New Port Facility Falkland Islands

Non-Technical Summary of the Environmental Impact Assessment undertaken for scuttling of FIPASS

Revision	Date	Description	Prep	Check	App
P04	18-Aug-2022	Final	BH	MS	MS

	Contract No:	Doc No:	Status	Revision
BAM	BAS.2051	BAS2051-RHD-ZZ-ZZ-FN-YE-5032	S4	P04
RHDHV	PB7829	PB7829-RHD-ZZ-ZZ-FN-YE-5032	S4	P04

Hold Record

Hold No.	Section	Description of Hold

Revision Tracking

Revision	Description of Revision
P01	First draft issued to BAM for review
P02	Revision following BAM review
P03	Update following CRS-352 and DS-352
P04	Update and finalisation following BAM review

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A1.0 Introduction

A1.1 Project summary

The economy of the Falkland Islands depends upon a Port and the Falklands Interim Port and Storage System (FIPASS) has been in operation since 1984. FIPASS is currently the main commercial port facility in the Falkland Islands.

Investigative work conducted between 2017 and 2019 has revealed a deteriorating condition of FIPASS and the system is nearing the end of its operational life. A new port facility is now required to serve the needs of traditional industries and support economic growth.

A planning application for a new port facility was submitted to the Falkland Islands Government (F.I.G.) in January 2022, with permission granted in March 2022 (reference 04.22.P). Applications for Maritime Authority licences for the facility were submitted in April 2022 and, at the time of writing, are yet to be determined. The applications for the facility were supported by an Environmental Impact Statement (EIS).

In summary, the new port facility which has received planning permission, comprises the following key elements:

- Establishment of temporary compounds / storage / working areas.
- Removal of ballast tank sediment and water from within the FIPASS ballast tanks.
- Removal and dismantling of FIPASS structures on the foreshore (including construction of a slipway to enable these works).
- Removal of surficial silt from Stanley Harbour into geotubes on the foreshore.
- Construction of a quay, access road and causeway using land-based plant methodology.

F.I.G. is now considering an alternative approach to the full removal methodology and dismantling of FIPASS structures assessed within the EIS for the new port facility. The proposed alternative (herein 'the proposed scheme') comprises the temporary storage of the FIPASS structures in Stanley Harbour followed by towing to a location to the south-west of Lively Island (shown in **Drawing PB7829-RHD-ZZ-ZZ-DR-Z-5021**) for scuttling (i.e. sinking). It also proposes an amended piling methodology using the FIPASS barges as working platforms. With the exception of the approved temporary works for the decommissioning causeway and compound area that would not be required should the proposed scheme be the option taken forward, and a minor amendment in the use of the site to allow for dewatering of a limited amount of hazardous ballast tank water, all other elements of the of the temporary and permanent works (for which planning permission has been granted) remain broadly the same.

A1.2 Study area for the EIA

The study area for the EIA is the area over which the potentially significant direct and indirect impacts of the proposed scheme may occur. This includes the eastern half of Stanley Harbour (within which preparatory works and temporary storage of FIPASS is to be undertaken prior to scuttling), the proposed towing route to the scuttling site and the scuttling site itself (see **Drawing PB7829-RHD-ZZ-ZZ-DR-Z-5021**).

A2.0 Description of the construction phase

A2.1 Infrastructure proposed for scuttling

The structures that would be scuttled are as follows:

- FIPASS barges (6. No) – maximum dimensions of 92m x 28m x 17m per barge.
- FIPASS RoRo barge (1. No). – maximum dimensions of 46m x 19m x 4m.
- FIPASS causeway (5. No sections) – maximum dimensions of 32m x 9m x 2m per causeway section (to be secured to the north-eastern FIPASS barge for scuttling).

BAM DRAWING No.
PB7829-RHD-ZZ-ZZ-DR-Z-5021

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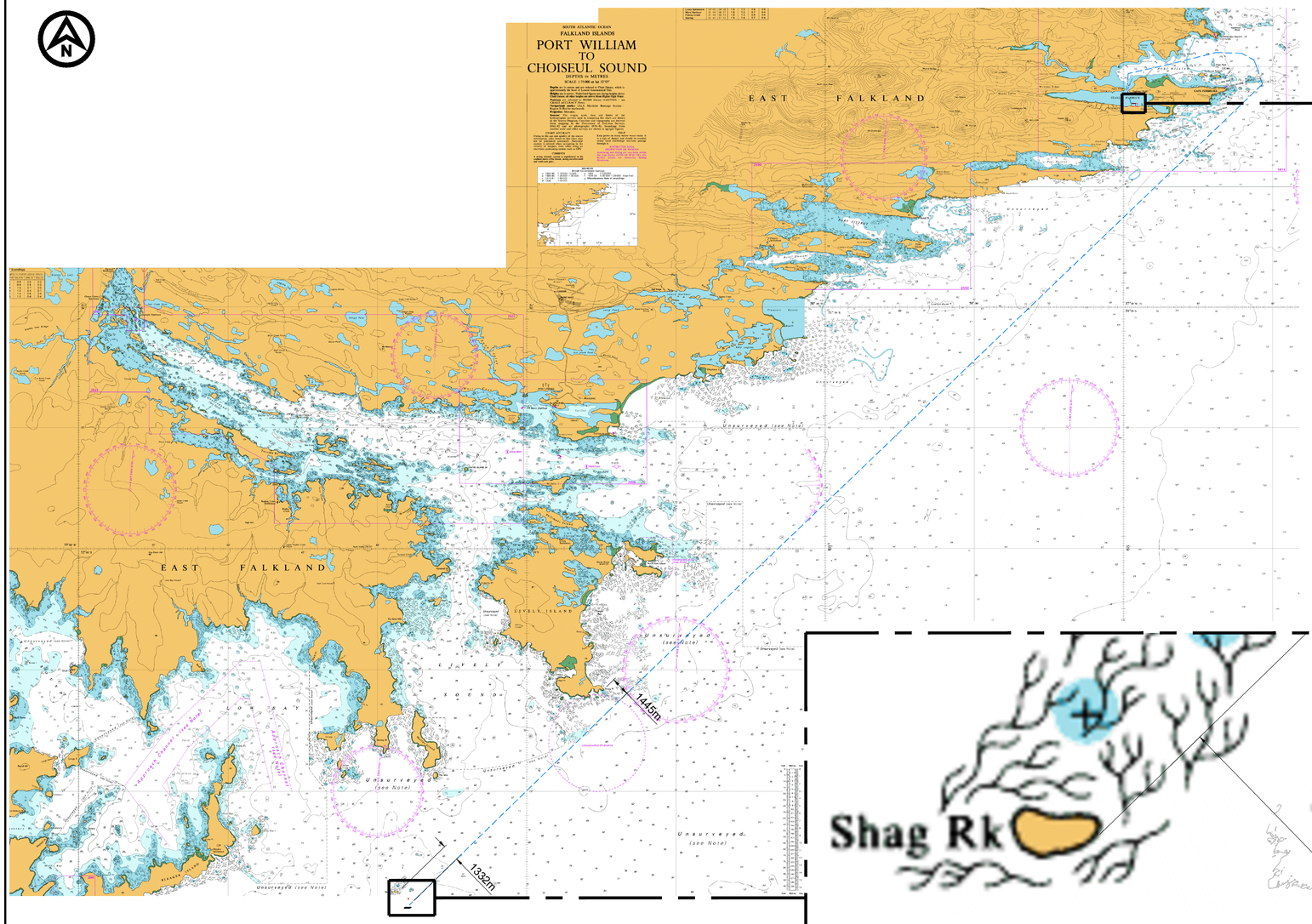

