.4 of Chapter 16: Navigation.

The area surrounding the existing slipway is designated as common grazing land (Garafad common grazing). Common grazing's are areas of land used by a number of crofters and others who hold a right to graze stock on that land. There are over 1000 common grazing's covering over 500,000ha across Scotland (Crofting Commission, 2021). The Garafad common grazing, with an area of approximately 100ha, is owned by the Scottish Ministers. There are currently 15 crofters who are tenants on the common grazing.

18.4.2 Population Demographics

With a population of 469,365 in 2018, the Highlands and Islands is characterised by population sparsity, an ageing population and net out-migration of young people. Following a period of strong growth between 2001 and 2011 (+7.8% compared with +4.7% for the whole of Scotland), population growth slowed to +0.5% between 2011 and 2018, lower than the +2.6% for the whole of Scotland (HIE, 2021). For the Lochaber, Skye & Wester Ross region, in which Staffin lies, the total population size in 2018 was 39,339, a 0.5% increase from that in 2011 (HIE, 2019). Although one of the biggest threats to many of Scotland's Island communities in particular is depopulation (The Scottish Islands Federation, 2010), the population on the Isle of Skye is predicted to increase from 13,100 people to 14,700 over the next 25 years (Directorate of Public Health, 2019).

Staffin, an area in the north of Skye, covers an area of 118km^2. In 2011, the Staffin Community Council area had a Census population of 579. However, due to changes in methodology, Census data (other than the total population) was only available for the new 2011 datazones. In the case of the Staffin datazone, the new boundary changes increased the size of the datazone, as shown in the whole of the blue shaded area in Figure 18.4.1 below. This larger area had a larger population of 626 in 2011. Between 2001-2011, the population of Staffin declined by 6%, although the data between 2011-2019 indicates that the population of Staffin grew by 8.3%. The latest data shows that the population size is approximately 678 people (see Appendix R.1) and comprises 23 crofting townships (Organic Sea Harvest, 2021).

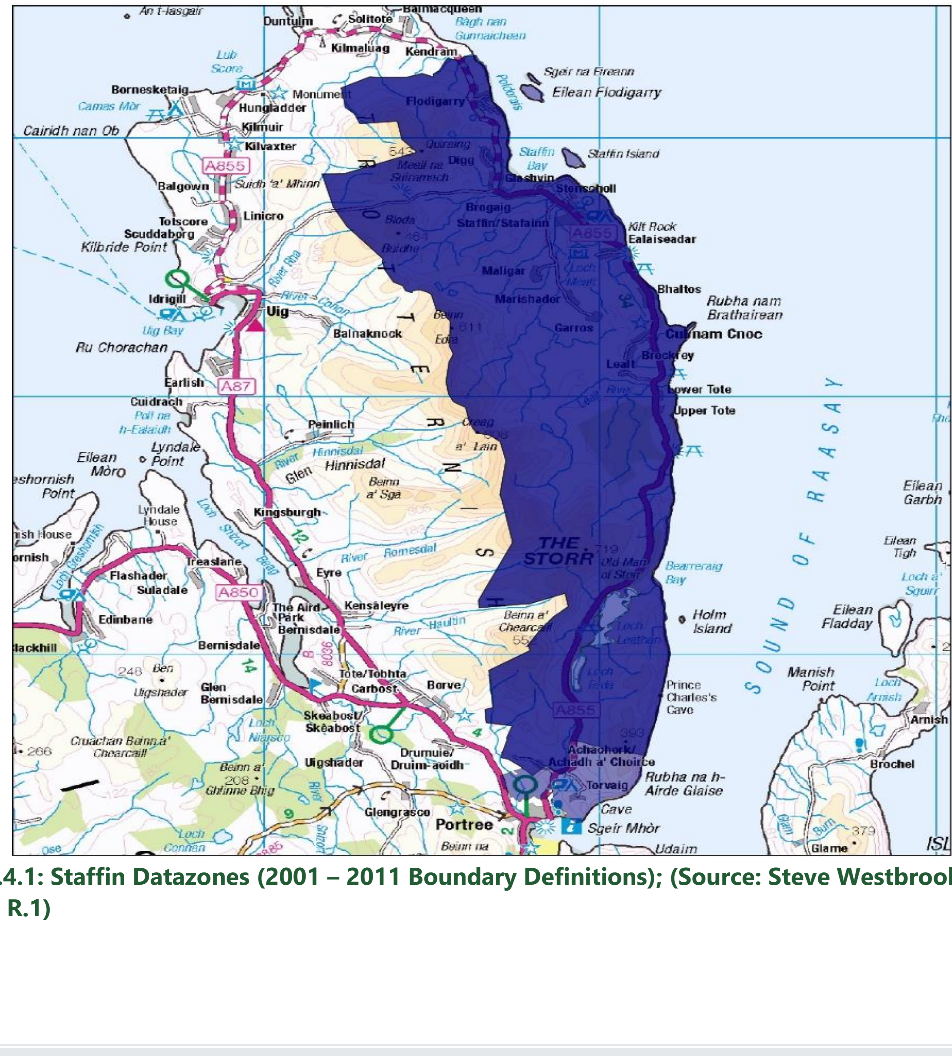


Figure 18.4.1: Staffin Datazones (2001 – 2011 Boundary Definitions); (Source: Steve Westbrook, 2021, see Appendix R.1)

The age structure of Staffin is relatively elderly and ageing, as demonstrated in Table 18.4.1 and Figure 18.4.2a below, with more than 50% of Staffin's population aged over 50 compared to 46% in the Highlands & Islands and 40% in Scotland as a whole. According to the Highland Council 2011 Census data, and the illustration in Figure 18.4.2b, over 30% of the Staffin population fall within the 45 to 59 age bracket. The 16 to 29 age bracket is noticeably lower than the others, suggesting that once teenagers finish school they move away for work or education. Across the Highlands and Islands as a whole, two-thirds (64%) of 15 – 30 year olds would like to work in the Highlands and Islands in future but numerous economic and social factors need to be in place to facilitate net-positive migration back into the Highlands and Islands region. The top four economic factors cited by young people were good pay levels, high quality jobs, a low cost of living and opportunities for career progression, and quality of life, availability of affordable housing and access to good healthcare were the top three social factors (HIE, 2021).

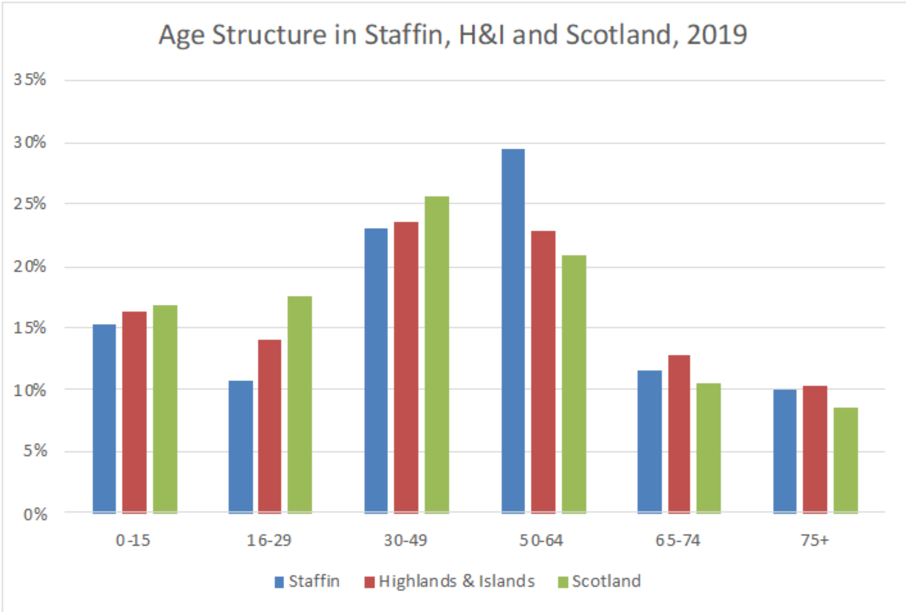


Figure 18.4.2a: Age Structure of the population of Staffin (2001-2019) compared with the Highlands & Islands area, and with Scotland as a whole. Source: Steve Westbrook, 2021, see Appendix R.1)

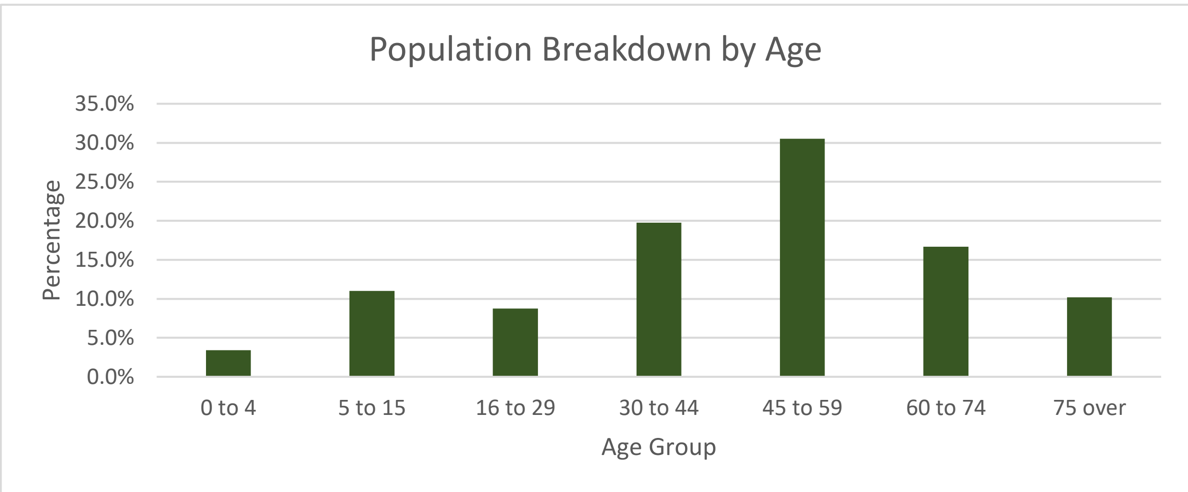


Figure 18.4.2b: Population breakdown by age (source: The Highland Council, 2011)

According to the Highland Council 2011 Census, 85.5% of the Staffin Community are in 'good' or 'very good' general health as presented in Figure 18.4.3. There are two hospitals on the Isle of Skye namely the Dr Mackinnon Memorial Hospital and the Portree Community Hospital. However, the closest district hospital is Raigmore in Inverness, approximately 195km from the Isle of Skye.

