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18 February 2019

Environmental Protection Authority (EPA)
Locked Bag 33,
Cloister Square
PERTH WA 6850

Attention: Executive Director

Copy to: Department of the Environment and Energy (DoEE)

Dear Sir

Re: Request for Change to Proposal – Learmonth Bundle Site Project (Assessment Number 2136 / EPBC 2017-8079)

Further to recent discussions with the Environmental Protection Authority, please find attached a request to vary the Learmonth Bundle Site Project (the Proposal) under Section 43A of the Western Australian *Environmental Protection Act 1986* (EP Act).

1. INTRODUCTION

This letter seeks to formally request consent from the EPA to amend the proposal for the Learmonth Bundle Site Project (the Proposal), including proposal title, and to provide the information required to support the requested change to the Proposal. A separate process is required to vary the Proposal under Section 156A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The changes to the Proposal are principally in response to stakeholder feedback. Significant additional engineering studies have been completed to support a reduction in impact, or risk of impact, to benthic communities and habitat (BCH) at Heron Point and in the Ningaloo Marine Park. These studies have led to further development of the Bundle launch and tow operations and the associated Offshore Operations Area. Minor changes to the onshore Development Envelope have also been made following confirmation of the location of groundwater bores which will provide the Proposal's water requirements, and to allow for flexibility in the access road alignment to meet Main Roads WA requirements.

1.1 STATE ASSESSMENT PROCESS

The Proposal was referred to the EPA under Section 38 of the EP Act on 23 October 2017. On 20 November 2017, the EPA determined the project required formal assessment with the level of assessment set as Public Environmental Review (PER), with an eight week public review period.

As outlined within the Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016 (EPA 2016a), the EPA may consent to the proponent making changes to a proposal without a revised

proposal being referred to the EPA. The EPA may only consent to a change to a proposal if the change is unlikely to significantly increase any impact that the proposal may have on the environment.

The Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual (EPA 2016b) states that the proponent must seek the EPA's consent, and provide the EPA with the following:

- Details of the proposed change.
- Statement of the significance of the change.
- Rationale for the change.

This information is presented in Section 2.

1.2 COMMONWEALTH ASSESSMENT PROCESS

The Proposal was referred to the Department of the Environment and Energy (DoEE) under the EPBC Act on 18 October 2017. On 24 February 2018 the Proposal was deemed a Controlled Action, with assessment by "accredited assessment" under the EP Act required, for the following controlling provisions (or relevant Matters of National Environmental Significance [MNES]):

- World Heritage Properties (Sections 12 & 15A).
- National Heritage Places (Sections 15B & 15C).
- Listed Threatened species and communities (Sections 18 & 18A).
- Listed Migratory Species (Sections 20 & 20A).
- Commonwealth Marine Areas (Sections 23 & 24A).

The EPBC Act states that '*The Minister must not decide to accept the varied proposal unless the Minister is satisfied that the character of the varied proposal is substantially the same as the character of the original proposal*' and '*In considering……whether or not the character of the varied proposal is substantially the same as the character of the original proposal, the Minister must have regard to the change (if any) in:*

a) *the nature of the activities proposed to be carried out in taking the action; and*

b) *the nature and extent of the impacts (if any) the action:*

   – *has or will have; or*

   – *is likely to have;*

on the matter protected by each provision of Part 3.'

Clause 5.08 of the Environment Protection and Biodiversity Conservation Regulations 2000 (Compilation 21) stipulates that '*a request under subsection 156A(1) of the Act must contain the following information:*

a) *details of the proposed variation to the action;*

b) *the reasons for the proposed variation;*

c) *how the impacts of the proposed variation on matters of national environmental significance compare with those of the original proposal;*

d) *if applicable, the impacts of the proposed variation on matters of national environmental significance not considered in the referral or assessment of the original proposal; and*

e) *if applicable, alternatives, mitigation measures and offsets to compensate for additional impacts on matters of national environmental significance*.'

This information is presented in Section 2 and Section 4.

2. ORIGINAL PROPOSAL AND PROPOSED CHANGES

Subsea 7 proposes to build and operate a new pipeline bundle fabrication site in Western Australia to offer this technology as an alternative to conventionally installed offshore pipelines. Heron Point near Learmonth (Exmouth) was chosen as the site for the construction and operation of the proposed pipeline bundle fabrication facility (the Proposal).