PLAN ON ROUTE TO BARGE SCUTTLING LOCATION
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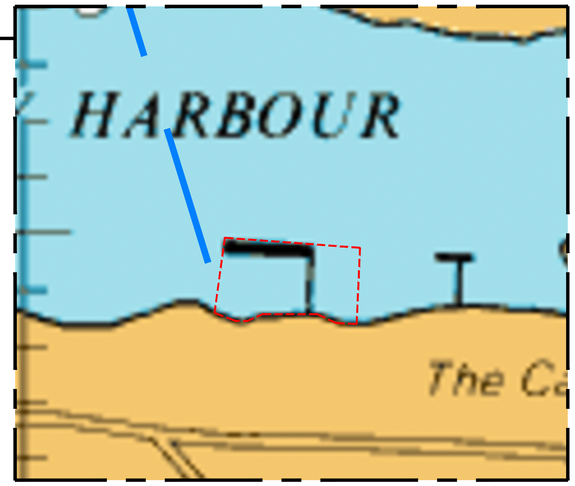
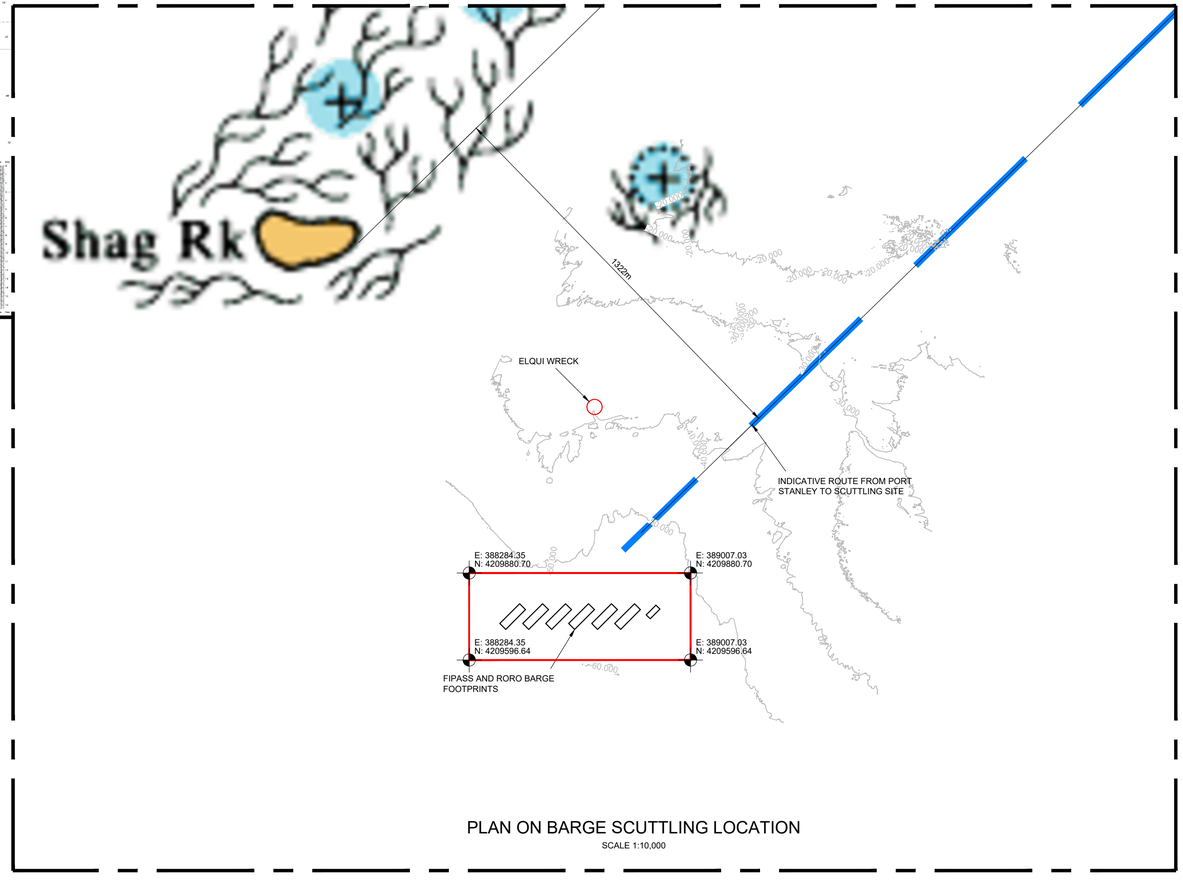


PLAN ON BARGE SCUTTLING LOCATION
SCALE 1:10,000



PLAN ON BARGE SCUTTLING LOCATION
SCALE 1:10,000

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES TO CHART DATUM (mCD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES RELATIVE TO WGS84 UTM ZONE 21S.

