

## **Eishort 2**

**Loch Eishort, Isle of Skye**

**Seabed Video Survey**



**HJALTLAND**

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## **Summary**

A remotely operated vehicle (ROV) video survey was undertaken by Elizabeth MacLeod (Hjaltland Seafarms Ltd.) and TRAC Oil and Gas on 6<sup>th</sup> February 2015. This survey was to determine the habitat type around the proposed Eishort 2 fish farm as part of an environmental impact assessment.

As commonly found in Scottish sea lochs the seabed was predominantly soft sandy mud with rocky areas. Compared with other areas of the loch there was less evidence of burrowing species, such as Norwegian lobster '*Nephrops norvegicus*'. Hermit crabs (*Diogenes bernhardus*), Common star fish (*Asterias rubens*) and Sea urchins (*Echinus esculentus*) were prolific in some areas, Football sea squirts (*Diazona violacea*), Crab (*Cancer pagurus*) and scallops (*Pecten maximus*) were also noted during the survey.

## **Outer Loch Eishort**

This report is submitted in support of a planning application made to the Highland Council. Hjalmland Seafarms Ltd. has applied to install ten 120m circumference cages plus an automated feed barge.

## **Scope**

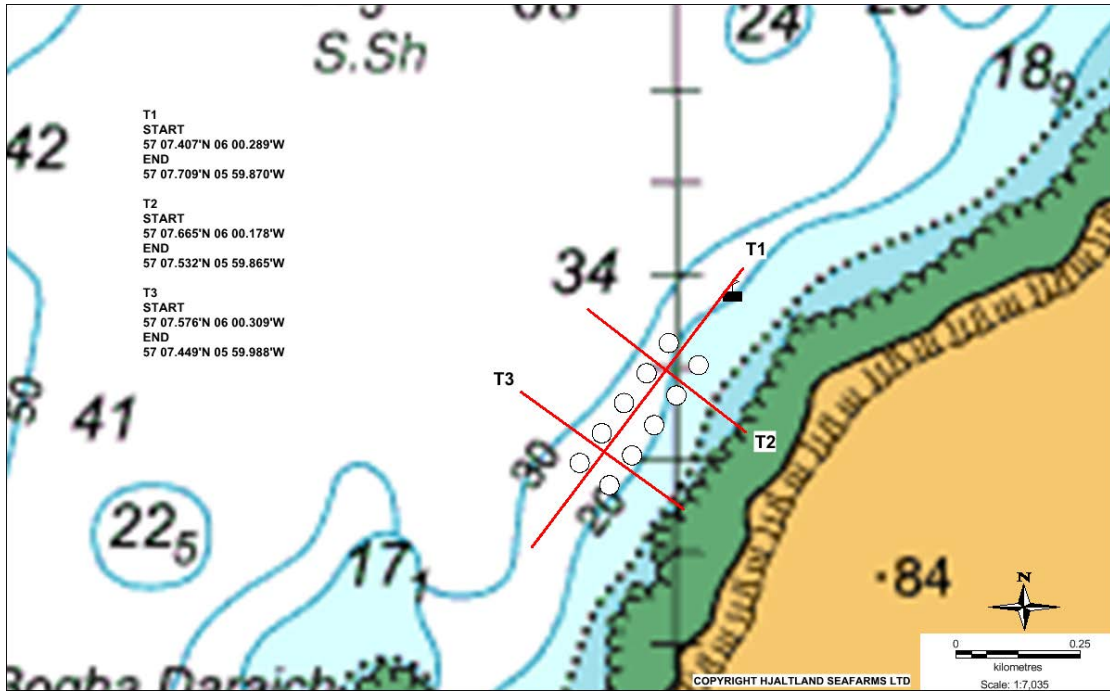
To determine, visually, the habitat type around the proposed Eishort 2 site. TRAC Oil and Gas was commissioned to undertake a video survey of the seabed to provide site specific baseline data. The SEPA guidance 'baseline survey, visual – site specific' was followed.