Bundle pipelines would be progressively manufactured until completed as one, up to 10 km long, segment and moved out from the manufacturing facility along the track. Once manufactured to its desired length and pressure tested, each Bundle pipeline will be towed out by boat and submerged on arrival at the offshore gas field.

The original Key Characteristics of the Proposal as outlined in the Environmental Scoping Document (ESD), and those of the amended Proposal, are provided in Table 1. The following sections provide further details on each change, with the potential impacts of the original and / or amended Proposal discussed, when necessary, to support the assessment of the impacts of the proposed changes.

Table 1: Proposal Key Characteristics (Original and Proposed)

Summary of Original Proposal (from ESD)		Proposed Changes	Change to Environmental Impact
Proposal Title	Learmonth Bundle Site	**Learmonth Pipeline Fabrication Facility**	No change
Proponent Name	Subsea 7 Australia Contracting (Subsea 7)	No change	No change
Short Description	The proposal is to construct and operate an onshore pipeline fabrication facility at Lots 233 and 1586 to the east of Minilya-Exmouth Road, Learmonth, approximately 35 km south of the Exmouth town site. The onshore pipeline bundle fabrication site and associated infrastructure includes two bundle tracks (approximately 10 km in length) along which the bundles will be constructed and launched from a bundle launch way which crosses the beach and extends into the subtidal zone at Heron Point in the Exmouth Gulf. Once launched the bundles will be towed along a pre-determined route between two tugs at a controlled depth to the Bundle laydown area within which tow reconfiguration may occur before continuing offshore.	The proposal is to construct and operate an onshore pipeline fabrication facility at Lots 233 and 1586 to the east of Minilya-Exmouth Road, Learmonth, approximately 35 km south of the Exmouth town site. The onshore pipeline bundle fabrication site and associated infrastructure includes two bundle tracks (approximately 10 km in length) along which the bundles will be constructed and launched from a bundle launch way which crosses the beach and extends into the subtidal zone at Heron Point in the Exmouth Gulf. Once launched the bundles will be towed along a pre-determined route between two tugs at a controlled depth to the **Bundle parking area** within which tow reconfiguration may occur before continuing offshore.	No change

Physical Elements						
Original Proposal (from ESD)			**Proposed Changes**			**Change to Environmental Impact**
Element	**Location**	**Proposed Extent**	**Element**	**Location**	**Proposed Extent**	
Bundle fabrication facility and associated infrastructure including: • Fabrication site (up to 8 ha) includes: site offices, staff facilities, messing facilities, storage area and car park. • Two Bundle Tracks (up to 35 ha). • Launchway facilities area (up to 1 ha). • Access roads (up to 3.5 ha). • Spray field (up to 1.5 ha). • Drainage sump (up to 0.5 ha). • Hydro testing water pond (up to 0.5 ha). • Drains, access tracks, earthworks areas (up to 120 ha). • Reverse Osmosis Plant.	Within the onshore area of the Development Envelope	Clearing and disturbance of up to 170 ha of vegetation within a 502 ha Development Envelope	**Bundle fabrication facility and associated infrastructure** including: • Fabrication site (up to 8 ha) includes: site offices, staff facilities, messing facilities, storage area and car park. • Two Bundle Tracks (up to 35 ha). • Launchway facilities area (up to 1 ha). • Access roads (up to **6.9** ha). • Spray field (up to 1.5 ha). • Drainage sump (up to 0.5 ha). • Hydro testing water pond (up to 0.5 ha). • Drains, access tracks, earthworks areas (up to 120 ha). • **Groundwater production bores and supply pipeline (up to 2.6 ha).** • Reverse Osmosis Plant.	Within the onshore area of the Development Envelope	Clearing and disturbance of up to **177** ha of vegetation within a **470** ha Development Envelope	Negligible change in impacts to flora and vegetation.