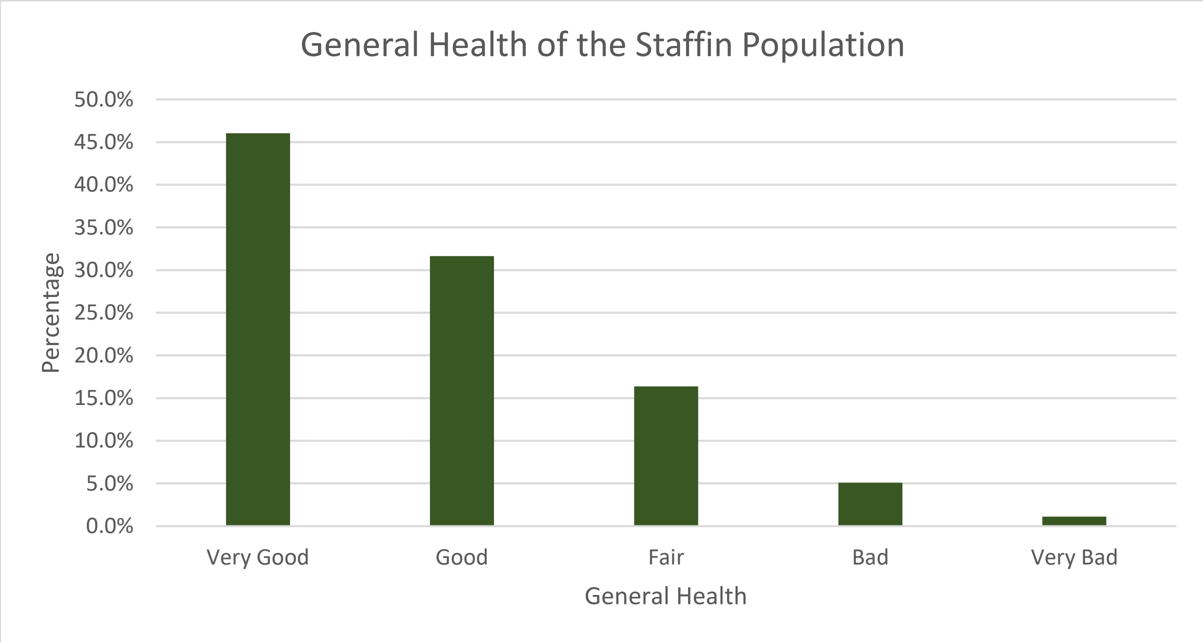


Figure 18.4.3: General Health of the Staffin Population

18.4.3 Education

According to the 2011 census, 32% of the population over 16 have no formal qualifications, while 20% have level 1[1], 11.3% have Level 2[2], 7.8% have Level 3[3] and 28.8% have level 4 or above[4] as depicted in Figure 18.4.4.

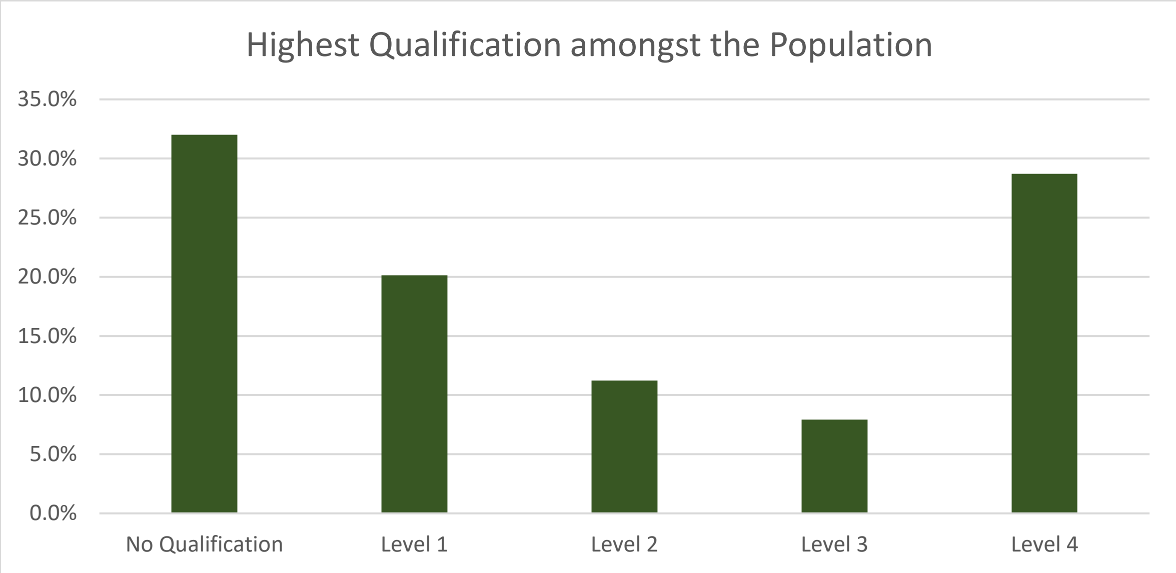


Figure 18.4.4: Highest Qualifications amongst the Staffin Population

The only school in Staffin is Staffin Primary School, which accommodates approximately 29 pupils from ages 4 – 12. The nearest Secondary is Portree High School, located approximately 29km south of Staffin. The only higher education facilities on the Isle of Skye are West Highlands College UHI.

18.4.4 Employment Sectors

In terms of the wider labour market, economic activity (8.3%) and employment rates (78.9%) in the Highlands and Islands are higher than national levels (77.4% and 74.1% respectively in 2018) and have remained relatively unchanged over the last decade (HIE, 2021). Following the long-term trend, unemployment in the region is lower than for Scotland (2.4% in July 2019 compared to 3.2% nationally) (HIE, 2021). For the Lochaber, Skye & Wester Ross region, in which Staffin lies, employment rates (83.2%) are higher than that of the Highlands and Islands (78.6%) and Scotland (74.7%) (HIE, 2019). Overall, unemployment rates (1.6% in 2019) are lower than the Highlands and Islands (2.3% in 2019) and Scotland (3.2% in 2019) (HIE, 2019).

[1] Level 1: 0 Grade, Standard Grade, Access 3 Cluster, Intermediate 1 or 2, GCSE, CSE, Senior Certification or equivalent; GSVQ Foundation or Intermediate, SVQ level 1 or 2, SCOTVEC Module, City and Guilds Craft or equivalent; Other school qualifications not already mentioned (including foreign qualifications).
[2] Level 2: CSYS, A Level, AS Level, Advanced Senior Certificate or equivalent; GSVQ Advanced, SVQ level 3, ONC, OND, SCOTVEC National Diploma, City and Guilds Advanced Craft or equivalent.
[3] Level 3: HNC, HND, SVQ level 4 or equivalent; Other post-school but pre-Higher Education qualifications not already mentioned (including foreign qualifications).
[4] Level 4 and above: Degree, Postgraduate qualifications, Masters, PhD, SVQ level 5 or equivalent; Professional qualifications (for example, teaching, nursing, accountancy); Other Higher Education qualifications not already mentioned (including foreign qualifications).

Lochaber, Skye and Wester Ross had a higher share of employment in construction; retail; transport and storage; accommodation and food services; education and arts, entertainment, recreation and other services in 2018 than the wider Highlands and Islands area and Scotland as a whole (HIE, 2019). However, the main economic sectors on the Isle of Skye itself are crofting, fishing, fish farming and tourism (Gittings, 2012). Employment in the tourism (accommodation and food services) sector in Lochaber, Skye and Wester Ross (21.1%) was more than double that of the Highlands and Islands (10.0%) and Scotland (7.9%) (Figure 18.4.5 and Table 18.4.1), highlighting the importance of the tourism sector in the area (HIE, 2019). In terms of unemployment, the Lochaber, Skye and Wester Ross unemployment rate is consistently lower than the whole Highlands and Islands since February 2016 (HIE, 2019). The latest figures for September 2019 show that Lochaber, Skye and Wester Ross had a rate of 1.6%, compared to 2.3% in the Highlands and Islands and 3.2% in Scotland (HIE, 2019). Overall, the economic activity rate in Staffin is similar overall to the Highlands & Islands average, with a relatively low proportion of full-time employees and a relatively high proportion of self-employment (Table 18.4.2).

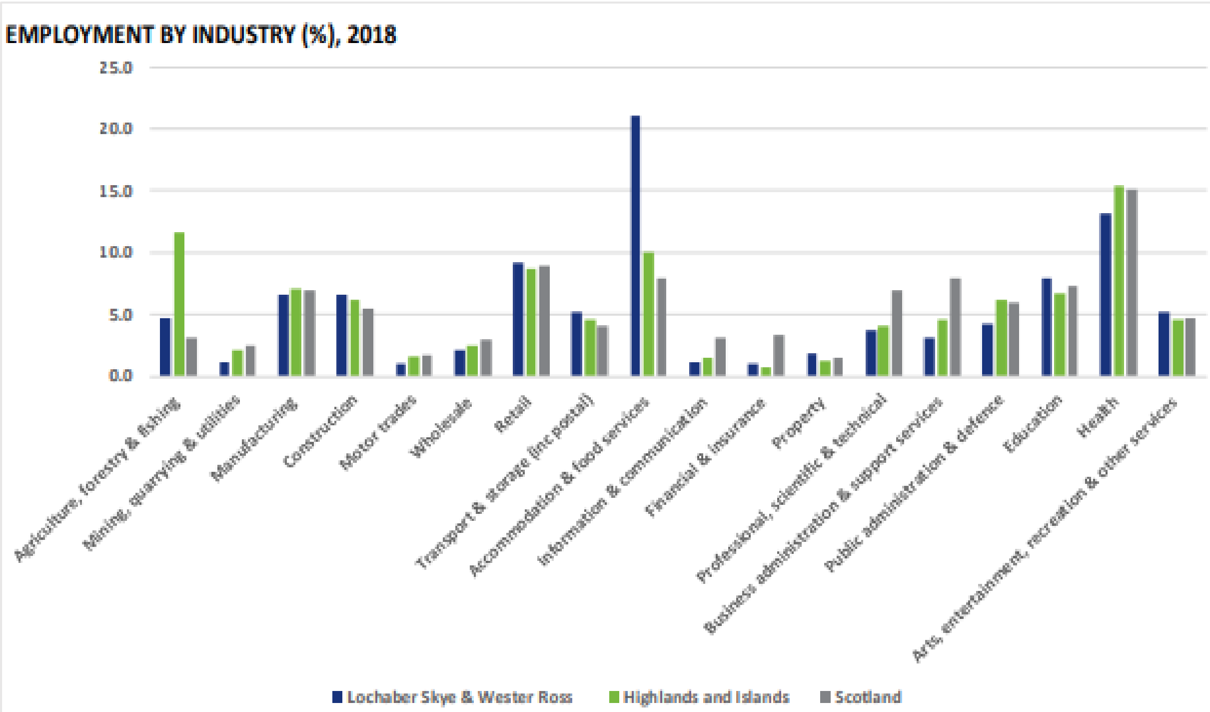


Figure 18.4.5: Economic Activity in Scotland (Source: HIE, 2019)

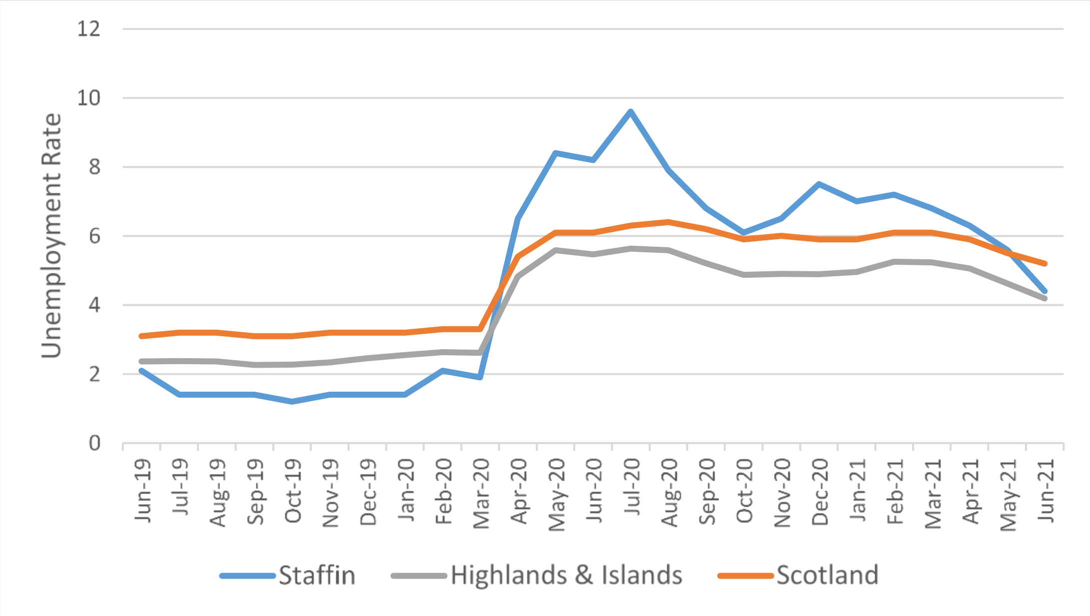
Table 18.4.1: Employment by Sector in Staffin versus Lochaber, Skye and Wester Ross (LSWR), the Highlands & Islands (H&I) and Scotland as whole (Source: BRES, 2019).