## **Hydrographic survey and AutoDepomod Modelling**

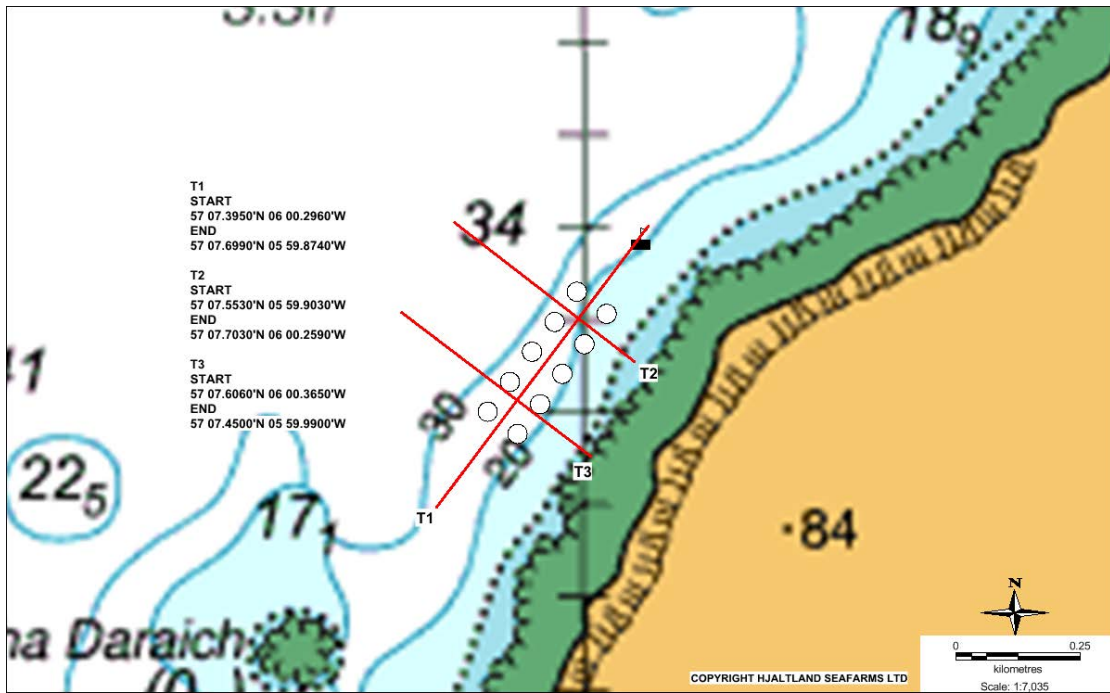
Hydrographic survey results indicate a weak to moderate tidal dispersion pattern. The modelling package AutoDepomod has been undertaken to determine the area of benthic impact. The modelling indicates that at a maximum site biomass of 2206.4 tonnes the 'AZE' (the allowable zone of effect, where sedimentation will be greater than 191 g / m<sup>2</sup>/ year) will not exceed 120m in any direction.