LEGEND

- ROUTE CORRIDOR TO SCUTTLING SITE
- SCUTTLING SITE LOCATION
- AREA FOR TEMPORARY BALLASTING OF BARGES TO THE SEABED FOR MANAGEMENT OF MARINE I.N.N.S.

REV	DATE	DESCRIPTION	BY	CHK	APP
P01	06.07.22	FOR APPROVAL	CH	DP	RCBP

REVISIONS

CLIENT

bam nuttall

PROJECT

NEW PORT FACILITY AT THE FALKLAND ISLANDS

TITLE

BARGE SCUTTLING LOCATION PLAN

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Enhancing Society Together

DRAWN	CHECKED	APPROVED
CH	DP	RCBP
DATE	SCALE	RHDHV DRAWING No.
30.06.22	AS SHOWN	

BAM DRAWING No.	SUITABILITY	REVISION
PB7829-RHD-ZZ-ZZ-DR-Z-5021	S4	P01

- FIPASS pontoons (10. No) – maximum dimensions of 16m x 14m x 10m per pontoon (to be secured to the north-central FIPASS barge for scuttling).

In addition, the proposed scheme will include scuttling four FIPASS mooring dolphins. The mooring dolphins consist of a number of steel elements (primarily tubular piles and connecting steel bracings) which are to be secured to a barge for scuttling.

Based on the dimensions of the infrastructure proposed to be scuttled, the area of seabed required to scuttle FIPASS is estimated at approximately 16,500m^2. This figure comprises the footprint of the barges and the gaps between the barges that has the potential to be impacted by anchors and chains. The proposed scuttling site (see **Drawing PB7829-RHD-ZZ-ZZ-DR-Z-5021**) was identified based on consultation with representatives from the Maritime Authority. The Maritime Authority confirmed that the site is outside of currently licensed fishing areas, is sufficiently deep to avoid risk to surface navigation and is of suitable seabed type. The area has previously been used for the scuttling of the fishing vessel *Elqui* in 2005 noting that this scuttle was at a shallower depth to the proposal and was scuttled by explosion, not a controlled sink.

A2.2 Preparatory works to FIPASS structures prior to towing and scuttling

The preparatory works described below would be undertaken for all FIPASS structures, unless stated otherwise. Preparatory works would be undertaken from the barges themselves while still berthed at the existing FIPASS moorings. Two of these barges would be used as working platforms for the new port facility development prior to removal and scuttling.

A2.2.1 Marine invasive non-native species

To support the scuttling assessment a survey by SAERI (Falklands) Ltd was conducted in late 2021, with further analysis testing undertaken in early 2022, to determine the presence of marine invasive non-native species (INNS) on the FIPASS structures.

The surveyed walls of the FIPASS barges are encrusted in a species-rich, dense assemblage of species which are typically found around the Stanley Harbour area (**Figure 2.1**). The invasive ascidian *Ciona intestinalis* was found on the surveyed sides of FIPASS barges where there is increased shading. They were also found in dense aggregations on the underside hull of the barges, with a patchy distribution ranging from a few individuals to complete surface coverage depending on location (**Figure 2.2**). Note that, for health and safety reasons, some areas under the barges could not be surveyed; however, it is assumed that the species composition as determined by the survey is representative of those parts of the FIPASS structures that could not be surveyed.

Of the 89 mussel samples which were recovered from FIPASS, 77 were found to be native; 11 individuals were classified as being non-native (*Mytilus edulis*). All of the non-native mussels were found within 1m of the waterline.

Given the known presence of marine INNS on parts of the structures and in the wider harbour area, it is necessary to use reasonable endeavours to minimise the risk of spreading marine INNS . Such measures are outlined in **Section A2.7.3**.

A2.2.2 Removal of materials with hazardous properties

Prior to the barges being scuttled, loose hazardous items present within the barges will be removed for appropriate disposal or moved by tenants to alternative locations. Engines and tanks will be drained of coolant, fuels and oils for re-use (if possible) or disposal. Following the removal of coolant, fuels and oils, the engines and tanks will either be fully cleaned or removed for disposal.