	Staffin		LSWR	H&I	Scotland
Industry Categories	**No.**	**%**	**%**	**%**	**%**
Agriculture, forestry and fishing	0	0.0	4.9	12.2	3.3
Mining and quarrying	0	0.0	0.2	0.4	1.1
Manufacturing	0	0.0	5.4	6.1	6.5
Electricity, gas, steam and air conditioning supply	0	0.0	0.3	0.6	0.7
Water supply, sewerage, waste management & remediation activities	0	0.0	0.7	1.0	0.7
Construction	0	0.0	6.1	6.5	5.5
Wholesale & retail trade, repair of motor vehicles & motorcycles	20	10.0	12.0	12.7	13.3
Transport and storage	30	15.0	4.6	4.9	4.1
Accommodation and food service activities	**75**	**37.5**	**25.2**	**11.8**	**8.2**
Information and communication	0	0.0	1.2	1.6	3.3
Financial and insurance activities	0	0.0	1.0	0.7	3.2
Real estate activities	10	5.0	2.2	1.2	1.5
Professional, scientific and technical activities	10	5.0	3.3	4.5	7.1
Administrative and support service activities	0	0.0	2.8	4.1	7.8
Public administration and defence, compulsory social security	20	10.0	4.1	5.7	6.0
Education	0	0.0	8.8	6.9	7.9
Human health and social work activities	45	22.5	12.1	15.5	15.4
Arts, entertainment, and recreation	0	0.0	4.0	2.9	2.7
Other service activities	0	0.0	0.9	1.2	1.7

Table 18.4.2: Employment type by demographics in Staffin versus Lochaber, Skye and Wester Ross (LSWR), the Highlands & Islands (H&I) and Scotland as whole (Source: 2011 Census of Population).

	Staffin		LSWR	Highlands & Islands	Scotland
	No.	**%**	**%**	**%**	**%**
All people aged 16 to 74	507				
Economically active: Employee: Part-time	80	16.9	15.3	15.3	13.3
Economically active: Employee: Full-time	148	31.4	34.9	39.4	39.6
Economically active: Self-employed	78	16.5	15.8	10.9	7.5
Economically active: Fulltime Student	4	0.8	1.5	1.9	3.7
Economically active: Unemployed	23	4.9	3.7	3.8	4.8
Unemployed people: Aged 16 to 24	3	0.6	0.9	1.1	1.4
Unemployed people: Aged 50 to 74	13	2.8	1.0	0.9	0.9
Unemployed people aged 16 to 74: Never worked	0	0.0	0.2	0.3	0.7
People aged 16 to 74: Long-term Unemployed	6	1.3	1.2	1.3	1.8
Total Economically Active	**333**	**70.6**	**71.3**	**71.3**	**69.0**

Data on the economics and employment sectors in Staffin remain outdated. During the last census (2011), 71.5% of the population in Staffin aged 16 to 75 were economically active (Figure 18.4.6). Although data on the rate of unemployment in Staffin is outdated, a recent study suggested that unemployment in Staffin was relatively low prior to Covid-19 – which in part reflected young people and others leaving the area to improve their employment prospects. However, the impacts from Covid-19 are highlighted in Figure 18.4.6 showing significant increases in unemployment since March 2020.



Source: NOMIS Claimant Count

Figure 18.4.6: Unemployment Rate for Staffin, Highlands & Islands and Scotland, June 2019-June 2021 (Source: Steve Westbrook, 2021, see Appendix R.1)

When comparing current rates of unemployment with the 2011 census, it was reported during the 2011 census that 4% of 16 – 75 year olds were unemployed, as depicted in Figure 18.4.7. However, this is likely to have changed at the time of writing this report.

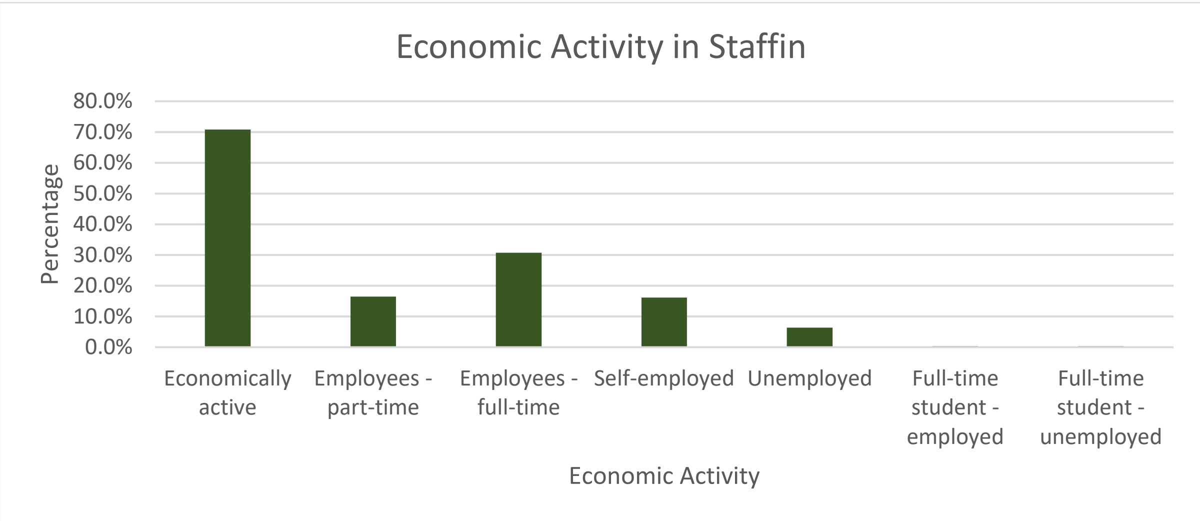


Figure 18.4.7: Economic Activity in Staffin (Source: The Highland Council, 2011)

Based on the census information from 2011, the sectors which employ the largest portion of the population from Staffin are agriculture, forestry and fishing, construction, education, human health and social work and accommodation and food services as presented in Figure 18.4.8.

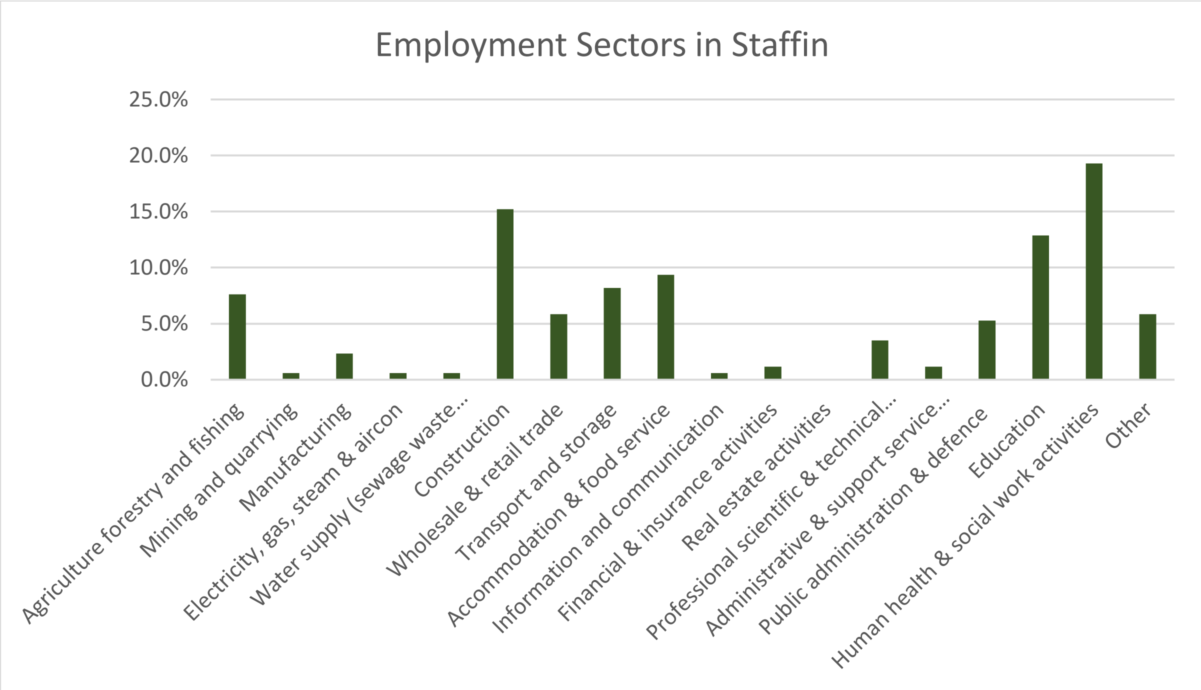


Figure 18.4.8: Employment Sectors in Staffin (Source: The Highland Council, 2011)

18.4.5 Tourism

In December 2020 VisitScotland released the Highlands Factsheet 2019, which provides a summary of tourism in the Highlands region. In 2019, the highlands received 2,907 domestic and international overnight_tourists. Most popular activities (in order by most popular) undertaken as part of a day trip in the Highlands:

- Went for a meal in a restaurant, café, hotel, pub, etc.
- Sightseeing on foot;
- Long walk, hike or ramble;
- Visited friends for leisure;
- Went for a drink in a pub, club, hotel etc.;
- Short walk/stroll;
- Visited family for leisure;
- Sightseeing by car;
- Watched wildlife, bird watching; and
- Visited a beach.

In 2019 Skye Connect Ltd commissioned Moffat Centre for Business Development (Glasgow Caledonian University) to undertake a study into the impact of Tourism on the Isle of Skye and Isle of Raasay. According to this study, there were 15.5 million visitors to Scotland and 650,000 visitors to the Isle of Skye and Isle of Raasay. Over two thirds of all visitors to Skye indicated that scenery and landscape were the overwhelming motivating factors for visiting.