## **Survey Rational**

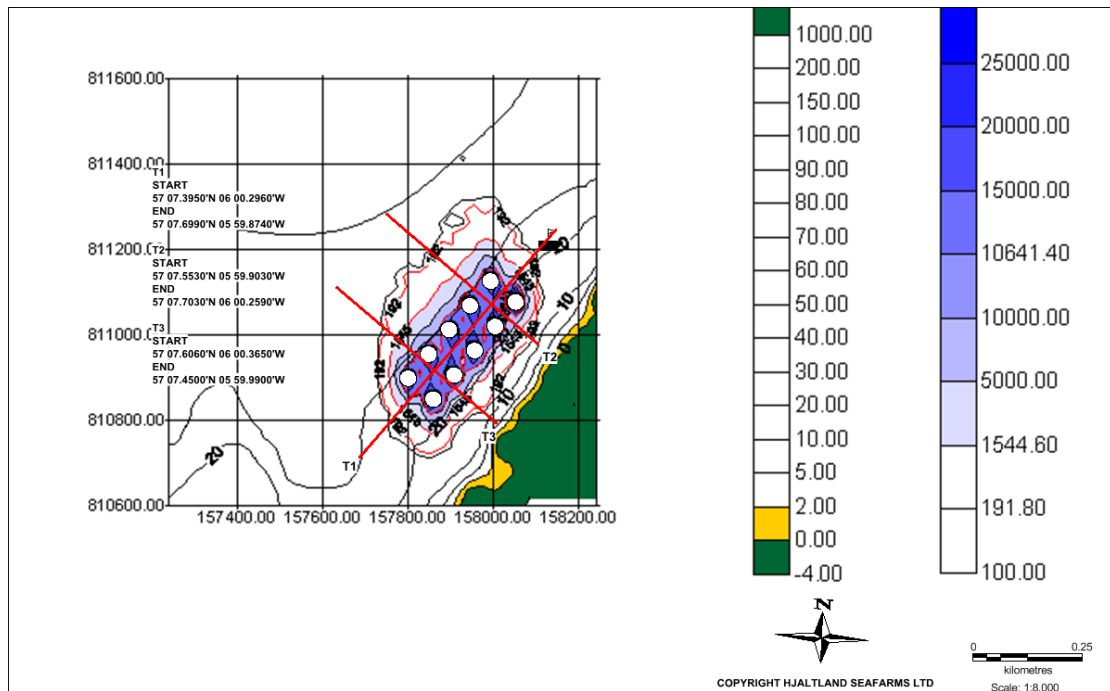
In consultation with SEPA three survey transects were proposed, Figure 1. These transects were deemed sufficient to allow a representative survey to be carried out. The transects surveyed on the day differ slightly, due to suitability of anchoring points, and are detailed in figure 2 and later within this report. The transects obtained exceed the AZE of the proposed development, as can be seen in figure 3, and are representative of the Loch.



**Figure 1: Proposed survey transect locations at the Eishort 2 site.**



**Figure 2: Actual survey transect locations at the Eishort 2 site.**



**Figure 3: Survey transects and sites modelled Allowable Zone of Effect**

### Survey Results

A video survey was undertaken on 06/02/2015 by Hjaltland Seafarms Ltd. and TRAC Oil and Gas. Start and end coordinates were entered into the boats on board positioning system and a weighted rope with tags at every 5m was placed between the two points. The boat was anchored to one end of the transect line while the ROV was piloted along the transects. At 10m intervals the ROV was piloted left and right out from the transect line to give a broader view of the area.

Abundance is given as occasional (1-3 within the 5 minute section), common (>3 within a five minute section), prolific (>10 within a five minute section).

## Transect 1:

Transect 1 was approximately 750m in length, SW to NE across the AZE. This transect comprises 01:48:26 minutes of footage. A max water depth of approximately 39.7m was observed. The starting transect position was 57° 07.3950'N 006° 00.2960'W and the end transect position was 57° 07.6990'N 005° 59.8740'W.

**Table 1: Summary of Transect 1**

Time	Description	Abundance	Depth (m)
00:00 - 05:00	Sandy mud with stones in areas and little evidence of burrowing species. Empty shells and shell fragments. Small crab Hermit crab ( <i>Diogenes bernhardus</i> ) Starfish ( <i>Asterias rubens</i> ) Crab ( <i>Cancer pagurus</i> )	Occasional Occasional Occasional Occasional	Start – 36.1 End – 35.9
05:01 - 10:00	Sandy mud with stones/boulders in areas and little evidence of burrowing species. Empty shells and shell fragments. Scallop ( <i>Pecten maximus</i> ) Starfish ( <i>Asterias rubens</i> )	Occasional Occasional	Start – 36.0 End – 35.0
10:01 – 15:00	Sandy mud with boulders/rocky areas and little evidence of burrowing species. Empty shells and shell fragments. Sea urchin ( <i>Echinus esculentus</i> ) Scallop ( <i>Pecten maximus</i> ) Starfish ( <i>Asterias rubens</i> ) Sea squirt ( <i>Ascidella aspersa</i> ) Plumose Anemone ( <i>Metridium senile</i> ) Northern sea fan ( <i>Swiftia pallida</i> )	Common Occasional Occasional Prolific Common Prolific	Start – 35.0 End – 34.9
15:01 – 20:00	Sandy mud with boulders/rocky areas and little evidence of burrowing species. Empty shells and shell fragments. Scallop ( <i>Pecten maximus</i> ) Sea squirt ( <i>Ascidella aspersa</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Small crab Sea urchin ( <i>Echinus esculentus</i> )	Occasional Prolific Common Occasional Occasional	Start – 34.9 End – 36.5
20:01 – 25:00	Sandy mud with evidence of burrowing species. Empty shells and shell fragments. Small crab Crab ( <i>Cancer pagurus</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Scallop ( <i>Pecten maximus</i> )	Occasional Occasional Common Occasional	Start – 36.5 End – 36.9
25:01 – 30:00	Sandy mud with evidence of burrowing species. Empty shells and shell fragments. Small crab Hermit crab ( <i>Diogenes bernhardus</i> )	Occasional Common	Start – 36.9 End – 37.3
30:01 – 35:00	Sandy mud with evidence of burrowing species. Hermit crab ( <i>Diogenes bernhardus</i> ) Scallop ( <i>Pecten maximus</i> )	Occasional Occasional	Start – 37.3 End – 37.3
35:01 – 40:00	Sandy mud with evidence of burrowing species. Hermit crab ( <i>Diogenes bernhardus</i> ) Crab ( <i>Cancer pagurus</i> )	Prolific Occasional	Start – 37.3 End – 38.7