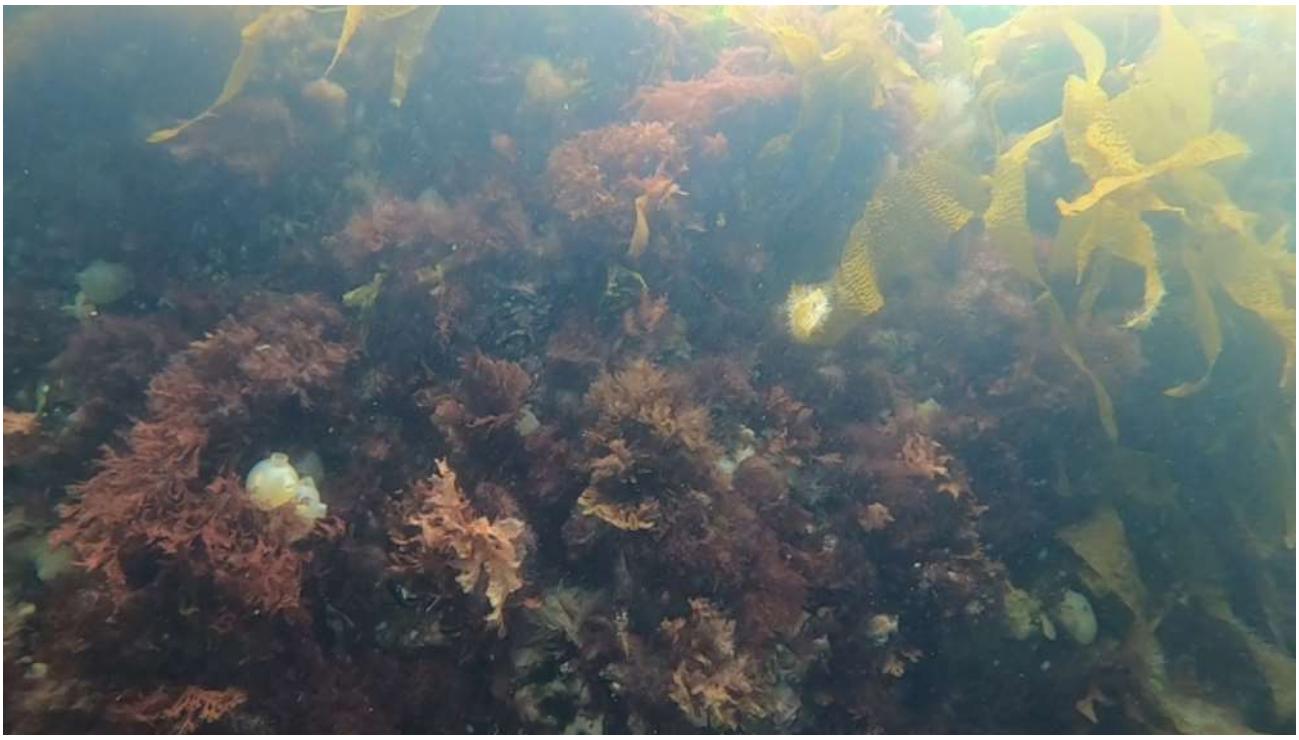

Figure 2.1 Typical assemblage on south face of southern barges

Figure 2.2 Underside of southern barges of FIPASS as seen from periphery dominated by *Ciona intestinalis* and at a lower abundance *Paramogula gregaria*

External painted sections assessed as hazardous due to the presence of TBT will be removed and returned to land for onward treatment / recycling.

Any friable asbestos not removed under controlled conditions in the soft strip will be sealed as a precautionary measure to prevent Health and Safety hazard to dismantlement staff during the scuttling operation. Intact and undisturbed asbestos materials will not be removed, given the depth and location of the scuttling site (as there is minimal risk of fibres washing up on shore).

A2.2.3 Soft-strip and removal of top structures on FIPASS barges

The soft-strip will include removal of electrical components, fittings, cables and any loose materials (such as insulation and boarding) that could float once scuttled. All redundant above-deck navigation equipment, life buoys, hydrants and wind socks will be removed, as well as below-deck mechanical and electrical equipment.

Top structures above deck level will be removed on the barges that are to be used as temporary working platforms prior to scuttling in order to create working space, and the dismantled steelwork from these barges will be secured on another barge for scuttling. The top structures on the other barges will remain intact for scuttling.

A2.2.4 Repairs to damage and corrosion of FIPASS barges

Where areas of damage or corrosion are present, repairs will be undertaken prior to tow commencement to ensure the barges are in a suitable condition for towing. Barges will be de-ballasted where necessary to facilitate these repairs.

A2.2.5 Temporary relocation of FIPASS barges and RoRo barge prior to scuttling

The barges will be retained at their existing locations for as long as practicable on the basis that this does not compromise access to the port / navigation within the harbour, or construction of the new port facilities. Prior to towing, the barges will be temporarily relocated to a zone either to the east of the existing FIPASS causeway or to the south of FIPASS and re-ballasted so that they sit within the seabed sediments. The purpose of this activity is to manage marine INNS on the base and lower sides of the barges.

A2.2.6 Installation of navigational lights and signals to FIPASS barges

Prior to the tow commencing, the barges would be fitted with temporary navigation lights. A battery powered floodlight would also be mounted above each embarkation point to illuminate the access ladder.

A2.2.7 Means of embarkation whilst at sea

Access to the deck of the barge would be required for personnel from a vessel positioned alongside. In order to allow such access onto the barges at sea, a boarding ladder door with ladder attachment points, a mooring bollard or cleat and a handhold for coming aboard would be fitted to each barge.

A2.2.8 Ballast tank sediment and ballast water

Prior to removal of ballast water from the FIPASS ballast tanks, a simple checking procedure will be put in place to verify the likely level of hazardous materials present within each of the tanks. This checking procedure will examine olfactory and visual evidence as well as prior chemical analysis and records of re-ballasting from the port operator. For the most contaminated tanks (currently assessed as 6 number), which includes those where the ballast water is classed as hazardous, water and sediment from the tanks would be removed and transported to separated geotubes located in a bunded and lined area adjacent to Stanley Harbour. The filtrate draining from the geotubes will be captured and passed through a hydrocarbon separator and treated as required prior to discharging back into the harbour. The ballast water in some of the remaining tanks (i.e. those which require de-ballasting prior to towing) will be de-ballasted into the sea as per existing FIPASS processes.

With the exception of the hazardous ballast water tanks referred to above, it is not feasible to remove the low volume of ballast tank sediment in all the other tanks due to health and safety risks (primarily the need to work within confined spaces to remove the materials as these works have significant hazards for the workforce).

A2.2.9 Water ballasting prior to towing

The barges are to be ballasted using water from Stanley Harbour prior to the tow to predefine the level of each barge in the water. Where possible water will be taken up out of the summer season to limit marine INNS seeding potential, noting that no ballast water controls are in place for any vessels within national waters.

A2.2.10 Placement of anchors at the scuttling site to moor the FIPASS and RoRo barges and causeway

In order to correctly position the structures for scuttling, two anchors for each barge will be placed on the seabed. The anchors will be deployed just prior to scuttling of each barge in order to limit the number of journeys required to the scuttling site.

A2.2.11 Preparation and lifting of causeway

The causeway to FIPASS is supported on five submerged pontoons, which are currently held to the seabed by the weight of ballast water within them. The causeway and connecting ramp would be removed first (by crane) and secured to a barge for scuttling. The pontoons would then be de-ballasted and cut in half transversely once floating, before the halves are lifted one at a time and secured onto the barge.

A2.3 Procedure for scuttling

A2.3.1 Towing route

The towing route is from Stanley Harbour to the scuttling site, a journey of approximately 55 nautical miles. Each return voyage is anticipated to take approximately 26 hours from departure at Stanley.