Physical Elements						
Original Proposal (from ESD)			**Proposed Changes**			**Change to Environmental Impact**
Element	**Location**	**Proposed Extent**	**Element**	**Location**	**Proposed Extent**	
Bundle Launchway	Within the intertidal /subtidal area of the Development Envelope	Up to 380 m long (measured from dune line) by 15 m wide. Disturbance of up to 7.5 ha within a 502 ha Development Envelope	**Bundle Launchway**	Within the intertidal /subtidal area of the Development Envelope	Up to 380 m long (measured from dune line) by 15 m wide. Disturbance of up to 7.5 ha within a **470** ha Development Envelope	No change
Bundle Laydown Area	Within the laydown area Development Envelope	Up to 1 ha of seabed disturbance within a 2,407-ha Development Envelope	**Bundle Parking Area**	Within the Offshore Operations Area	Up to **371** ha of seabed disturbance within a **2,426** ha Development Envelope	Change maintains no impact to mangrove, seagrass or coral habitat. Negligible change to BCH impacts.
Bundle Tow Route	Within the Exmouth Gulf and Ningaloo Marine Park Ningaloo Coast World Heritage	No ground or seabed disturbance to the extent of State Waters approximately 70 km	**Offshore Operations Area (Off bottom tow)**	Within the Exmouth Gulf	Up to **1,464** ha of seabed disturbance (per Bundle launch)	Change maintains no impact to mangrove, seagrass or coral habitat.

Physical Elements						
Original Proposal (from ESD)			**Proposed Changes**			**Change to Environmental Impact**
Element	**Location**	**Proposed Extent**	**Element**	**Location**	**Proposed Extent**	
	Property/ Ningaloo Coast World Heritage Place		**Offshore Operations Area (Surface tow)**	Within the Exmouth Gulf and Ningaloo Marine Park, Ningaloo Coast World Heritage Property/ Ningaloo Coast World Heritage Place	No ground or seabed disturbance to the extent of State Waters	Reduction in risk of impact to BCH within Ningaloo Marine Park.

Operational Elements						
Original Proposal (from ESD)			**Proposed Changes**			**Change to Environmental Impact**
Element	**Location**	**Proposed Extent**	**Element**	**Location**	**Proposed Extent**	
Power Generation	Within the onshore area of the Development Envelope	4 x 850 kVA diesel generators 645 kW solar array	**Power Generation**	No change	No change	No change
Groundwater abstraction	Learmonth (onshore)	Abstraction of up to 16 ML/annum for potable and hydrotest water	**Groundwater abstraction**	No change	No change	No change

Operational Elements						
Original Proposal (from ESD)			**Proposed Changes**			**Change to Environmental Impact**
Element	**Location**	**Proposed Extent**	**Element**	**Location**	**Proposed Extent**	
Discharge via sprayfield, re-injection, infiltration/irrigation or evaporation pond	Within the onshore area of the Development Envelope	6.2 ML/annum of brine discharge 5.6 ML/annum of treated wastewater discharge	**Discharge via sprayfield, re-injection, infiltration/irrigation or evaporation pond**	No change	No change	No change
Bundle launch and tow	Within the Exmouth Gulf and Ningaloo Marine Park/ Ningaloo Coast World Heritage Property/Ningaloo Coast World Heritage Place	Nominally two days of offshore activity per launch, maximum of three launches per annum	**Bundle launch and tow**	No change	No change	Reduction in direct impacts to 'Reef with macroalgae and filter feeders' habitat by 10.2 ha.
Bundle tow	Within the laydown area Development Envelope	Bundle laydown (neutral buoyancy) within which temporary (≤ 24 hours) tow re-configuration may occur	**Bundle tow**	Within the Offshore Operations Area (Parking area)	No change	No change

2.1 PROPOSAL TITLE

Subsea 7 proposes to amend the Proposal title from the 'Learmonth Bundle Site' to the 'Learmonth Pipeline Fabrication Facility'.

The proposed change aims to remove ambiguity as "Bundle" technology is a bespoke technology developed by Subsea 7. A Bundle is essentially a pipeline, and this term is more widely understood. The proposed title more accurately reflects the key activity to be undertaken at the site (i.e. pipeline fabrication).

2.2 BUNDLE FABRICATION FACILITY AND ASSOCIATED INFRASTRUCTURE

The original Development Envelope included an approximately 750 m long interface with the existing Minilya-Exmouth Road to allow for flexibility in the final alignment of the site access road. Advice was received from Main Roads WA (MRWA) in July 2018 that, for safety reasons, the site access road should join the Minilya-Exmouth Road at a slightly different location (either slightly to the north or slightly to the south) due to the bend in the road. In liaison with MRWA, the Development Envelope has been slightly extended to the north (further from the bend and beyond the slight dip in the road associated with the creekline) and to the south (further from the bend) to ensure that the Development Envelope allows for a safe alignment of the site access road (Figure 1).