40:01 – 45:00	Sandy mud with evidence of burrowing species. Hermit crab ( <i>Diogenes bernhardus</i> ) Scallop ( <i>Pectin maximus</i> ) Small crab	Common Occasional Occasional	Start – 38.7 End – 39.7
45:01 – 50:00	Sandy mud with evidence of burrowing species. Decaying seaweed Hermit crab ( <i>Diogenes bernhardus</i> ) Crab ( <i>Cancer pagurus</i> )	Common Occasional	Start – 39.7 End – 38.9
50:01 – 55:00	Sandy mud with evidence of burrowing species. Empty shells and shell fragments. Decaying seaweed. Boulders at end of section. Sea urchin ( <i>Echinus esculentus</i> ) Small fish	Occasional Occasional	Start – 38.9 End – 38.3
55:01 – 1:00:00	Sandy mud with boulders and little evidence of burrowing species. Empty shells and shell fragments. Sea squirt ( <i>Ascidella aspersa</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Starfish ( <i>Asterias rubens</i> )	Prolific Common Occasional	Start – 38.3 End – 35.6
1:00:01 – 1:05:00	Sandy mud with boulders and little evidence of burrowing species. Empty shells and shell fragments. Sea squirt ( <i>Ascidella aspersa</i> ) Small crab Hermit crab ( <i>Diogenes bernhardus</i> ) Squat lobster ( <i>Mundina rugosa</i> )	Prolific Occasional Occasional Occasional	Start – 35.6 End – 33.1
1:05:01 – 1:10:00	Sandy mud with rocky areas/boulders and little evidence of burrowing species. Empty shells and shell fragments. Hermit crab ( <i>Diogenes bernhardus</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Starfish ( <i>Asterias rubens</i> ) Sea squirt ( <i>Diazona violacea</i> ) Celtic feather star ( <i>Leptometra celtica</i> ) Sea squirt ( <i>Ascidella aspersa</i> ) Small crab Crab ( <i>Cancer pagurus</i> )	Prolific Common Occasional Occasional Occasional Occasional Common Occasional Occasional	Start – 33.1 End – 33.8
1:10:01 – 1:15:00	Sandy mud with evidence of burrowing species. Empty shells and shell fragments. Hermit crab ( <i>Diogenes bernhardus</i> ) Small fish Scallop ( <i>Pectin maximus</i> ) Starfish ( <i>Asterias rubens</i> ) – imprint seen	Prolific Occasional Occasional Occasional	Start – 33.8 End – 33.7
1:15:01 – 1:20:00	Sandy mud with evidence of burrowing species. Hermit crab ( <i>Diogenes bernhardus</i> ) Small crab	Prolific Common	Start – 33.7 End – 33.5
1:20:01 – 1:25:00	Sandy mud with evidence of burrowing species. Empty shells and shell fragments. Hermit crab ( <i>Diogenes bernhardus</i> ) Starfish ( <i>Asterias rubens</i> ) Flatfish	Prolific Occasional Occasional	Start – 33.5 End – 32.1
1:25:01 – 1:30:00	Sandy mud with rocky areas/boulders and little evidence of burrowing species. Empty shells and shell fragments. Hermit crab ( <i>Diogenes bernhardus</i> ) Starfish ( <i>Asterias rubens</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Scallop ( <i>Pectin maximus</i> )	Prolific Occasional Common Occasional	Start – 32.1 End – 30.1
1:30:01 – 1:35:00	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Small crab	Occasional	Start – 30.1 End – 28.5