A2.3.2 Towing and support vessels

The main towing vessel is a tug, currently present in the Falkland Islands at Mare Harbour, which will require assistance from a smaller vessel (a support vessel, such as a multi-cat or similar). Additionally, crew required to prepare the barge for scuttling on site will be brought to the scuttling site via a crew transfer vessel from Mare Harbour, resulting in a total of three vessels for the towing and scuttling procedure.

A2.3.3 Requirements for main and emergency tow lines

The tow line will be a minimum of 650m in length. An emergency tow line (150m length) will be carried on the barges and would be deployed in the event of failure of the main tow line.

A2.3.4 Towing procedure

It is proposed that the initial tow out of Stanley Harbour and through the Narrows would be in a side-by-side arrangement. Once clear of the Narrows and any moored vessels, the tow will be let out to 100m until the tow reaches the outer part of Port William, at which point the tow will be let out to the full length of 650m.

On arrival at the scuttling site, the tow line will be brought in and the tug will position the barge to allow the support vessel to attach the anchors to the barge. Once the anchors are attached, the tug will recover the tow equipment and standby.

A2.3.5 Scuttling procedure once at the scuttling site

The barge scuttling process will be achieved by sinking the barge in a controlled manner to reduce the likelihood of sinking in a vertical orientation and to limit the impact on the sea bed and the marine environment.

Once secured via the anchors, the barge will be boarded by a team of four personnel that would perform the following tasks:

- Remove navigation equipment and flood lights, where accessible.
- Assist with disconnecting the tow lines.
- Check that the mechanical system for opening the valves (which need to be opened for the barge to flood and sink) is operational.
- Open and secure the cap of the vents.

On completion of the above tasks, boarding crew will return to the launch vessel before the valves will be opened, allowing the barge to flood. The launch vessel will retreat to a safe distance of at least 500m away from the barge. The barge would then begin to sink.

The position and orientation of each barge on the seabed will be confirmed on completion of the scuttling exercise, and the securing anchors and chains will be left in place.

A2.3.6 Weather limitations for towing and scuttling

Wave and weather conditions will be closely monitored to identify a suitable weather window to complete each tow and scuttle operation, with specific weather conditions required for at least 24 hours prior to the operation. Based on records, it is anticipated that there is likely to be only two weather windows per month to undertake the full tow and scuttle process. There are no weather restrictions for the return journey.

A2.4 Construction programme

A2.4.1 Indicative programme for preparatory works

Overall, preparatory works are predicted to take in the order of 180 days to complete; however, due to the phasing of the consented new port facility, it is likely that the preparatory works would be undertaken sporadically (rather than all at once) and would be linked to the progression of the new facility, anticipated to run from 2023 to 2025. Working hours would typically be undertaken six days per week (normally Monday to Saturday) in accordance with main planning consent and from 0700 to 1900hrs, although may be periodically extended with prior notice in accordance with the CEMP, if activities become critical path activities or weather windows are available to suit scuttling.

A2.4.2 Indicative programme for the scuttling operation

It is proposed that the barges are towed and scuttled one at a time, as opposed to all being towed to the scuttling site in one go; the reason being that towing more than one barge at a time would likely be too much weight for the tug. Additionally, towing more than one barge at a time has greater risk should any difficulties / issues be encountered during the tow. The exact timescales for scuttling activities is heavily dependent on suitable weather windows for health and safety reasons, however, the barges are proposed to be scuttled between 2023 and 2025.

A2.5 Management of construction waste

Non-recyclable rubbish generated from the construction area would be appropriately segregated and removed from site for incineration or landfill if incineration is not available. Lidded containers will be used of any food waste whilst on barges.

Waste generated as a result of the soft-strip process is to be disposed of through a combination of incineration if available on Island and deposition into existing landfill (unless it can be re-used).

The paintwork on FIPASS is known to contain very locally elevated concentrations of lead and TBT. The painted sections containing identified TBT from the survey will be assessed for lack of marine growth (i.e. TBT still active) and if clear of marine growth will be clearly marked as hazardous, removed by cutting them out and returned to land for onward treatment / recycling of steelwork. In areas containing lead paint, loose flaking paint/rust will be removed, but otherwise assets with lead paint will remain *in situ* as the main risk from lead paint is to the workforce when the material is disturbed.

A2.6 Use of barges as working platforms

As a result of the use of two of the barges as working platforms, the drilling of the sockets at the base of the tubular piles will now be undertaken using a rotary drilling rig from the SW barge rather than a pile top drilling rig. As per

the original approach, the arisings from drilling the bedrock in order to place the piles would be placed within the footprint of the new port facility. These will be placed behind the combi quay wall, forming part of the fill material. The amended approach will use the drill arisings from the overburden to fill the pile casings. Due to a lack of storage space, the drill arisings from the overburden of the first 6 piles (a total of approximately 71m^3) will need to be deposited in the harbour.

While this represents a minor change from the management of arisings described for the wider port facility development, there would be no material changes to the type, location, duration or frequency of piling activities.

A2.7 Embedded mitigation

The proposed scheme has been designed to minimise environmental impact as far as practicable. The following mitigation measures have been 'embedded' into the design for the proposed scheme.

A2.7.1 Measures to manage the risk of accidental spillages of oils, fuels and chemicals

The construction works will be undertaken in accordance with international guidance relating to pollution prevention and management.

In the unlikely event of a spill, appropriate pollution control kits and spill kits will be available. In addition, measures will be employed to minimise the risk of release of fuel, oils and lubricating fluids associated with the plant and equipment into the marine environment. Regular drills will be held to ensure employees are fully aware of spill procedures.