The busiest months were noted to be May to September, with September having the most visitors. When asked what they felt was missing in Skye 45.5% of the respondent's noted toilets/ facilities were lacking followed by 30.3% stating parking spaces. Of the top 12 places visitors had either seen or planned to see two, namely Trotternish and Kilt Rock, are located near Staffin.

18.4.6 Recreation

There are number of walking routes around the Staffin and Lealt area, used by both the local community and the visitors. According to the Highland Council's Core Paths Plan for East Trotternish Skye and Lochalsh (Highland Council, 2021) there is a 1.4km core path which goes between Columba 1400, off the A855, and the Staffin Slipway (Figure: 18.4.9). This core path walk is often extended into a circular route which starts at either the slipway or Columbia 1400 and utilises the single access track past An Corran and up to the A855 and along the paved footpath to Columbia 1400 (Figure 18.4.10). at An Corran there are interpretation boards providing information on the dinosaur footprints.

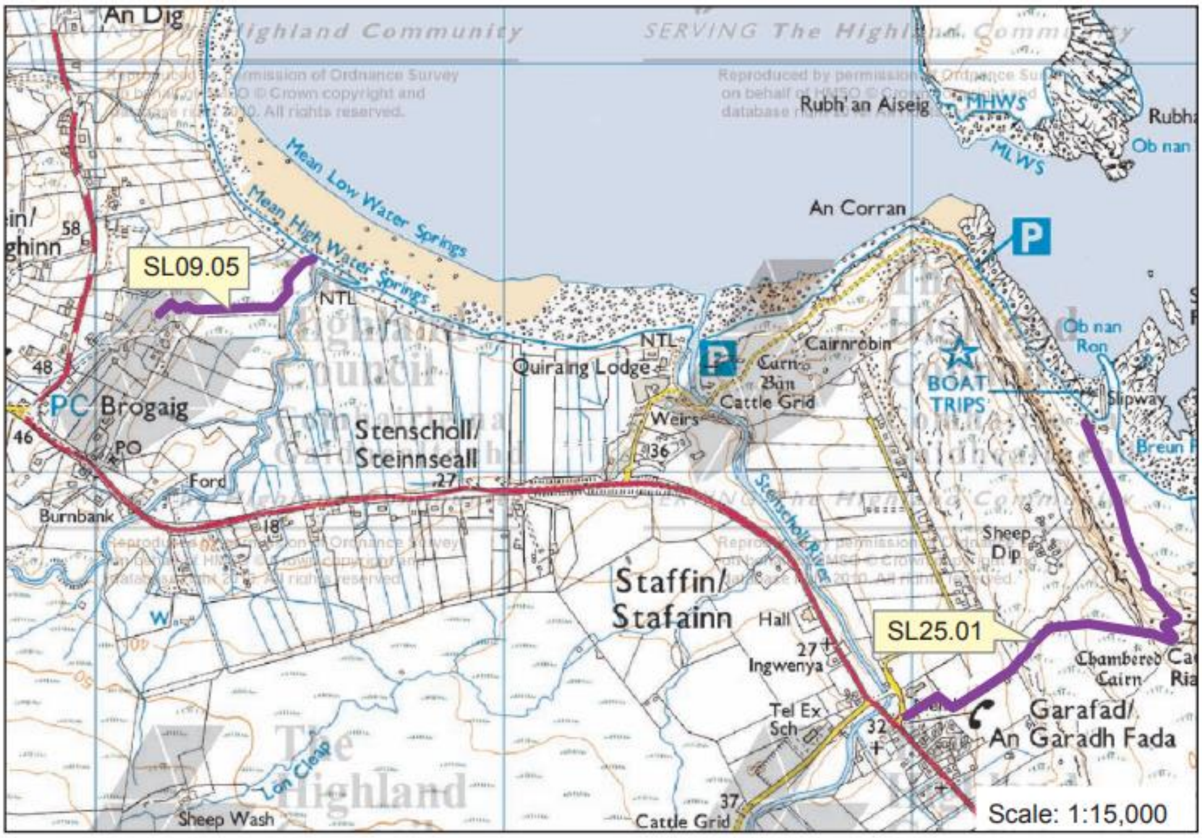


Figure 18.4.9: Core Path SL25.01 to Staffin Slipway (Highland Council, 2021)

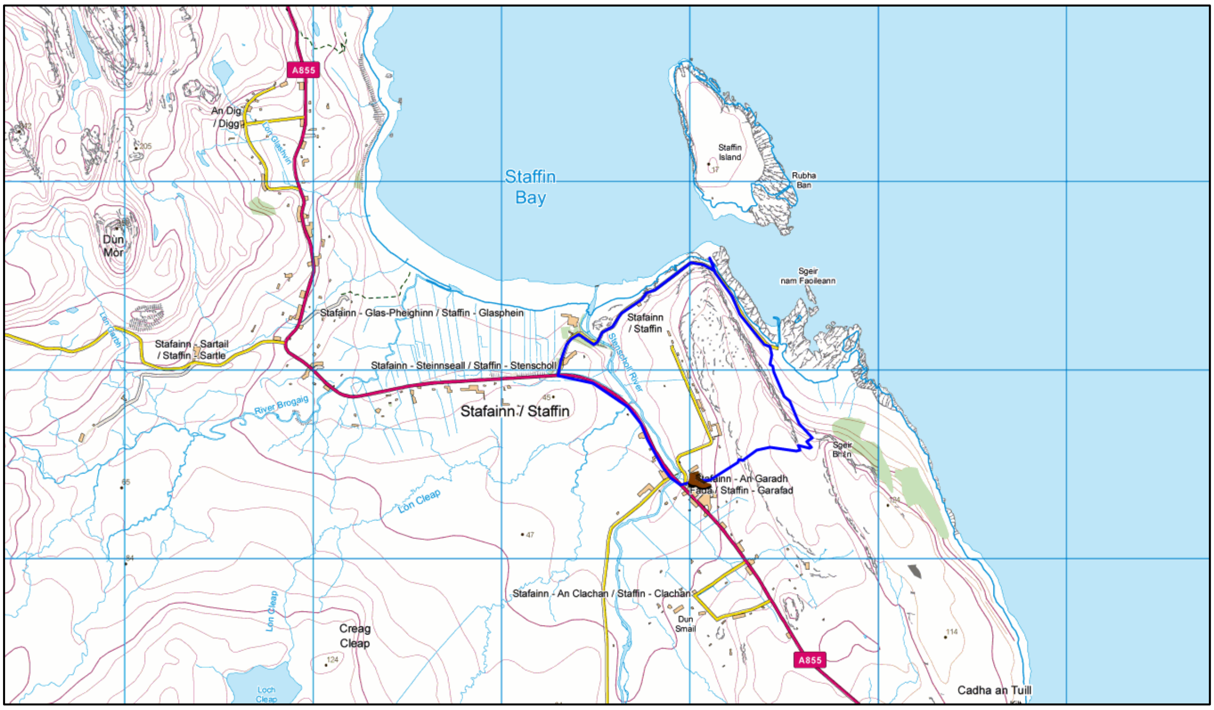


Figure 18.4.10: Staffin Circular Walk (Walking Highlands, 2021)

The existing borrow pit lies adjacent to the A855 which is the main tourist route in the area. Access to the quarry is directly from the A855.

Part of the existing tourist interest in the Lealt area relates to the historic industrial activity of the Diatomite extraction and processing factory. Approximately 200m to the south-west of the borrow pit is the Lealt Gorge car park from which a path leads to a viewpoint for the Lealt Stream Waterfall, a further car park and picnic area immediately to the south of the borrow pit access road and a further path leading to the An Leth-Allt viewpoint over the old Diatomite furnace and mill down on the shore at Inver Tote.

One of the more challenging walking routes on the Isle of Skye is the Trotternish Ridge walk which is 36.5km walk, which starts in Flodigarry (north of Staffin) and ends in Portree (Figure 18.4.10). The route does not cross the A855 and while there are views of the coastline (including Staffin Bay) it does not directly connect to the Staffin Slipway or Lealt Quarry.

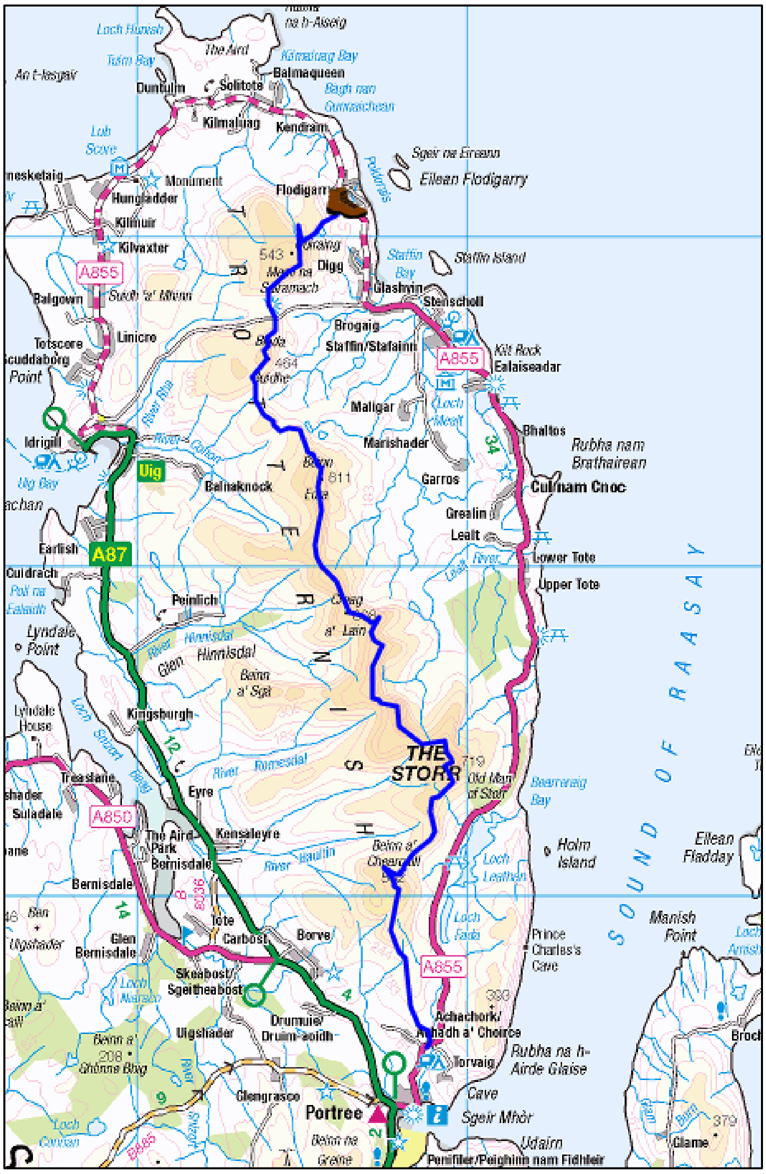


Figure 18.4.11: Trotternish Ridge walking route (Walking Highlands, 2021)

There are no facilities in north-east Skye, between Portree, Uig and Gairloch, where yachts and pleasure craft can berth to access services such as water, power, fuel and general provisions.