1:35:01 – 1:40:00	Rocky areas/boulders. Sandy mud with little evidence of burrowing species. Sea urchin ( <i>Echinus esculentus</i> ) Starfish ( <i>Asterias rubens</i> ) Sea squirt ( <i>Asciidiella aspersa</i> ) Sea squirt ( <i>Diazona violacea</i> ) Yellow sponge	Prolific Prolific Prolific Common Occasional	Start – 28.5 End – 25.2
1:40:01 – 1:48:26	Rocky areas/boulders. Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Celtic feather star ( <i>Leptometra celtica</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Starfish ( <i>Asterias rubens</i> ) Sea squirt ( <i>Asciidiella aspersa</i> ) Yellow sponge Spiny starfish ( <i>Marthasterias glacialis</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Small crab	Occasional Prolific Prolific Prolific Occasional Occasional Common Occasional	Start – 25.2 End – 28.8

## Transect 2:

This transect was approximately 453m in length, SE to NW across the AZE.

This transect comprises 01:16:05 minutes of footage. A max water depth of approximately 44.8m was observed. The starting point was

57° 07.5530'N 005° 59.9030'W and the end point was

57° 07.7030'N 006° 00.2590'W.

**Table 2: Summary of Transect 2**

Time	Description	Abundance	Depth (m)
00:00 - 05:00	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Scallop ( <i>Pecten maximus</i> ) Starfish ( <i>Asterias rubens</i> )	Occasional Occasional	Start – 15.3 End – 22.1
05:01 - 10:00	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Numerous creels ghost fishing. Boulders at end of section. Starfish ( <i>Asterias rubens</i> ) Scallop ( <i>Pecten maximus</i> ) Sea urchin ( <i>Echinus esculentus</i> )	Occasional Occasional Occasional	Start – 22.3 End – 26.9
10:01 – 15:00	Boulders/Rocky. Numerous creels ghost fishing. Sea urchin ( <i>Echinus esculentus</i> ) Sea Orange ( <i>Suberites ficus</i> ) Sea squirt ( <i>Asciidiella aspersa</i> ) Celtic feather star ( <i>Leptometra celtica</i> ) Starfish ( <i>Asterias rubens</i> ) Spiny starfish ( <i>Marthasterias glacialis</i> ) Seven armed starfish ( <i>Luidia ciliaris</i> ) Plumose Anemone ( <i>Metridium senile</i> )	Prolific Occasional Prolific Common Common Occasional Occasional Occasional	Start – 26.8 End – 22.5
15:01 – 20:00	Boulders/Rocky. Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Celtic feather star ( <i>Leptometra celtica</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Starfish ( <i>Asterias rubens</i> )	Common Prolific Occasional	Start – 22.5 End – 28.9
20:01 – 25:00	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Boulders in some areas. Scallop ( <i>Pecten maximus</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Crab ( <i>Cancer pagurus</i> ) Celtic feather star ( <i>Leptometra celtica</i> ) Starfish ( <i>Asterias rubens</i> ) Squat lobster ( <i>Mundina rugosa</i> ) Sea urchin ( <i>Echinus esculentus</i> )	Occasional Prolific Occasional Occasional Occasional Occasional Occasional	Start – 28.6 End – 32.1
25:01 – 30:00	Sandy mud with evidence of burrowing species. Empty shells and shell fragments. Boulders in some areas. Sea urchin ( <i>Echinus esculentus</i> ) Squat lobster ( <i>Mundina rugosa</i> ) Sea squirt ( <i>Asciidiella aspersa</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Sea squirt ( <i>Diazona violacea</i> )	Common Common Common Common Occasional	Start – 32.1 End – 34.5