The final alignment of the site access road will be determined following the completion of heritage surveys and detailed road engineering. The infrastructure footprint has been amended to reflect the worst-case (longest) access road alignment (the actual design will reduce the infrastructure footprint and associated vegetation clearing as much as possible).

2.3 GROUNDWATER PRODUCTION BORES AND SUPPLY PIPELINE

The Section 38 Referral Supporting Document (360 Environmental 2017a) stated that "It is currently proposed that a small number (nominally 3) of production bores will be drilled and commissioned at a location to the north west of the Project envelope" (Page 12).

Following the drilling and testing of a number of bores (required to support the subterranean fauna sampling program required under the ESD (EPA 2018)), the location of the proposed production bores has now been confirmed. For completeness of the proposal description and Development Envelope, Subsea 7 proposes to include these bores, and associated water supply pipeline, within the Development Envelope (Figure 1). The bores were previously not included within the 'physical elements' section of the key characteristics table presented in the ESD, though the proposed groundwater abstraction was defined within the 'operational elements' section (EPA 2018).

2.4 OFFSHORE OPERATIONS AREA

2.4.1 Tow Route

The original Proposal defined a Bundle tow route (Figure 3). Following the capture of additional metocean (wave and current) data within Exmouth Gulf, and the detailed engineering of Bundle launch scenarios, the tow route has been slightly modified. In addition, to provide clarity regarding the tow route and allowing for minor changes in the exact tow path (which may occur under varying wind and tidal conditions), an Offshore Operations Area has been defined (Figure 3). This is the maximum area (or envelope) within which launch and tow operations will occur.

2.4.2 Offshore Operations Area (Off bottom tow)

The original Development Envelope included a 2,275 m by 250 m section surrounding and extending offshore from the launchway (Figure 3). This was developed to take account of potential impacts associated with the construction of the launchway, and impacts associated with the launch of Bundles, including the skidding of the

Bundle towheads along the seabed until buoyancy is achieved (nominated as at a distance of 1,220 m from the end of the launchway and 1,500 m from the beach).

Since the referral, Subsea 7 has performed extensive launch and tow engineering studies to consider the feedback received through stakeholder engagement and to continue the research required ahead of site development. Some key aims of the engineering included:

- Investigation of opportunities to increase buoyancy of the Bundle towheads and therefore reduce / eliminate seabed interaction.
- Modelling of vessel operations within Exmouth Gulf during a Bundle launch and tow.
- Use of site specific current data obtained since the referral to model in detail the tow path of Bundles, under different oceanographic conditions, during launch and tow.

The fundamental objective was to develop a robust Bundle launch and tow methodology, building on the knowledge obtained from 40 years of operations in the North Sea, but adapted to suit the very specific conditions in the Exmouth Gulf. As a result of this engineering, the width of the Offshore Operations Area (equivalent to the Section 38 Original Development Envelope) in the launchway area has been reduced (Figure 3) and the length of seabed along which the Bundle towheads will skid has been reduced.

Following the additional Bundle launch and tow engineering work it has been determined that some of the ballast chains which hang below the Bundle, forming a component of the Controlled Depth Tow Method (CDTM), will be in contact with the seabed out to the Bundle parking area.

The ballast chains that hang beneath the Bundle vary between short and long lengths, typically alternating in a short-long-short-long configuration. The typical chain size used is 76 mm (diameter) chain. Short lengths are typically 10-12 links (3-4 m) and long chain lengths are typically 18-20 links (5-6 m). The long chain lengths are typically spaced at 20 m intervals along the Bundle.

The chains become even more important as the buoyancy of the Bundle towheads is increased (to facilitate the early floatation of the towheads and a reduction in seabed interaction within the nearshore filter feeder habitat adjacent to Heron Point) as they provide critical latitudinal control (to resist alongshore tidal currents) to the Bundle during launch.

The longer Bundle chain lengths will have some contact (4-5 links touching the seabed) along the length of the tow route, from the end of the Bundle launchway out to the Bundle parking area. To cover this seabed disturbance an Offshore Operations Area (Off bottom tow) has been defined (Figure 3). This area represents an envelope within which any and all disturbance associated with Bundle launches, over the life of the facility, may occur. A 'realistic worst case' disturbance footprint associated with a Bundle launch is 1,464 ha.