18.5 Impact Assessment

18.5.1 Construction

18.5.1.1 Job Creation

During the construction phase of the project there will be more than five full time equivalent (FTE) years, this could be up to 15 FTE years supported during the construction phase of the project. Depending on the successful contractor and availability of the relevant skills locally this is likely to include a combination of workers from the local community, from Skye and from the mainland.

As detailed in Table 18.3.2 more than 5 FTE short term jobs is classed a **low** impact magnitude, which is equivalent to a **minor: non-significant** beneficial effect.

18.5.1.2 Access Restrictions to Local Amenities

18.5.1.2.1 Proposed SCH Development

Walking Routes

As discussed in the Section 18.4, the slipway is used by both the local community and tourists one the circular route around Staffin. During the construction phase of the project, there is likely to be an increase in activity including movements of construction vehicles and machinery, and the need for areas to store material. This will limit the available space for parking at the slipway for individuals wanting to access the walking trails. There is no intention to restrict access to the walking trail around Staffin, however, the access to the slipway area may at times be restricted and alternative routes from the core walking path onto the single-track access route will need to be utilised.

The potential for access restriction will have a **low local** value and with a **low short term** impact magnitude on tourism and recreation. The significance is therefore deemed **negligible: non-significant**.

Access to the Slipway Infrastructure

As discussed in Section 18.4.1, day trippers and the local community alike visit the slipway to take in the view, walk along the breakwater and even fish off the end of it. During the construction phase, there will be limited access to the area for recreational use other than launching boats (discussed in Chapter 16: Navigation).

During the construction phase of the project, there is likely to be an increase in activity including movements of construction vehicles and machinery, and the need for areas to store material. This will limit the available space for parking for individuals wanting to enjoy the slipway infrastructure.

The potential for access restriction to the breakwater and slipway area for recreational purposes during construction will have a **moderate local** value and with a **low short term** impact magnitude on tourism and recreation. The significance is therefore deemed **negligible: non-significant**.

18.5.1.2.2 Borrow Pit

Due to the nature of the construction activities (i.e. blasting of rock), portions of the footpaths in the immediate vicinity of the Borrow Pit will be closed when blasting takes place. These are short term as it will only occur when blasting is happening. It is anticipated that the temporary closure would be for a period of around 30 minutes for each blast. There will be 12 to 20 blasts required, these will be spread over the proposed SCH development construction period, anticipated to be around 12 months.

The potential for access restriction to walking trail around the boundary of the Borrow Pit, during the blasting operations at the Borrow Pit will have a **low local** value and with a **low, short term** (adverse) magnitude of impact on tourism and recreation in the immediate vicinity of the Borrow Pit. The significance is therefore deemed **negligible: non-significant**.

18.5.1.3 Value of the Experience

18.5.1.3.1 Proposed SCH Development

The Isle of Skye is a popular destination for tourists to come an enjoy the scenery and landscape. The rural and tranquil nature of the area is an important part of the experience for tourists and the local community who choose to live there.

The core path mentioned in Section 18.4.6. leads down to the slipway area to join to the single-track access road, it is likely that the noise and the sight of the construction activities upon entering the proposed SCH development area will reduce the value of the experience. In addition, the movement of vehicles and trucks carrying rock and other construction materials is likely to impact on the overall value of the experience for both tourists and local community walking along the single-track access route as part of the circular walking trail.

Due to the inaccessibility of the slipway infrastructure for non-boat launching activities, the value of the experience will be impacted for those wanting to take in the view and enjoy the breakwater.

Public parking at the slipway area during construction will not be available, with the public parking area at An Corran utilised instead. Therefore, people wanting to visit An Corran beach may find the parking area and beach busier than usual reducing the value of the experience.

The potential reduction in the value of the experience for people utilising the core path and access road for walking and enjoying the Staffin slipway area as well as accessing An Corran beach during the construction period is deemed **Low Local** value with the magnitude of the impact deemed **low, short term adverse**. The effect is therefore deemed **negligible: non-significant**.

18.5.1.3.2 Borrow Pit

During the 2 to 3 months that the Borrow Pit will be operational with the 12 month construction period, it is likely that the onsite activities, will have an impact on the visitors experience. Due to the nature of the activities, there will be a degree of dust and noise associated with the rock processing and loading and movement of HGV's on site. As discussed in Chapters 5: Air Quality and 14: In-air Noise mitigation will be in place to minimise these effects. There is still a potential to reduce the value of the experience to those visiting An Leth-Allt viewpoint or utilising the picnic area and walking paths.

The potential reduction in the value of the experience as a result of the operational activities associated with the Borrow Pit operations is deemed **low local** value with the magnitude of the impact deemed **adverse low** and **short term**. The effect is therefore deemed **negligible: non-significant**.

18.5.2 Operation

18.5.2.1 Job Creation

During the operational phase of the proposed SCH development, a Harbour Manager be employed to oversee the Harbour, this is likely to be a part time position. An additional support worker will need to be employed to assist with managing the operations. This will lead to 1-1.5 FTE long term jobs being created at the proposed SCH development.

It is anticipated that the proposed SCH development will attract tourism opportunities into the proposed SCH development such as boat trips (wildlife watching and/or fishing). This is likely to be seasonal and is anticipated to create at least 0.5 FTE local jobs.

Job creation during the operational phase of the proposed SCH development, will have an impact magnitude of **low**. This will give rise to a **minor: non-significant** effects on job creation.

18.5.2.2 Tourism

The development of the SCH allows for tourism operators in the area to expand their current activities to include more marine based activities. Allowing tourists to enjoy the scenery and landscape from the sea and enjoy the marine wildlife that the area has to offer.

The development of the SCH provides a safe place for visiting sail boats to stop and visit the Staffin area whether it is overnight or just for a few hours. As the proposed SCH development will have refuelling facilities and water and electricity points at the pontoons, and toilets and shower facilities for visitors.

The creation of new marine activities provides visitors with additional sightseeing opportunities in the area and encourages them to visit the area for a longer period of time. With the new storage sheds being constructed as part of the proposed SCH development, it will encourage tourism operators to base themselves at Staffin as they will have adequate and secure storage space for equipment. This will be essential to local businesses servicing the tourism industry following the COVID 19 Pandemic.

Creating tourism opportunities in the area is a benefit that will have a long-term effect on tourism and economic growth within Staffin but also neighbouring villages having a **moderate local** value. The benefits of the proposed SCH development are likely to enhance the Staffin area and therefore has a **medium permanent beneficial** impact magnitude. The proposed SCH development is therefore deemed to have a **minor: non-significant** effect on tourism.

18.5.2.3 Commercial Users

One of the key users of the proposed SCH development will be the commercial fish farms as well as the local creel fisherman in the area. The proposed SCH development will provide adequate boat and craft launching facilities as well as safe loading and berthing spaces for crew boats. As discussed in Chapter 16: Navigation the small tenders will no longer be essential for ferrying crew to the crew boats, which has both time and safety benefits. The improved infrastructure will ensure the continued operations of the fish farms and fishing activities from Òb nan Ron.

The improved facilities create opportunities for other commercial fish farms to look at operating within the Staffin area and potentially servicing their fish farms from the proposed

SCH development. This will likely bring further job opportunities, aiding in economic growth in the area.

The new storage sheds that will be constructed as part of the proposed SCH development will allow commercial fisherman and fish farm operators to store equipment for easier and more convenient access when required.

The infrastructure that the proposed SCH development will provide to the commercial fish farms will not only aid in the retention and success of the existing farms but also encourage new fish farms to establish in the area. This will have **moderate local** value with a **high beneficial** impact magnitude. The proposed SCH development is therefore deemed to have a **moderate: significant** effect on the commercial fish farm operations.

18.5.2.4 Community Resource

Once operational the proposed SCH development will not only allow local residents to utilise the safe berthing and improved boat launching facilities but also have amenities such as toilets and parking when using the walking trails. The local community has shown interest in being able to store kayaks and paddle boats within the storage units, increasing the recreational value of the proposed SCH development beyond just boat launching.

The proposed SCH development provides an improved space for the local community which is likely to have beneficial **moderate local** value on the community with a **high beneficial** magnitude of impact as it will to enhance the wider Staffin area. The proposed SCH development is therefore deemed to have a **moderate: significant** effect on the local community.

18.6 Mitigation Measures

18.6.1 Construction

Encouraging local labour and material content through the procurement will help maximise the local benefits of the construction works. It is noted that the encouragement will need to be within appropriate procurement rules.

The contractor shall implement the following mitigation measures during the construction phase of the proposed SCH development and Borrow Pit operations to minimise the effects of access restrictions to local amenities:

- Local liaison officer in place;
- Appropriate notice to the community will be posted prior to and as required during the construction works; and
- Signage of any detours or alternative provisions will be displayed.

Having regard to the proximity of recreational areas to the Borrow Pit, for health and safety purposes, appropriate management procedures will be implemented when actual blasting is taking place. There will be temporary clearance of the paths near the Borrow Pit and posting of sentries.

The contractor shall implement the following mitigation measures during the construction phase of the Borrow Pit operations to enhance the value of the experience:

- Implement a Site Dust Management Plan at the Borrow Pit, as discussed in Chapter 5: Air Quality.

18.6.2 Operation

To enhance the benefits to the wider Staffin area, tourism information and attractions within Staffin will be displayed at the proposed SCH development.

Educational posters will be erected to provide information on the marine environment including how to enjoy the resource responsibly, which will include the Marine Wildlife Code and Scottish Outdoor Access Code.

18.7 Cumulative Impacts

As discussed in Chapter 3: Methodology, there are plans for an existing agricultural shed, at the A855 and Staffin Road junction, to be converted to a farm shop. The farm shop will rely on passing vehicles. As the proposed SCH development will attract visitors down the road passed the farm shop entrance, then it will increase the potential passing trade. Visitors taking time to turn off the A855 to visit the proposed SCH development are likely to explore more of the area, increasing the likelihood they will also visit the farm shop.

The proposed SCH development and farm stall complement each other, and they will cumulatively help to make Staffin a destination which will encourage visitors to stay longer on the island. Hence, there is a potential knock on benefit to the sider service provision providers of the island (i.e. food, accommodation). The cumulative impact of these two developments are therefore **high local** value with a **medium beneficial permanent** magnitude of impact giving rise to an overall **minor: non-significant** effect.

18.8 Residual Effects

There are no negative significant effects on the community or economic receptors identified and therefore no residual effects need to be considered.

18.9 Summary

All positive (beneficial) and negative (adverse) population and socio-economic impacts associated with the construction and operation of the proposed SCH development (including the Borrow Pit) have been identified and assessed.

During the construction and operational phases there are no significant adverse impacts on population and socio-economics. During operational there are two significant beneficial impacts associated with improved facilities for commercial users and creating a community resource.