A2.7.2 Measures to minimise the risk of accidental sinking of FIPASS

The following measures have been built into the scheme design to minimise the risk of accidental scuttling:

- Extensive preparatory and repair works where necessary prior to towing.
- Pre-filling ballast tanks within the harbour to minimise the risk of instability during the tow.
- Ensuring a sufficient supply of fuel is available to power pumps to either remove water from any flooding tanks or pump water into pre-filled tanks in event of a leak.
- Installation of steel coaming around access hatches to minimise the risk of water entry.
- Identification of limits on wind speed and wave height to control climatic conditions during tow and scuttle.
- Use of a side-by-side tow during transit through the Narrows.
- During each tow, the tug crew would keep watch on marks painted on the bow of the FIPASS barge and, if a heel develops (i.e. the vessel is no longer upright), action would be taken.
- Inclusion of an emergency tow line.
- Identification of emergency refuge / shelter points along the tow route.

The above measures would also ensure that the risk of accidental loss of tow is as low as reasonably practicable.

A2.7.3 Biosecurity risk management

Literature suggests that, while non-native mussels are unlikely to survive at the scuttling site due to the depths involved, INNS such as *C. intestinalis* are capable at surviving at such depths. As such, the following represent key measures which will be implemented during the construction phase with respect to managing biosecurity risk:

- Non-native mussels on the structures will be removed in the 1m tidal range zone.
- The barges will be ballasted so that they sit on the bed of Stanley Harbour to crush any invasive species (e.g. *C. intestinalis*) on the base of the structures and expose them to anoxic (i.e. oxygen deficient) conditions. Initially this will be for a 7-day period, though may be adjusted based on success.
- Ballasting of the FIPASS barges inside Stanley Harbour would occur during winter months where possible, to avoid the spawning period for marine organisms. Ballasting outside of the Harbour is not possible for safety reasons.

- All deliveries of plant, machinery and equipment would be shipped using agents familiar with deliveries to the Falkland Islands.
- The holds of vessels to be used to transport construction equipment would be appropriately cleaned prior to loading.
- Atlink's existing Standard Operating Procedure (SOP) (Rodent Control) will be adopted with specific measures adopted by the contractor (e.g. rat guards will be used on mooring lines and use of baited boxes, lidded refuse containers).

A2.7.4 Measures to minimise impact to subtidal habitats and benthic communities at the scuttling site

The scuttling location has been selected following completion of a benthic survey in 2022 that covered a 2km x 2km area of seabed. The survey identified that bedrock habitats within 30-40m depth of water had the highest biodiversity (in terms of number of species) in the surveyed area. By contrast, sandy habitats in the deeper parts of the survey site (greater than 50m depth) were found to be of very low biodiversity. As a result, the proposed scheme has been designed so that FIPASS structures are scuttled on sandy substrate in deeper waters (greater than 55m), specifically avoiding the more sensitive rock habitats.

A3.0 Description of the post-scuttling phase

During the post-scuttling phase, the scuttled FIPASS infrastructure is predicted to remain on the seabed at the scuttling site to naturally corrode and erode into the seabed. No further works would be undertaken once scuttling is complete.

A4.0 Consideration of alternatives

A4.1 Alternative approaches to disposal of FIPASS

Planning permission for the new port facility was granted in January 2022 (reference 04.22.P), which includes the removal and dismantling of FIPASS on the foreshore (involving the construction of a temporary slipway). Assuming planning permission is granted for the scuttling option, there will be two viable options that could be progressed to dispose of FIPASS. An evaluation of the relative environmental effects of the two options is set out in the EIS, which concludes that the scuttling option is the preferred option.

A4.2 Alternative approaches to management of marine INNS

The following alternatives approaches have been considered for the management of marine INNS:

- Lift FIPASS onto the shore (out of the water) and physically remove the invasive species (using a jet wash or similar) and collect for subsequent disposal prior to structures being returned to the harbour.
- Detach the invasive species in situ using divers, with marine INNS remaining within the marine environment of Stanley Harbour.
- Temporarily relocate the barges into deeper water within Stanley Harbour and detach the invasive species using divers.
- Use of high pressure water (working from a pontoon) with the barges de-ballasted in situ to physically remove some of the invasive species from FIPASS, allowing them to fall onto the seabed.

The proposed approach (i.e. to locally remove non-native mussels by working off barges and then temporarily sink barges to the seabed, leading to mortality of remaining marine INNS) was considered to be the preferred approach when the Health and Safety of the construction team actioning the work was fully considered. This approach was recommended by SAERI Falklands Ltd. (SFL) based on expert judgement and understanding.

A4.3 Alternatives options for management of ballast tank sediment

Consideration has been given to the cleaning the ballast tank sediment from each tank prior to scuttling. The health and safety risks associated with the cleaning the tanks are considered so significant (i.e. risk to life for the staff involved) that this approach was not given further detailed consideration.

The key health and safety risks comprise:

- Confined space working, requiring additional oxygen forced into the spaces whilst cleaning
- A requirement to cut additional hatches in the decks for emergency retrieval of the workforce from each and every tank in case of inadequate oxygen or a failure of the compressed air line, resulting in a possible explosive risk that could endanger life due to the likelihood of high levels of pyrophoric iron sulphide being present in the tanks.

A5.0 Overarching policy framework and legislation

The policy framework relevant to the proposed scheme is provided by the following:

- Falkland Islands Development Plan.
- The Islands Plan 2022-2026.
- State of the Environment 2020.
- Falkland Islands Environment Strategy.
- Biosecurity and Invasives Strategy.

The requirement for EIA arises from the Planning Ordinance 1991 and the Planning (EIA) Regulations 2015. Other legislation applicable to the proposed scheme and considered in the EIS includes:

- Maritime Ordinance 2017.
- Harbours and Ports Ordinance 2017.
- Marine Mammals Ordinance 1992.
- Conservation of Wildlife and Nature Ordinance 1999.
- Fisheries (Conservation and Management) Ordinance 2005.
- Merchant Shipping (Registration of Ships) Regulations 2001.
- The Protection of Wrecks Ordinance 1977.
- The Harbour Regulations 1944.
- The Merchant Shipping Act 1894.

A6.0 EIA methodology

A6.1 EIA scoping

As discussed and agreed with F.I.G., a number of topics have been scoped out, either because there is no means by which an impact could occur given the location of the works within the marine environment (i.e. terrestrial topics), and / or because the impacts arising from the proposed scheme are already assessed within the EIS submitted for the new port facility and remain unchanged for the proposed scuttling.