2.4.3 Bundle Laydown Area (now termed the Bundle Parking Area)

The original Proposal defined an offshore 'Bundle laydown area' of 2,407 ha (Figure 3). The location and alignment of the Bundle laydown area (now termed the Bundle parking area) has been slightly modified to align with the revised tow route. The area of the Bundle parking area is 2,426 ha.

2.4.4 Offshore Operations Area (Surface tow)

Within the Section 38 Referral Supporting Document (360 Environmental 2017a), the Bundle tow, on leaving the Bundle laydown area, was described as occurring in mid-water (Plate 1). Following receipt of comments from stakeholders, it became clear that there was some concern around the potential for the Bundle towheads, or chains, to make contact with the seabed within the Ningaloo Marine Park.

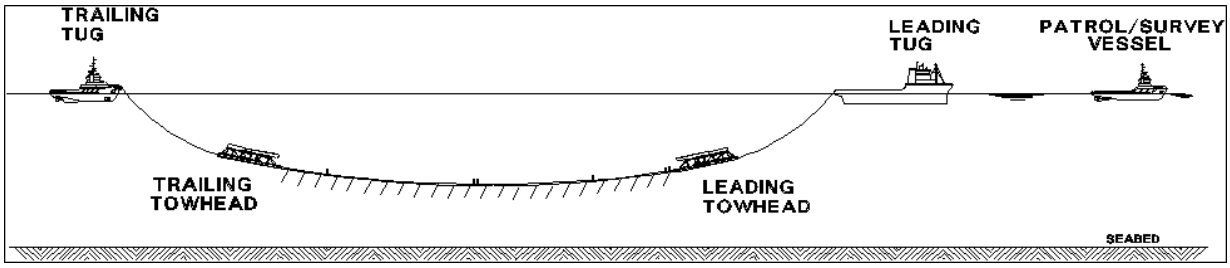

Plate 1: Bundle CDTM Tow Procedure (Plate 3 in 360 Environmental 2017a)

To address this issue, Subsea 7 has undertaken significant additional Bundle tow engineering work, and the capture of additional metocean data at the entrance to Exmouth Gulf, to confirm the feasibility and safety of a 'Surface tow' through this area. This method would involve tow vessels increasing speed to 5 to 6 knots (up to a maximum of 8 knots[1]) after leaving the Bundle parking area, and the trailing tow vessel providing some back tension. Under these conditions hydrodynamic forces acting on the ballast chains produce a lift component and the Bundle rises to the surface in a controlled manner. In this configuration, the Bundle has the maximum clearance from the seabed (Plate 2).

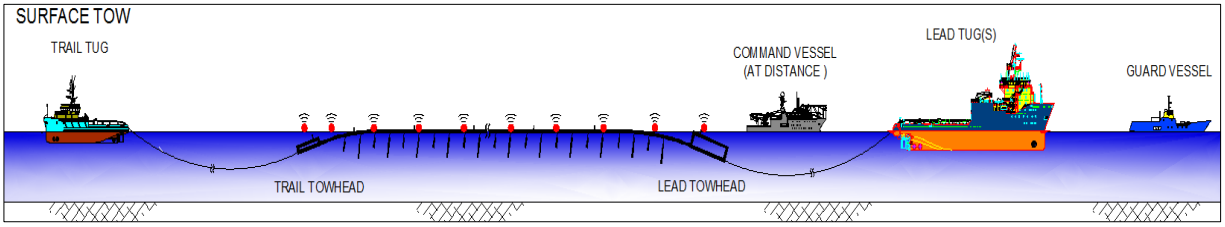

Plate 2: Bundle Surface Tow Procedure

To cover the slight change in tow route and tow method (from 'CDTM' to 'Surface tow'), the Offshore Operations Area (Surface tow) (Figure 3) has been defined to include the tow route out through the Ningaloo Marine Park. This area represents an envelope within which all Bundle tows, over the life of the facility, will occur.

[1] Maximum speed through water

3. CHANGE TO ENVIRONMENTAL IMPACTS AS A RESULT OF THE PROPOSED CHANGES TO PROPOSAL

3.1 PROPOSAL TITLE

No change to environmental impacts will occur as a result of the change to Proposal title.