Table 18.9.1: Summary of Effects

Receptor	Nature of Impact	Receptor Value	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction: Proposed SCH Development							
Local economy	Job Creation	Local to Regional	Low Beneficial	Minor: Non-significant Beneficial	Encouraging local labour and material content through the procurement.	Low Beneficial	Minor: Non-significant Beneficial
Local community and Visitors	Access Restrictions to Local Amenities: Walking routes	Low Local	Low Adverse	Negligible: Non-significant Adverse	Local liaison officer in place. Appropriate notice to the community will be posted prior to and as required during the construction works. Signage of any detours or alternative provisions will be displayed.	Low Adverse	Negligible: Non-significant Adverse
Local community and Visitors	Access Restrictions to Local Amenities: Slipway Infrastructure	Moderate Local	Low Adverse	Negligible: Non-significant Adverse	Local liaison officer in place. Appropriate notice to the community will be posted prior to and as required during the construction works. Signage of any detours or alternative provisions will be displayed.	Low Adverse	Negligible: Non-significant Adverse
Local community	Reducing the value of the experience	Low Local	Low Adverse	Negligible: Non-significant Adverse	Local liaison officer in place. Appropriate notice to the community will be posted prior to and as required during the construction works.	Low Adverse	Negligible: Non-significant Adverse
Construction: Borrow Pit							
Local Community	Access Restrictions to Local Amenities	Low Local	Low Adverse	Negligible: Non-significant Adverse	Local liaison officer in place. Appropriate notice to the community will be posted prior to and as required during the construction works. Signage of any detours or alternative provisions will be displayed.	Low Adverse	Negligible: Non-significant Adverse

Receptor	Nature of Impact	Receptor Value	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Local Community	Reducing the value of the experience	Low Local	Low Adverse	Negligible: Non-significant Adverse	Local liaison officer in place. Appropriate notice to the community will be posted prior to and as required during the construction works. Implement a Site Dust Management Plan.	Low Adverse	Negligible: Non-significant Adverse
Operation							
Local Economy	Job creation	Moderate Local	Low Beneficial	Minor: Non-significant Beneficial	No mitigation required.	Low Beneficial	Minor: Non-significant Beneficial
Local Economy	Tourism	Moderate Local	Medium Beneficial	Minor: Non-significant Beneficial	Tourist information and attractions within Staffin will be displayed at the proposed SCH development. This will include information on how to enjoy the marine environment responsibly.	Medium Beneficial	Minor: Non-significant Beneficial
Commercial users	Improved facilities for commercial users	Moderate Local	High Beneficial	Moderate: Significant Beneficial	No mitigation required.	High Beneficial	Moderate: Significant Beneficial
Local Community	Community Resource	Moderate Local	High Beneficial	Moderate: Significant Beneficial	Posters with information on how to enjoy the marine environment responsibly to be displayed.	High Beneficial	Moderate: Significant Beneficial

Key

Significant Effect
Non-Significant

18.10 References

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18.11 Glossary

Acronym	Definition
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
FTE	Full Time Equivalent
HIE	Highlands and Islands Enterprise
MHWS	Mean high Water Springs
SCH	Staffin Community Harbour

Chapter 19: Schedule of Mitigation

Document Control

	Name	Title	Signature	Date
Author	Bronwyn Fisher	Senior Consultant	[redacted]	29/09/2021
	Jack Clarkson	Environmental Consultant		29/09/2021
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Contents

19 Schedule of Mitigation

19.1 Introduction

Mitigation measures which have been identified throughout the Environmental Impact Assessment Report (EIAR), are collated within this Chapter to form the Schedule of Mitigation (SoM) for the proposed Staffin Community Harbour (SCH) development and associated Borrow Pit operations.

19.2 Schedule of Mitigation

Table 19.2.1 collates all the mitigation measures identified for the construction phase of the proposed SCH development, including the Borrow Pit, while Table 19.2.2 covers the operational phase. References to the relevant sections of the EIAR and other associated guidance documents are provided in both tables.

19.3 Mitigation Implementation

19.3.1 Construction Mitigation

A Construction Environmental Management Document (CEMD) will be drafted based on the mitigation included in Table 19.2.1. The CEMD will be a working document utilised by the construction contractor during both the construction planning and implementation phases. The CEMD will inform the production of the construction contractor Risk Assessment Method Statements (RAMS) for the works.

Appropriate resources will be put in place to ensure the CEMD requirements can be met, including appropriately trained and experienced personnel. Due to the scale of the development, and relatively simple construction processes, it is not proposed that there will be full time Environmental Clerk of Works (ECoW) support to the project. Rather an ECoW will carry out visits to site at appropriate stages in the programme to carry out ecological checks, deliver toolbox talks and carry out site walk overs and audits to ensure mitigation is being implemented appropriately. The ECoW will also provide offsite support to review RAMS and provide advice to any issues arising.

19.3.2 Operational Mitigation

During the operational phase, a Harbour Manager will be appointed to manage the Harbour and will be responsible for developing and maintaining a management system. All mitigation developed identified in Table 19.2.2 will be incorporated into the new SCH management system.

Table 19.2.1: Schedule of Mitigation

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
	Proposed SCH Development				
CH.01	Air Quality	Dust	Dust suppression in line with PPG6 (e.g. sprinklers and water trucks) will be used in open areas and stockpiles as appropriate. Regular visual assessments of dust emissions will be made by site supervisory staff and remedial actions initiated as necessary. Regular maintenance will be undertaken on equipment.	PPG 6: Working at Construction and Demolition Sites.	Scoping Report Section 4.4.2.
CH.02	Air Quality	Greenhouse Gas Emissions (GHG)	The intrinsic GHG cost of materials and associated transport to site, to be considered during procurement.	PPG 6: Working at Construction and Demolition Sites.	Scoping Report Section 4.4.2.
CH.03	Archaeology and Cultural Heritage	Archaeological Recording	A programme of Historic Building Recording must be undertaken on the boat nausts prior to their dismantling. A watching brief will be undertaken during their dismantling and groundworks in the immediate vicinity of the boat nausts. If significant archaeological remains are identified during the Watching Brief, excavation and post-excavation analyses can be undertaken where appropriate.		EIAR Chapter 6, Section 6.6.1.1.
CH.04	Archaeology and Cultural Heritage	Marine Archaeological Finds	A protocol for archaeological discoveries (PAD) is to be included within the CEMD to ensure it is utilised in the event of a marine archaeological find.	Offshore Renewables Protocol for Archaeological Discoveries (The Crown Estates).	EIAR Chapter 6, Section 6.6.1.1.
CH.05	Marine Mammals	Disturbance	Workers will be briefed to look for pinnipeds in the vicinity of the works, especially at the start of the day or after a break when they are most likely to be present. Activities will not start or will be stopped if individuals approach closer than 50m to the works. The works will cease until such a time that the individuals have moved further than 50m away.		EIAR Chapter 10, Section 10.6

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
CH.06	Terrestrial Ecology	Habitat Disturbance	Plant will be precise when stripping vegetation within the construction footprint to minimise disturbance to the surrounding vegetation. Edges of remaining habitat will be sealed to prevent habitats drying out. If practical, turves from removed habitat within the footprint will be used to surface exposed edges. The vegetation temporarily removed during the laying of the water pipe feeding the harbour buildings will be reinstated as soon as practicable.		EIAR Chapter 11, Section 11.6.1
CH.07	Terrestrial Ecology	Otter	Pre-construction otter survey will be carried out 6-8 weeks before construction commences. If a holt, layup or couch is found then an EPS licence may need to be sought. A Species Protection Plan will be developed for otters, taking into account the pre-construction otter survey findings.		EIAR Chapter 11, Section 11.6.3.1
CH.08	Terrestrial Ecology	Birds	If construction is planned to commence during the breeding bird season (March – September), a breeding bird survey should be carried out at an appropriate point prior to construction commencing. Seasonal considerations will be given to nesting birds. Where practicable, ground clearance and movement of large piles of materials will be carried out, outwith the breeding bird season. However, where this is not practical, bird nest checks will be carried out regularly ahead of clearance/material movement works. A species protection plan will be produced for birds.		EIAR Chapter 11, Section 11.6.3.1 EIAR Chapter 11, Section 11.6.3.2
CH.09	Soils, Geology & Palaeontology	Fossils	An identification of where known fossils are present in the area will be included in the risk assessment for work being undertaken on site. Visual inspection for fossils to be undertaken prior to works commencing and the existing breakwater rock is removed.		EIAR Chapter 12, Section 12.6.1.1 & 12.6.1.3.

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
			Appropriate construction site staff training will be provided to key employees (such as site supervisor) that includes awareness of fossil resources, and information on the Scottish Fossil Code. A Scottish Fossil Code Poster will be placed on the environment, health and safety boards in the welfare facilities make all construction workers aware of the fossil resources. If a fossil is found, the Scottish Fossil Code will be followed.		
CH.10	Landscape, Seascape & Visual	Visual impacts	Maintaining a tidy site, appropriate storage of materials and consumables, considerate parking of plant and vehicles and, maintenance of temporary elements, i.e., safety barriers, fencing, signage and lighting.		EIAR Chapter 13, Section 13.6.1.1.
CH.11	Traffic & Access	Access Road to proposed SCH development	Planned works on access road including passing place upgrades to be completed prior to construction works on the proposed SCH development commencing.		EIAR Chapter 15, Section 15.6.1.1 Appendix O.1., in Volume 3 of the EIAR
CH.12	Traffic & Access	Road User Safety and Navigation	Construction Traffic Management Plan will be prepared and agreed with The Highland Council prior to works commencing. Daily road inspection and the public road to ensure it is kept clear of debris and mud.		EIAR Chapter 15, Section 15.6.1.2 EIAR Chapter 15, Section 15.6.1.3
CH.13	Navigation	Construction Collision Risk	Local liaison officer in place. Appropriate Notice to Mariners provided prior to and during construction works. Temporary safe water markers (day and night) around the perimeters of the works. Inform users of works affecting navigation.		EIAR Chapter 16, Section 16.6
CH.14	Navigation	Access to Slipway Reduced	Agree and communicate schedule of access to slipway. If practicable make new slipway available prior to concrete works on existing slipway. Local liaison officer in place.		EIAR Chapter 16, Section 16.6

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
CH.15	Water Quality & Coastal Processes	Loss of Containment	Compliance with CAR GBR28 for oils storage. Bio-degradable hydraulic fluids will be utilised in machinery where practicable. Adoption of appropriate spill prevention and response procedures. Appropriately bunded chemical storage cabinets will be provided on site. These will be kept locked, with the key under management control to ensure appropriate use and accountability. Refuelling will be carried out in designated areas by trained operatives following site refuelling procedures to be put in place aligned with GPP2. Plant and equipment will be appropriately maintained and operated. Compliance with the COSHH Regulations 2002. Sealing of shuttering and appropriate cement washout and treatment implemented in line with PPG6.	GPP2, The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended). Control of Substances Hazardous to Health Regulations 2002.	EIAR Chapter 17, Section 17.6.1.1
CH.16	Water Quality & Coastal Processes	Introduction of Invasive and Non-Native Marine Species	All plant and equipment will be thoroughly cleaned prior to mobilisation to site.		EIAR Chapter 17, Section 17.6.1.2
CH.17	Water Quality & Coastal Processes	Litter	Waste receptacles will be covered, and littering will not be tolerated.		EIAR Chapter 17, Section 17.6.1.3
CH.18	Population & Socioeconomics	Job Creation	Encouraging local labour and material content through the procurement.		EIAR Chapter 18, Section 18.6.1
CH.19	Population & Socioeconomics	Access to Local Amenities	Local liaison officer in place. Appropriate notice to the community will be posted prior to and as required during the construction works.		EIAR Chapter 18, Section 18.6.1