However, the following topics have been assessed in the EIS:

- Coastal processes.
- Marine water and sediment quality.
- Marine ecology.
- Marine mammals.

- Navigation.
- Greenhouse gas emissions.
- Vulnerability to major accidents and disasters.

A6.2 Defining the baseline environment

A wide range of information has been gathered to define the baseline environment for topics scoped into assessment, comprising the following:

- Desk-based review of existing published data.
- Data provided by stakeholders.
- Field survey and site investigation information.

A6.3 Impact identification and assessment

The impact assessment process considers the following aspects when determining the significance of a potential impact due to the various effects (or changes) arising from the proposed scheme:

- Magnitude of effect.
- Sensitivity of a receptor.
- Probability that an effect-receptor interaction would occur.
- Determination of the level of impact on a receptor, considering the probability that the effect-receptor interaction would occur, the spatial and temporal extents of the interaction and the significance of the resulting impact.

The significance of an impact is determined by combining the predicted magnitude of the effect with the sensitivity of the receptor.

In the context of an EIA, ‘significant impacts’ are taken to be those of moderate or major significance; albeit that appropriate and proportionate mitigation, where available, should be sought for all impacts.

A6.4 Mitigation and residual impact

Mitigation through design (embedded mitigation) is an important concept in ensuring that the environmental impacts of a proposed scheme are minimised. Through the development of the design of the proposed scheme, mitigation has been built into the design.

Where significant impacts potentially remain, further mitigation measures are defined where available and feasible. Where further mitigation measures are identified, the significance of the residual environmental impact (i.e. the post-mitigation impact) is assessed.

A6.5 Cumulative impact assessment

The EIA has given due consideration to the potential for different residual impacts to have a combined impact on key sensitive receptors. The objective is to identify where the accumulation of impacts on a single receptor, and the relationship between those impacts, potentially gives rise to a need for additional mitigation.

The EIA also considers the potential for cumulative effects with the wider port facility development, where there is potential for temporal or spatial overlap.

A7.0 Summary of predicted environmental impacts

A7.1 Coastal processes

The assessment of coastal processes was informed by a desk-based review of existing information, analysis of newly collected survey data and expert geomorphological assessment. The bathymetry of the area, local oceanographic conditions (winds, waves, tidal levels and tidal currents), predicted sea level rise and local conditions in terms of sediment composition and seabed formation have all been considered.

As the baseline currents in Stanley Harbour are very low, preparatory works on the barges would not result in anything more than a highly localised effect on coastal processes. Prior to temporary relocation of the FIPASS barges during the preparatory works, the FIPASS barges will be de-ballasted to undertake works to the sides of the barges in preparation for scuttling. The de-ballasting will also avoid the barges grounding as they are towed into shallower water before they reach the temporary relocation area and, therefore, there would be no risk of significant disturbance to sediment in the harbour.

There would be localised, temporary disturbance of sand during the processes of installing anchors and scuttling FIPASS structures. However, this effect would cause only insignificant impact in terms of changes to sediment transport and seabed levels.

During the post-scuttling phase (i.e. following the scuttling), there would be highly localised changes to tidal currents as they pass around the structures. Such changes would be so small in magnitude and so localised in extent that there would be no far-reaching or significant impacts.

Due to the depth at which FIPASS structures would be scuttled, there would be no effect on wave patterns. As there would be no significant effects to tidal or wave conditions, there would be no consequent effects on the movement of sediment.

Some localised scour (i.e. removal of sand) would be expected to develop in the immediate areas around the scuttled structures. However, the quantities of sand released by this process would be small in magnitude and localised in extent, so there would be no significant change to seabed sediment conditions.

If sediment is released from the barge ballast tanks as they slowly break up over time, it would be mobilised in the water column and transported via tidal currents. However, the total quantity of sediment in the ballast tanks is small (1,080m^3 for all six FIPASS barges and the one RoRo barge) and it is highly unlikely that multiple barges and individual tanks within the barges would break-up simultaneously. The wide dispersion of such a small quantity of sediment would not represent a significant change in sediment transport processes.

A7.2 Marine water and sediment quality

The assessment of potential impacts associated with marine water and sediment quality has been undertaken with reference to publicly available water quality data and the results of targeted sediment quality sampling and analysis from Stanley Harbour and survey data from within the FIPASS ballast tanks.

During the construction phase, potential impacts would relate to the disturbance of sediment within Stanley Harbour due to re-ballasting on the seabed, the proposed use of some of the barges as working platforms and placement of arisings from drilling the piles (a total of approximately 71m^3) and at the scuttling site due to the deployment of anchors and the process of scuttling FIPASS structures. Resuspension of seabed sediments from these activities would be highly localised and short term, and seabed sediments present at these locations do not contain elevated contaminant concentrations. Consequently, such impacts would be of minor adverse significance.

During the post-scuttling phase, the realistic worst-case scenario is that the FIPASS barge structures would begin to break down over a long time period and the ballast tanks would become compromised. This would result in periodic release of small volumes of sediments present in the ballast tanks and dispersal within tidal currents. The contaminant concentrations within the ballast tanks are, in some cases, high and would therefore cause temporary

reductions in water quality within the area of dispersal. However, such reductions would be short-term due to rapid dispersion and small quantities in each release.

Where sediment released from the tanks resettles on the seabed, some sediment-bound contaminants would persist over a long period of time. Hence, there may be a long-term effect on sediment quality within the zone of influence of the dispersion of ballast tank sediment, but this receptor is not of high importance or rarity in its own right in the wider context of the Falkland Islands. The potential impact is assessed as minor adverse significance as defined in section A5 above.

A7.3 Marine ecology

The assessment of potential impacts to marine ecology has been informed by a benthic survey of the scuttling site, which used drop-down camera images to identify the marine organisms typical of the site. This included a survey of the existing exploded wreck, *Elqui*, to understand what may be expected in terms of future colonisation of the FIPASS structures. An invasive species survey was also undertaken of the FIPASS structures themselves, to identify the risks of further spread.