3.2 DEVELOPMENT ENVELOPE AND INFRASTRUCTURE FOOTPRINT

The change in Development Envelope adjacent to the Minilya-Exmouth Road results in a 13.5 ha increase in the area of the Development Envelope in this area. This allows for flexibility in the future alignment of the access road, with the maximum additional clearing for the access road to be 7 ha. Vegetation within the additional areas of the Development Envelope adjacent to the Minilya-Exmouth Road has been mapped as AcCl (*Acacia coriaecea* and *Cullen* sp. shrubland over *Sida rohlenae* subsp. *rohlenae* low shrubland over *Triodia epactia*), AgTe (*Acacia gregorii* low open shrubland over *Triodia epactia* closed grassland) and AsSs (*Acacia stellaticeps* and *Scaevola sericophylla* open shrubland over *Triodia epactia* hummock grassland) (360 Environmental 2018). These vegetation types are all well represented across the wider survey area, including outside of the Development Envelope (Figure 2).

For completeness of the proposal description and Development Envelope, Subsea 7 proposes to include the groundwater production bores, and associated water supply pipeline, within the Development Envelope. The production water bores will be installed within cleared pads measuring 25 m by 25 m. The pads were previously surveyed and cleared, to facilitate groundwater and stygofauna investigations, under Native Vegetation Clearing Permit CPS 7946. The production water pipeline, running from the three production bores, across the Minilya-Exmouth Road, to the main Development Envelope, will be a ≤ 150 mm diameter PVC pipe. The change to incorporate the production bores and supply pipeline results in a 2.6 ha increase in the Development Envelope to the north and west of the main Bundle site. As the proposed pipeline alignment will follow existing tracks, running south east, before running beneath the Minilya-Exmouth Road and along another section of existing track into the original Development Envelope (Figure 1), only minor additional clearing of native vegetation (of up to 0.03 ha) will be required. This clearing is required to facilitate the horizontal directional drilling of the pipeline beneath the Minilya-Exmouth Road.

Environmental outcome:
No significant change in environmental impacts associated with the Proposal.

3.3 OFFSHORE OPERATIONS AREA

3.3.1 Tow Route

The Offshore Operations Area has been defined (Figure 3) to describe the maximum area (or envelope) within which launch and tow operations will occur. The centreline, representing the proposed tow route, has been slightly modified from the original alignment following the collection and analysis of additional wave and current data and the completion of additional launch engineering.

The tow route and associated Offshore Operations Area remain within the centre of Exmouth Gulf and well separated from sensitive BCH (refer Figure 3, Figure 5 and Attachment 1).

Environmental outcome:
No change to environmental impacts associated with the Proposal.

3.3.2 Offshore Operations Area (Off bottom tow)

As a result of additional launch engineering, the width of the Offshore Operations Area immediately offshore of the launchway (replacing the offshore component of the Section 38 Original Development Envelope) has been reduced (Figure 3). Thus the change to Proposal results in reduced direct impacts to BCH adjacent to the launchway. Potential direct impact to the nearshore BCH type 'Reef with macroalgae and filter feeders' has been reduced from 15.5 ha to 5.3 ha. The change results in a decrease to potential impacts associated with the Proposal.

The longer Bundle chain lengths will have some contact (4-5 links touching the seabed) along the length of the tow route within the Off bottom tow area. The effect of the chains touching the seabed in this area will not lead to a significant increase in impacts to marine environmental quality or BCH associated with the Proposal as:

- The BCH within the Off bottom tow area is soft sediment (Figure 4).
- The seabed within the Off bottom tow area is located within the active trawling area of the Exmouth Gulf Prawn Fishery and is regularly disturbed by ongoing prawn trawling activities (Figure 4).
- The effect of the chains touching the seabed within this already disturbed, soft sediment habitat, will not have a significant impact on BCH.
- No filter feeder, coral or seagrass habitats occur in proximity to the Bundle tow route (the nearest filter feeder and coral habitat is located at Cooper Shoal, over 2 km from the tow route).
- Seabed disturbance due to Bundle chains may occur a maximum of three times per year.
- A field 'turbidity trial', completed to quantify the sediment flux rate, particle size distribution and vertical distribution of sediments resuspended by a single Bundle chain as it was towed along the seabed off Heron Point at a speed of 3 knots (refer Attachment 2), showed that:
  - No elevated turbidity was visible on the surface behind the tow vessel at any point during the trial.
  - Turbidity in the order of 2 to 6 NTU (compared to a background turbidity of 1 NTU) was recorded for a period of approximately 5 to 10 minutes close to the seabed within 100 m (down current) of the tow route.
  - Total suspended solids loads of 2 mg/L to 30 mg/L were recorded close to the seabed immediately adjacent to the chain.
- Turbidity generated during a Bundle launch and tow will rapidly dissipate.
- Experience from large scale, long-term (months), dredging programmes in the Pilbara (MScience 2009; Hanley 2011) has shown that the impacts associated with these major programs have generally been limited to areas close to the dredging activity (> 500 m), and that impacts have been consistently over-estimated.