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
			Signage of any detours or alternative provisions will be displayed.		
CH.20	Natural Resource Usage and Waste	Materials and Water Usage	The re-use of materials will be preferred where practicable, to prevent additional materials from being required to be brought in off-site. In addition, where materials are required to be brought in from off-site, locally produced or sourced materials will be preferred.	Article 4 of the revised EU Waste Framework Directive (Directive 2008/98/EC) (rWFD)	Scoping Report, Section 12.4
CH.21	Natural Resource Usage and Waste	Waste	Waste will be required to be appropriately segregated and sentenced in line with the principles of the Waste Hierarchy.	Article 4 of the revised EU Waste Framework Directive (Directive 2008/98/EC) (rWFD)	Scoping Report, Section 12.4
	Borrow Pit				
CB.01	Air Quality	Dust	A Site Dust Management Plan in line with PAN 50 Annex B Guidance must be developed and incorporated into the CEMD.	PAN 50 Annex B	EIAR Chapter 5, Section 5.7
CB.02	Air Quality	GHG Emissions	Plant and vehicles associated with the operational activities will be well maintained.		Scoping Report Section 4.4.3
CB.03	Air Quality	GHG Emissions	Stationery vehicles will be requested to switch off engines while waiting.		Scoping Report Section 4.4.3
CB.04	Archaeology & Cultural Heritage	Archaeological Finds	Disturbance of the areas in the immediate vicinity of the known non-designated assets (Sites 35, and 58 to 63) along the southern and eastern edges of the development need to be avoided as far as practicable. Where works are required in these areas, a Watching Brief may be required to identify any archaeological remains. If significant archaeological remains are identified during the Watching Brief, excavation and post-excavation analyses can be undertaken where appropriate.		EIAR Chapter 6, Section 6.6.1.2
CB.05	Terrestrial Ecology	Habitats and Flora	Plant will be precise when stripping vegetation to minimise disturbance to surrounding vegetation. Edges of remaining		EIAR Chapter 11, Section 11.6.1

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
			habitat will be sealed to prevent habitats drying out. If practical, turves from removed habitat within the footprint will be used to surface exposed edges.		
CB.06	Terrestrial Ecology	Otters	Pre-construction otter survey will be carried out 6-8 weeks before construction commences. If a holt, layup or couch is found then an EPS licence may need to be sought. A Species Protection Plan will be developed for otters, taking into account the pre-construction otter survey findings.		EIAR Chapter 11, Section 11.6.3.1
CB.07	Terrestrial Ecology	Birds	If construction will start during the breeding bird season (March – September). A breeding bird survey should be carried out at an appropriate point prior to construction commencing. Seasonal considerations will be given to nesting birds. Where practicable, ground clearance, movement of large piles of materials and blasting will be carried out, outwith the breeding bird season. However, where this is not practical, bird nest checks will be carried out regularly ahead of clearance/material movement works and blasting. A Species Protection Plan will be produced for birds.		EIAR Chapter 11, Section 11.6.3.1 EIAR Chapter 11, Section 11.6.3.2
CB.08	Soils, Geology & Palaeontology	Fossils	Borrow pit work will not encroach on the Valtos SSSI. A visual inspection will be undertaken before work commences. Appropriate construction site staff training will be provided to key employees (such as site supervisor) that includes awareness of fossil resources, and information on the Scottish Fossil Code. A Scottish Fossil Code Poster will be placed on the environment, health and safety boards in the welfare facilities make all construction workers aware of the fossil resources. If a fossil is found, the Scottish Fossil Code will be followed.		EIAR Chapter 12, Section 12.6.1.2 & 12.6.1.3.
CB.09	Landscape, Seascape & Visual	Visual impacts	Maintaining a tidy site, appropriate storage of materials and consumables, considerate parking of plant and vehicles and, maintenance of temporary elements, i.e., safety barriers, fencing, signage and lighting.		EIAR Chapter 13, Section 13.6.1.2.

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
			Careful management of stockpiles to reduce perception of disturbance from the nearest residential receptors. This will require close liaison with the proposed SCH development main contractor.		
CB.10	In-Air Noise and Vibration	Environmental noise nuisance	Operational hours restricted to 7.00am to 7.00pm Monday to Friday inclusive and 7.00am to noon on Saturdays. Broad spectrum white noise vehicle reversing alarms shall be fitted to all plant. All plant shall be properly maintained to ensure the integrity of silencers, lubrication of bearings etc. Site operatives appropriately trained to ensure compliance and to be noise vigilant at all times. Proposed noise limits: • During normal daytime working hours, temporary operations (including soil and overburden stripping, mound formation and removal, and final restoration), and for a total of no more than eight weeks in any calendar year, the free-field Equivalent Continuous Noise Level (LAeq, 1h) shall not exceed 70$dB_{LAeq,1h}$ as recorded at any existing third-party noise sensitive properties. • During normal daytime working hours the free-field Equivalent Continuous Noise Level (LAeq, 1h) for the period of quarry operations shall not exceed a noise level of 45$dB_{LAeq,1h}$ as recorded at any existing third-party noise sensitive properties. This will be achieved by ensuring that drilling and processing does not occur simultaneously during Phase 2.	PAN 50 Annex A	EIAR Chapter 14, Section 14.6
CB.11	Water Quality & Coastal Processes	Loss of Containment	Compliance with CAR GBR28 for oils storage. Bio-degradable hydraulic fluids will be utilised in machinery where practicable.	GPP2. The Water Environment	EIAR Chapter 17, Section 17.6.1.1

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
			Adoption of appropriate spill prevention and response procedures. Appropriately bunded chemical storage cabinets will be provided on site. These will be kept locked, with the key under management control to ensure appropriate use and accountability. Refuelling will be carried out in designated areas by trained operatives following site refuelling procedures to be put in place aligned with GPP2. Plant and equipment will be appropriately maintained and operated. Compliance with the COSHH Regulations 2002. Sealing of shuttering and appropriate cement washout and treatment implemented in line with PPG6.	(Controlled Activities) (Scotland) Regulations 2011 (as amended). Control of Substances Hazardous to Health Regulations 2002.	
CB.12	Water Quality & Coastal Processes	Surface Water and Overland Drainage	Surface water from the catchments surrounding the Borrow Pit will be prevented from entering the operational area by appropriate use of peripheral bunding and soil mounds.		EIAR Chapter 17, Section 17.5.1.5
CB.13	Water Quality & Coastal Processes	Groundwater Management	All aspects of groundwater management will be in accordance with current best practice techniques. All collected water (predominantly comprising incident rainfall and potential minor groundwater seepages) shall be directed to a sump, and allowed to infiltrate through underlying strata. Water shall be used, as necessary, for dust suppression and operational processing.	Water Framework Directive (200/60/EC) Groundwater Directive (80/68/EEC) Groundwater Daughter Directive (2006/118/EC) Water Environment and Water Services (Scotland) Act 2003 Water Environment (Controlled	EIAR Chapter 17, Section 17.6.1.4

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
				Activities) Regulations 2011.	
CB.14	Population & Socioeconomics	Access to Local Amenities	Local liaison officer in place. Appropriate notice to the community will be posted prior to and as required during the Borrow Pit operations. Signage of any detours or alternative provisions will be displayed		EIAR Chapter 18, Section 18.9, Table 18.9.1

Table 1919.3.1: Summary of Operational Mitigation

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
O.01	Soils, Geology & Palaeontology	Fossils	If geological features found during construction, mitigation implemented as agreed with appropriate authorities. Following construction, Scottish Fossil Code posters will be installed in the SCH office and in areas accessible to the public.		EIAR Chapter 12, Section 12.6.2 & Section 12.9, Table 12.9.1
O.02	Navigation	Grounding of Vessels	Appropriately communicate new navigational arrangements to all mariners in the area and inform the new harbour master of these changes so that they can also inform mariners.		EIAR Chapter 16, Section 16.6.2
O.03	Navigation	Collisions with Other Vessels and the New Breakwater	Marine Safety Management Plan to be developed and implemented. Harbour manager to be employed. Design and installation of navigational markers on the breakwater to be agreed with the Northern Lighthouse Board (NLB).		EIAR Chapter 16, Section 16.6.2
O.04	Water Quality & Coastal Processes	Discharges	Foul drainage will be passed through a septic tank, compliant with the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended). The septic tank and oil interceptor, will be emptied at a suitable frequency and an appropriately licenced waste contractor.	Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).	EIAR Chapter 17, Section 17.6.2.1

No.	Topic	Aspect	Mitigation/Enhancement	Guidance	Source
O.05	Water Quality & Coastal Processes	Potential Loss of Containment.	Oil storage will be compliant with CAR GBR28. Adoption of appropriate spill prevention and response procedures will be developed and will include the requirement for spill kits to be available near all fuel tanks and at all refuelling point(s). Signage regarding correct refuelling procedure to prevent overfilling. Nozzles which have safety features to prevent overfilling installed. Visual inspections of the nozzles and hoses.	Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).	EIAR Chapter 17, Section 17.6.2.2
O.06	Water Quality & Coastal Processes	Litter	Waste receptacles located well away from the seafront, and of a suitable design to prevent escape of litter. Waste receptacles emptied on a regular basis. Harbour users will be encouraged to dispose of waste appropriately to prevent litter.		EIAR Chapter 17, Section 17.6.2.3
O.07	Population & Socioeconomics	Tourism & Local Community	Tourist information and attractions within Staffin will be displayed at the proposed SCH development. This will include information on how to enjoy the marine environment responsibly.		EIAR Chapter 18, Section 18.6.2

19.4 Glossary

Acronym	Definition
CAR	The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)
CEMD	Construction Environmental Management Document
COSHH	Control of Substances Hazardous to Health
CTMP	Construction Traffic Management Plan
ECoW	Environmental Clerk of Works
EIAR	Environmental Impact Assessment Report
EPS	European Protected Species
GHG	Greenhouse Gas
IAQM	Institute of Air Quality Management
GPP	Guidance for Pollution Prevention
m	Metres
PAD	Protocol for Archaeological Discoveries
PAN	Planning Advice Note
PPG	Pollution Prevention Guidance
RAMS	Risk Assessment Method Statements
SCH	Staffin Community Harbour
SoM	Schedule of Mitigation
SSSI	Special Site of Scientific Interest
THC	The Highland Council

Chapter 20: Conclusion

Document Control

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20 Conclusion

The Staffin Community Trust are proposing to upgrade the existing Staffin Slipway to create a Community Harbour which addresses the short comings of the existing slipway, namely lack of sheltered berthing, limitations to boat launching and hauling out from the existing low gradient slipway, lack of onshore facilities and storage, and limited parking for slipway users and the general public.

In developing a harbour suitable for the community, the design team have taken into account the following consideration:

- The location of the proposed development area with the Trotternish Ridge National Scenic Area (NSA);
- The location of the proposed development area being immediately adjacent to the part of the Skye Nature Conservation Order (NCO) 2019 area, and the An Corran a Geological Conservation Review (GCR) Site;
- The wave climate within Staffin Bay;
- Minimising the impact upon the Common grazing land which surrounds the proposed development area;
- The volume of material that would be required, specifically rock;
- The needs of all users including: the local community, visitors to Staffin and commercial harbour users; and
- Public feedback received through the Pre-Application Consultation process.