During the construction phase, potential risks to marine benthic organisms would relate to smothering / crushing of communities during both the re-ballasting (in Stanley Harbour) and the scuttling (at the scuttling site). At the site of the re-ballasting, seabed communities are low diversity and typical of other areas within the harbour. Recolonisation of the re-ballasting site could occur immediately following this activity.

At the scuttling site, embedded mitigation has specifically targeted areas of coarse sand habitat where there is low biodiversity (compared to richer habitat types nearby) and is typical of sand habitat across a much wider area. Consequently, any adverse impacts would be of negligible to minor significance, as defined in Section A5.

In the longer term, the scuttled FIPASS structures are likely to be colonised in a similar manner to the *Elqui*. The presence of these hard structures on the sandy seabed may promote added diversity at the site via colonisation from nearby habitats. The colonising communities, similar to the *Elqui*, are expected to represent a subset of the communities present on the shallower hard bedrock / boulder / cobble areas in proximity to the scuttling site, hence there may be a minor beneficial impact.

Potential reductions in sediment quality may occur in a localised area of seabed around the scuttling site where small quantities of contaminated sediment is released, dispersed and ultimately resettles following eventual breakdown of the FIPASS ballast tanks. Contaminated sediment has the potential to cause harmful or fatal effects to benthic organisms if concentrations are suitably high; however, the scuttling site was selected for its low diversity and its similarity to habitat in the wider area. The impact on local marine communities is predicted to be of moderate adverse significance.

A7.4 Marine mammals

Baseline information on marine mammal activity in the study area has been drawn from a number of data sources, including recent sea lion censuses and surveys for fur seals, sei whales and other marine mammals species.

During the construction phase, the assessment has focused on the potential for disturbance or collision, namely the risk of such impacts occurring during towing activity. However, given the slow speed of all vessels involved, the low number of vessels involved and the periodic nature of the tow activity, the significance of any such impacts would be negligible. Regardless, the *Cetacean code of conduct for the Falkland Islands*, which provides guidance to minimise impacts on marine mammals, would be adhered to by all construction phase vessels.

Potential impacts on seal haul-out sites would be negligible given that the known haul-out locations are all a considerable distance from the tow route.

The presence of the scuttled structures on the seabed during the post-scuttling phase would not have any significant direct effects on marine mammals. However, should the structures act as a source of fish aggregation, as often occurs around wrecks, this may be of minor benefit to foraging marine mammals.

A7.5 Navigation

The preparatory works to scuttle FIPASS are to be undertaken predominantly using land-based plant. However, two of the FIPASS barges are proposed for use as working platforms. During parts of the construction phase, this will result in some temporary reduction in berth capacity and increased complexity of approach at FIPASS, varying in magnitude depending on the positions of the working platforms relative to FIPASS. The impact of the use of the barges as working platforms is assessed to be of minor adverse significance.

During Phase 2, the pontoons used by Sulivan Shipping would be relocated from FIPASS to the eastern side of the new causeway forming part of the new port facility. The minimum required clearance between the working platforms and the residual FIPASS barges for safe navigation access for Sulivan Shipping is maintained.

F.I.G. has reviewed the impact to operations at FIPASS and has now confirmed that it will provide a tug for operational berthing use for the periods of compromised berthing (i.e. relative to the existing situation).

The area of Stanley Harbour identified for temporary storage of FIPASS structures prior to towing have been agreed with the Harbour Master on the basis that there would be no impediment to navigation. Towing operations would be coordinated via the Harbour Master and appropriate measures, such as Notices to Mariners, would be put into place. The risk of accidental sinking of the FIPASS structures on route to the scuttling site would be minimised through the embedded mitigation set into the proposed scheme.

As the scuttling site is at a depth of more than 55m and within an area unused for fishing purposes, there is no risk of adverse impacts on navigation during the post-scuttling phase.

A7.6 Greenhouse gas assessment

Greenhouse gas emissions have been calculated from the predicted consumption of fuel and electricity from on-site plant and equipment during the construction phase.

The largest source of emissions is anticipated to be from marine vessels moving to and from the scuttling site, although this figure is approximately 0.4% of the total annual greenhouse gas emissions in the Falkland Islands, Consequently, emissions generated during the construction phase would not be significant.

Following completion of the scuttling, there would be no further potential for greenhouse gas emissions to occur.

A7.7 Vulnerability to major accidents and disasters

The proposed scheme is not considered a type of project that is particularly vulnerable to major accidents or disasters which could lead to significant adverse environmental impacts. However, during scoping consultation with F.I.G. in February 2022, it was requested that consideration is given to potential accidents and disasters associated with the scuttling activity at a more local level (e.g. accidental sinking of the barges on route to the scuttling site, for example). Such impacts have been incorporated into the relevant sections summarised above.

A7.8 Cumulative impact assessment

The proposed scuttling of FIPASS forms part of the same overall project (i.e. construction of the new port facility) and represents an alternative approach to that which is already consented under planning permission reference 04.22.P. Should the proposed scuttling approach be granted planning permission and be progressed as part of the construction phase for the new port facility, the potential environmental impacts of the works consented under planning permission 04.22.P would differ from those assessed in the EIS that supported the application for the new port facility, because it would no longer be necessary to dismantle the barges on the foreshore.

The potential for cumulative impact between the new port facility and the proposed scuttling has been assessed for all topics originally assessed in the EIS for the new port facility. The assessment concludes that there is no potential for significant cumulative impact, either because the two proposals would not both have the potential to affect a particular receptor or because there is no potential for additive or synergistic impacts to occur between the new port facility and scuttling on the same area or receptor.

A8.0 Conclusion

Wherever possible, control and mitigation measures have been embedded into the design of the proposed scheme in order to minimise the potential for significant environmental impacts. Typically, residual potential impacts are assessed as being of minor adverse significance as worst, with an impact of moderate adverse predicted due to the potential impact of scuttling on the benthic marine community at the scuttling site (during the post-scuttling phase).

The potential minor adverse impact due to the use of FIPASS barges as working platforms is to be mitigated by the use of a tug for operational berthing use during the periods of compromised berthing.