30:01 – 35:00	Sandy mud with evidence of burrowing species. Empty shells and shell fragments. Boulders/rocky in some areas. Northern sea fan ( <i>Swiftia pallida</i> ) Small crab Sea squirt ( <i>Ascidella aspersa</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Celtic feather star ( <i>Leptometra celtica</i> )	Prolific Occasional Prolific Common Occasional	Start – 34.5 End – 35.1
35:01 – 40:00	Sandy mud with evidence of burrowing species. Empty shells and shell fragments. Boulders/rocky in some areas. Sea squirt ( <i>Ascidella aspersa</i> ) Squat lobster ( <i>Mundina rugosa</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Sea loch anemone ( <i>Protanthea simplex</i> ) Small fish Hermit crab ( <i>Diogenes bernhardus</i> )	Prolific Occasional Common Occasional Occasional Occasional	Start – 35.3 End – 36.9
40:01 – 45:00	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Boulders/rocky in some areas. Sea squirt ( <i>Ascidella aspersa</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Plumose Anemone ( <i>Metridium senile</i> ) Celtic feather star ( <i>Leptometra celtica</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Sea squirt ( <i>Diazona violacea</i> )	Prolific Prolific Common Occasional Occasional Occasional	Start – 36.8 End – 33.0
45:01 – 50:00	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Boulders/rocky in areas. Sea loch anemone ( <i>Protanthea simplex</i> ) Sea squirt ( <i>Ascidella aspersa</i> ) Sea squirt ( <i>Diazona violacea</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Squat lobster ( <i>Mundina rugosa</i> )	Occasional Prolific Common Common Prolific Occasional Occasional	Start – 33.0 End – 31.6
50:01 – 55:00	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Boulders/rocky in areas. Sea squirt ( <i>Ascidella aspersa</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Starfish ( <i>Asterias rubens</i> ) Small crab	Prolific Common Occasional Common Occasional Occasional	Start – 31.5 End – 35.0
55:01 – 1:00:00	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Boulders/rocky in areas. Sea squirt ( <i>Ascidella aspersa</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Starfish ( <i>Asterias rubens</i> ) Celtic feather star ( <i>Leptometra celtica</i> ) Scallop ( <i>Pecten maximus</i> )	Prolific Prolific Occasional Occasional Occasional Occasional	Start – 35.0 End – 37.9
1:00:01 – 1:05:00	Sandy mud with evidence of burrowing species. Empty shells and shell fragments. Boulders/rocky in areas. Sea pen ( <i>Virgularia mirabilis</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Small crab Scallop ( <i>Pecten maximus</i> ) Sea squirt ( <i>Ascidella aspersa</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Celtic feather star ( <i>Leptometra celtica</i> )	Occasional Occasional Occasional Occasional Prolific Common Prolific Occasional	Start – 37.9 End – 39.2

1:05:01 – 1:10:00	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Boulders/rocky in areas. Sea urchin ( <i>Echinus esculentus</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Small crab Starfish ( <i>Asterias rubens</i> ) Sea squirt ( <i>Ascidella aspersa</i> ) Sea squirt ( <i>Diazona violacea</i> ) Small fish	Common Prolific Occasional Occasional Prolific Occasional Occasional	Start – 39.2 End – 40.01
1:10:01 – 1:16:03	Sandy mud with little evidence of burrowing species. Empty shells and shell fragments. Boulders/rocky in areas. Small fish Northern sea fan ( <i>Swiftia pallida</i> ) Sea squirt ( <i>Ascidella aspersa</i> ) Sea urchin ( <i>Echinus esculentus</i> )	Occasional Common Prolific Common	Start – 40.1 End – 44.8

### Transect 3:

This transect was approximately 475m, in length, NW to SE across the AZE.

This transect comprises 1:03:53 minutes of footage. A max water depth of

approximately 40.1m was observed. The starting point was

57° 07.6060'N 006° 00.3650'W and the end point was

57° 07.4500'N 005° 59.9900'W.