The proposed Staffin Community Harbour (SCH) development entails the construction of a new breakwater, installation of pontoons, construction of a new launching and berthing slipway, extending and improving the existing berthing slipway, extension of the hard surfacing above the existing slipway through land reclamation, the construction of Water Closets (WCs), showers and a harbour office, parking for harbour users and the general public, construction of storage sheds, connecting the site to the electricity grid, installation of a water supply, installation of a marine fuel storage and delivery system, and undertaking improvements to the single-track access road to ensure safe access to the proposed SCH development during construction and operational phases. It is proposed that Lealt Quarry to the south of the development is reopened as a Borrow Pit, to provide rock and stone to construct the project.

Having completed a scoping exercise, the Environmental Impact Assessment (EIA) focused on the topics areas in which there was a potential for significant effects. Impacts have been assessed and appropriate mitigation identified where required, to minimise adverse effects. The significant effects identified, taking account of primary and tertiary mitigation for all topic areas are summarised in Table 20.1.

There were 13 significant adverse effects associated with the proposed SCH development construction works without secondary mitigation. Once secondary mitigation was taken into account, the number of residual adverse significant effects was reduced to two. The remaining significant effects are associated with landscape, seascape and visual effects on viewers at viewpoint 2 (the core path above the slipway) and viewers at viewpoint 3 (the single-track access road). Although mitigation has been proposed to minimise the effect on receptors utilising the core path and the single-track road during construction, the construction works will remain highly visible.

There were three significant adverse effects associated with the operations at the Borrow Pit without secondary mitigation. Once secondary mitigation was taken into account, the number of residual adverse significant effects reduced to one. The remaining adverse effect is associated with viewers at viewpoint 4 (Borrow Pit entrance) who are walking past the Borrow Pit. While mitigation to minimise the visual impact will be implemented on site, the Borrow Pit will remain visible.

There were eight significant adverse effects associated with the operation of the proposed SCH development, without secondary mitigation. Once secondary mitigation had been taken into account, two adverse effects remain significant. These two effects are associated with the viewers at viewpoint 2 (the core path above the proposed SCH development) and viewers at viewpoint 3 (the single-track access road); these residual effects may be perceived by some viewers as beneficial. As mentioned above, the proposed SCH development is within an NSA however the proposed SCH development will be constructed using natural materials and has been designed with minimal 'clutter' to fit in with the local vernacular.

In addition to the eight significant adverse effects during the operating of the proposed SCH development, there were seven significant beneficial effects associated with the operations. The beneficial effects are all associated with the creation of safe berthing, improved launching and hauling of boats and creating a community resource at the proposed SCH development which give rise to both navigational and socio-economic benefits.

Five projects were identified as having potential cumulative effects, namely the farm shop in Staffin, Stornoway Deep Water Port, Lochmaddy Ferry Terminal, Uig Ferry Terminal Development and the agricultural shed in Lower Tote, Lealt. There were no significant adverse effects from the cumulative assessments undertaken within the relevant chapters. A potential non-significant beneficial cumulative effect was however identified on the local economy, associated with the farm shop, as visitors will potentially visit both developments, stay longer in the area due to the larger offering and hence, utilise additional services and increase spend.

In conclusion, during both construction and operation of the proposed SCH development there will be adverse effects which can be minimised through appropriate mitigation to non-significant levels, with the exception of landscape, seascape and visual effects, due to the change in landscape and intensification of use; these residual effects may be perceived as beneficial. There are a number of beneficial effects for the local community, visitors to Staffin and commercial harbour users arising from the proposed SCH development.

Table 20.1: Summary of Significant Effects in the Absence of Mitigation

Receptor	Nature of Impact	Receptor Sensitivity/ Value/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Construction – Proposed SCH Development							
Atlantic Salmon	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented.	Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
European Eel		International	Low Adverse Short-term Reversible	Moderate: Significant Adverse		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
Common Seal		International	Low Adverse Short-term Reversible	Moderate: Significant Adverse		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
Grey Seal		International	Low Adverse Short-term Reversible	Medium: Significant Adverse		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
Otters	Disturbance of Protected Species	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Pre-construction surveys. EPS licence sought if required. Development of Species Protection plan (SPP). Artificial lighting within the site should only be used where required to light works sites and for safety reasons and should be directional towards the required works area. Minimise area and duration of disturbance.	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Value/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Otters	Accidental Physical Damage	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Measures to prevent entrapment. Pollution prevention as identified in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes.	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse
An Corran GCR – whole area	Direct Impacts	High / Very High	Minor / Moderate Adverse	Major / Moderate Significant Adverse	Harbour Construction not to encroach on An Corran GCR; key employees aware of existing assets.	Negligible Adverse	Negligible/ Minor: Non-Significant Adverse
An Corran GCR - Dinosaur Footprints and other fossils	Potential for direct impacts and new discoveries.	Very High	Minor Adverse	Moderate Significant Adverse	Potential for fossils included in risk assessment; visual check for fossil assets prior to construction, and after boulder removal; Scottish Fossil Code posters put up; key employees made aware of fossil potential; plans in place for collection/study if fossils found.	Negligible Adverse	Minor: Non-Significant Adverse
Viewers at VP 2		Medium	Medium - High	Moderate-Major: Significant	Maintenance of a tidy site. Appropriate storage of construction materials and consumables. Maintenance of temporary elements such as safety barriers, fencing, signage and lighting.	Medium / High	Moderate-Major: Significant
Viewers at VP 3		Medium	Medium-High	Moderate-Major: Significant	Maintenance of a tidy site. Appropriate storage of construction materials and consumables. Maintenance of temporary elements such as safety barriers, fencing, signage and lighting.	Medium-High	Moderate-Major: Significant

Receptor	Nature of Impact	Receptor Sensitivity/ Value/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Residents and users of the A855 and Staffin Road	Accidents and Safety	Medium	Moderate Adverse	Moderate: Significant	Construction Traffic Management Plan (CTMP) proposals and layby enhancements on Staffin Road.	Slight Adverse	Minor: Non-Significant
Commercial fishing vessels and Fish farm support vessels	Access to Slipway Reduced	High	Medium Adverse Short-term	Moderate: significant Adverse	Agree and communicate schedule of access to slipway. If practicable make new slipway available prior to concrete works on existing slipway.	Low Adverse Short-term	Minor: Non-significant Adverse
Marine tourism vessels; Local non-commercial fishing vessels; Local seasonal recreational users.	Access to Slipway Reduced	Medium	Medium Adverse Short-term	Moderate: Significant Adverse	Local liaison officer in place. Publish schedule of access. If practicable make new slipway available prior to concrete works on existing slipway.	Low Adverse Short-term	Minor: Non-significant Adverse
Construction – Borrow Pit							
Otters	Disturbance of Protected Species	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Pre-construction surveys. EPS licence sought if required. Development of SPP. Artificial lighting within the site should only be used where required to light works sites and for safety reasons and should be directional towards the required works area. Minimise area and duration of disturbance.	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse
Otters	Accidental Physical Damage	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Measures to prevent entrapment. Pollution prevention as identified in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes.	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse

Receptor	Nature of Impact	Receptor Sensitivity/ Value/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Viewers at VP 4		Low-Medium	Medium – High	Moderate – Major: Significant	Mitigation to reduce effects; construction works will however remain highly visible.	Medium-High	Moderate-Major Significant
Operation							
Atlantic Salmon	Mortality and reduced productivity resulting from water quality issues caused by the release of hazardous substances.	International	Low Adverse Short-term Reversible	Moderate: Significant Adverse	Mitigation outlined in Chapter 17: Hydrology, Hydrogeology, Water Quality and Coastal Processes will be implemented.	Negligible Adverse Short-term Reversible	Minor: Non-significant Adverse
European Eel		International	Low Adverse Short-term Reversible	Moderate: Significant Adverse		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
Common Seal		International	Low Adverse Short-term Reversible	Moderate: Significant Adverse		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
Grey Seal		International	Low Adverse Short-term Reversible	Medium: Significant Adverse		Negligible Adverse Short-term Reversible	Minor: Non-Significant Adverse
Land cover	Introduction of new land cover.	Medium	Medium	Moderate: Significant	Use of natural rock, minimise impermeable surfaces, quality built design.	Medium	Slight – Moderate: Non-significant
Landscape Character	Redevelopment of SCH Intensification of use	High	Low	Moderate: Significant	Sensitive design, appropriate scale and form. Use of local vernacular and natural finishes where possible, minimal 'clutter'.	Low	Slight-Moderate: Non-significant

Receptor	Nature of Impact	Receptor Sensitivity/ Value/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Viewers at VP 2		Medium	Medium	Moderate: Significant⁺	Use of natural materials, minimise impermeable surfaces, local vernacular, minimal 'clutter'.	Medium	Moderate: Significant⁺
Viewers at VP 3		Medium	Medium	Moderate: Significant⁺	Use of natural materials, minimise impermeable surfaces, local vernacular, minimal 'clutter'.	Medium	Moderate: Significant⁺
Visiting skippers as part of flotilla.	Grounding of Vessels	Medium	Medium	Moderate: significant Beneficial	Appropriately communicate new arrangements.	Medium	Moderate: significant Beneficial
Commercial fishing vessels and Fish farm support vessels.	Safe Berthing	High	High Beneficial Permanent	Major: significant Beneficial	No mitigation required.	High Beneficial Permanent	Major: Significant Beneficial
Marine tourism vessels; Local non-commercial fishing vessels; Recreational flotilla; and Local seasonal recreational users.	Safe Berthing	Medium	High Beneficial Permanent	Moderate: Significant Beneficial	No mitigation required.	High Beneficial Permanent	Moderate: Significant Beneficial
Commercial fishing vessels and Fish farm support vessels	Improved Launching and Hauling of Boats	High	Medium Beneficial Permanent	Moderate: Significant Beneficial	No mitigation required.	Medium Beneficial Permanent	Moderate: Significant Beneficial
Marine tourism vessels; Local non-commercial fishing vessels;	Improved Launching and Hauling of Boats	Medium	Medium Beneficial Permanent	Moderate: Significant Beneficial	No mitigation required.	Medium Beneficial Permanent	Moderate: Significant Beneficial

Receptor	Nature of Impact	Receptor Sensitivity/ Value/ Probability	Impact Magnitude	Significance (Absence of Secondary Mitigation)	Mitigation Summary	Residual Impact Magnitude	Significance of Residual Effect
Recreational flotilla; and Local seasonal recreational users.							
Commercial users	Improved facilities for commercial users	Moderate local	High Beneficial Permanent	Moderate: Significant Beneficial	No mitigation required.	High Beneficial Permanent	Moderate: significant Beneficial
Local Community	Community Resource	Moderate local	High Beneficial Permanent	Moderate: Significant Beneficial	Posters with information on how to enjoy the marine environment responsibly to be displayed.	High Beneficial Permanent	Moderate: significant Beneficial

+ may be considered positive.

Key

Significant Effect
Non-significant effect

20.1 Glossary

Acronym	Definition
GCR	Geological Conservation Review
MLWS	Mean low water springs
NCO	Nature Conservation Order
NSA	National Scenic Area
SCH	Staffin Community Harbour
SPP	Species Protection plan
WC	Water Closet