To take account of the potential impact from multiple Bundle launches, the cumulative footprint following a number of Bundle launches was modelled (Figure 5). In the event that six different Bundles (ranging from 4 km to 8 km in length) are launched under differing tidal conditions (neap, mean and spring), over a period of several years, a total of 1,752.7 ha of soft sediment habitat would be directly disturbed. As stated above, such disturbance within this already disturbed, soft sediment habitat, will not have a significant impact on BCH.

Environmental outcome:
The low level of disturbance within this already disturbed, soft sediment habitat, will not have a significant impact on BCH.

3.3.3 Bundle Laydown Area (now termed the Bundle Parking Area)

Habitat surveys undertaken within the original Bundle laydown area (360 Environmental 2017b) and within the new Bundle parking area (MBS Environmental 2018) have confirmed that the new Bundle parking area is characterised by soft sediment with little to no epifauna (Figure 4). Both areas fall within the trawled areas of the Exmouth Gulf prawn fishery (Figure 4). The increase in the size of the Bundle parking area cumulative chain footprint area is not considered to represent a significant increase in impact to BCH, given the type of disturbance (physical displacement of surficial sediments where Bundle chains contact the seabed), the BCH type and ongoing commercial fishing activities.

Environmental outcome:
The low level of disturbance within this already disturbed, soft sediment habitat, will not have a significant impact on BCH.

3.3.4 Offshore Operations Area (Surface tow)

Given that the number of Bundle launches (nominally two, but up to three per year), the speed of the tow (2-3 knots (up to a maximum of 5 knots) during Off bottom tow, 5-6 knots (up to a maximum of 8 knots) during Surface tow) and the location of the tow route (within deep (> 20 m water) mid-way between the North West Cape and the Muiron Islands) remain the same, the change in potential impacts to marine fauna is considered negligible.

The key management measures to reduce the risk of impact to marine fauna during a Bundle launch and tow are:

- No bundle launches during the main period of Humpback whale usage of Exmouth Gulf (a three month period during August, September and October).
- Bundle launch and tow speed not to exceed 8 knots.
- Marine Fauna Observer (MFO) on lead support vessel, to identify marine fauna within 500 m ahead of tow, to allow avoidance measures to be implemented.

It is therefore considered that the proposed changes to Proposal do not represent a significant change in the risk to marine fauna.

Environmental outcome:
This change to the Bundle tow operations is considered to represent a decrease to the potential environmental impacts associated with the Proposal, as the clearance between the Bundle and the seabed is increased.

3.3.5 Summary

A summary of potential impacts is as follows:

- No impact to 'Mangroves', 'Seagrass' or 'Soft sediment with turf algae' (Table 2).
- Reduced impact to 'Reef with macroalgae and filter feeders' (Table 2).
- No change in impacts to 'Pavement Reef' and 'Reef with macroalgae' (Table 2).
- Increase in the extent of 'Soft sediment with filter feeders' within the Offshore Operations Area (Table 2), although the majority of this habitat within the Offshore Operations Area will not be impacted during a Bundle launch (Figure 5).
- Increase in the extent of 'Soft sediment' habitat within the Offshore Operations Area (Table 2), although the majority of this habitat will not be impacted during a Bundle launch (Figure 5). Further, as the seabed within the Offshore Operations Area is regularly disturbed by ongoing prawn trawling activities (Figure 4), and the effect of the chains touching the seabed will not have a significant impact on the 'Soft sediment' habitat, a corresponding impact to 'Soft sediment' habitat will not occur.

The change to the Offshore Operations Area (Off bottom tow), including the interaction of the Bundle chains with the seabed, will not result in a significant change to the potential environmental impacts associated with the Proposal.