**Table 3: Summary of Transect 3**

Time	Description	Abundance	Depth (m)
00:00 – 05:00	Rocky at start leading to soft sandy mud with boulders. Some evidence of burrowing species. Sea urchin ( <i>Echinus esculentus</i> ) Squat lobster ( <i>Mundina rugosa</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Sea squirt ( <i>Asciidiella aspersa</i> ) Prawn cracker sponge ( <i>Axinella infundibuliformis</i> ) Sea squirt ( <i>Diazona violacea</i> ) Anemone ( <i>Metridium senile</i> ) Crab ( <i>Cancer pagurus</i> ) Hermit crab ( <i>Diogenes bernhardus</i> )	Common Occasional Common Prolific Common Prolific Common Occasional Prolific	Start – 38.5 End – 39.6
05:01 – 10:00	Soft sandy mud with boulders. Some evidence of burrowing species. Empty shells Hermit crab ( <i>Diogenes bernhardus</i> ) Northern sea fan ( <i>Swiftia pallida</i> )	Prolific Common	Start – 39.7 End – 39.7
10:01 – 15:00	Soft sandy mud with boulders. Some evidence of burrowing species. Starfish ( <i>Asterias rubens</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Crab ( <i>Cancer pagurus</i> ) Scallop ( <i>Pecten maximus</i> )	Occasional Common Occasional Occasional	Start – 40.1 End – 39.8
15:01 – 20:00	Soft sandy mud. Some evidence of burrowing species. Small crab	Occasional	Start – 40.0 End – 39.6
20:01 – 25:00	Soft sandy mud with boulders. Some evidence of burrowing species. Empty shells. Sea squirt ( <i>Asciidiella aspersa</i> ) Sea squirt ( <i>Diazona violacea</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Hermit crab ( <i>Diogenes bernhardus</i> ) Starfish ( <i>Asterias rubens</i> ) Squat lobster ( <i>Mundina rugosa</i> )	Prolific Occasional Prolific Occasional Common Occasional	Start – 39.4 End – 37.4
25:01 – 30:00	Soft sandy mud with boulders. Some evidence of burrowing species. Empty shells. Hermit crab ( <i>Diogenes bernhardus</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Small fish Starfish ( <i>Asterias rubens</i> ) Squat lobster ( <i>Mundina rugosa</i> ) Sea squirt ( <i>Asciidiella aspersa</i> )	Occasional Common Occasional Occasional Occasional Prolific	Start – 37.1 End – 35.9
30:01 – 35:00	Rocky with some areas of soft sandy mud with boulders. Some evidence of burrowing species. Sea squirt ( <i>Diazona violacea</i> ) Northern sea fan ( <i>Swiftia pallida</i> ) Sea urchin ( <i>Echinus esculentus</i> ) Starfish ( <i>Asterias rubens</i> ) Anemone ( <i>Metridium senile</i> ) Crab ( <i>Cancer pagurus</i> )	Common Prolific Prolific Occasional Occasional Occasional	Start – 33.9 End – 37.0

<b>35:01 – 40:00</b>	Rocky at start leading to soft sandy mud with boulders. Some evidence of burrowing species. Sea urchin ( <i>Echinus esculentus</i> )	Prolific	Start – 35.8 End – 37.6
<b>40:01 – 45:00</b>	Soft sandy mud. Some evidence of burrowing species. Hermit crab ( <i>Diogenes bernhardus</i> )	Occasional	Start – 37.6 End – 37.0
<b>45:01 - 50:00</b>	Soft sandy mud. Some evidence of burrowing species. Hermit crab ( <i>Diogenes bernhardus</i> )	Prolific	Start – 36.8 End – 34.0
<b>50:01 – 55:00</b>	Sandy mud. Little evidence of burrowing species. Shell fragments.		Start – 33.9 End – 27.6
<b>55:01 – 1:00:00</b>	Sandy mud. Little evidence of burrowing species. Shell fragments. Hermit crab ( <i>Diogenes bernhardus</i> ) Small crab	Occasional Occasional	Start – 27.6 End – 21.0
<b>1:00:01 – 1:03:45</b>	Sandy mud. Little evidence of burrowing species. Shell fragments. Hermit crab ( <i>Diogenes bernhardus</i> )	Occasional	Start – 21.0 End – 18.4

# **Appendix 1 –**

## **Still images from video footage**

Please see separate files for each transect

Still images are taken from paused video footage and therefore may not be as clear as within the original moving footage. The original footage has been submitted to statutory consultees to view alongside this report. Some still images are to show the substrate present and therefore may not have any visible species.