Table 2: Extent of BCH within Development Envelope/Offshore Operations Area (original and amended Proposal)

BCH Type	BCH (ha)	
	Original Proposal	Amended Proposal
Mangroves	0.0	0.0
Pavement Reef	1.5	1.5
Reef with macroalgae	6.6	6.6
Reef with macroalgae and filter feeders	15.5	5.3
Seagrass	0.0	0.0
Soft sediment	38.5	4,142.0
Soft sediment with filter feeders	1.5	5.8
Soft sediment with turf algae	0.0	0.0

4. CHANGE IN RISK TO MNES

4.1 DETAILS OF THE PROPOSED VARIATION TO THE ACTION

As presented in Section 2, and in Figure 1, the proposed changes to Proposal are related to the:

- Proposal title.
- Bundle fabrication facility and associated infrastructure.
- Groundwater production bores and supply pipeline.
- Offshore Operations Area.

Details are provided in Section 2.

4.2 REASONS FOR THE PROPOSED VARIATION

As presented in Section 2, several of the proposed changes to the Proposal are related to issues raised during stakeholder consultation and efforts made by Subsea 7 to address these matters. The other proposed changes relate to the provision of more detail regarding the proposed operations (e.g. groundwater bore locations and Bundle tow methods).

4.3 IMPACTS ON MNES FROM THE AMENDED PROPOSAL COMPARED TO THE ORIGINAL PROPOSAL

The controlling provisions relevant to this Proposal are:

- World Heritage Properties (Sections 12 & 15A).
- National Heritage Places (Sections 15B & 15C).
- Listed Threatened species and communities (Sections 18 & 18A).
- Listed Migratory Species (Sections 20 & 20A).
- Commonwealth Marine Areas (Sections 23 & 24A).

The potential impacts to these matters from the proposed variation, compared to the original Proposal, are discussed in the sections below.

4.3.1 World Heritage Properties and National Heritage Places

The Ningaloo Coast World Heritage Area (Reference 1369) was inscribed on the World Heritage List on 1 November 2011 under criteria (vii) and (x), as follows:

- Criterion (vii) contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.
- Criterion (x) contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation (DEWHA 2010).

The adopted boundary of the Ningaloo Coast World Heritage Area includes the Ningaloo Marine Park (Commonwealth Waters), Ningaloo Marine Park (State Waters) and Muiron Islands Marine Management Area (including the Muiron Islands), Jurabi Coastal Park, Bundegi Coastal Park, Cape Range National Park and Learmonth Air Weapons Range.

The Ningaloo Coast National Heritage Place covers approximately 710,000 ha, comprising Ningaloo Marine Park, Muiron Islands Marine Management Area (including the Muiron Islands), Jurabi Coastal Park, Bundegi Coastal Park, Cape Range National Park, Learmonth Air Weapons Range and portions of Exmouth, Ningaloo, Cardabia, Warroora, Gnaraloo and Quobba pastoral leases.

The potential impacts from the Proposal are:

- Impacts to the heritage values of the Ningaloo Coast World Heritage Property and the Ningaloo Coast World Heritage Place.
- Impacts to amenity values (including visual landscape, scenic and visual aesthetic values and recreational tourism) in a Marine Park.
- Impacts to the social values (e.g. aesthetics or active use).
- Impacts to commercial fishing and recreational fishing operations/businesses and tourism activities.

4.3.1.1 Heritage Values

When assessing the significance of impacts of the Proposal (and change to Proposal) on the first listed World Heritage Area (WHA), the criterion '*superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance*', the visual impact of the Bundle tow has been considered.

The estimated time the Bundle and associated vessels will take to travel through this WHA is 3 hours, 48 mins. This equates to 10.44 hours per year (0.24% visual impact per year). Additionally, the Bundle tow operations are not exclusive and existing vessels will continue to operate in this area, including prawn trawlers, heavy lift crane vessels, offshore construction vessels, offshore support vessels, cruise ships, towing tugs and barges etc.

A viewshed analysis from the Vlamingh Head Lighthouse was undertaken (this vantage point has uninterrupted views of the sea across the WHA and is a popular tourist destination). During the assessment from this vantage point, the proposed Bundle tow impacts are consistent with existing impacts evident from this location such as other vessels operating in the vicinity, the Harold E. Holt Naval Communication Station (significantly more visually impacting) and offshore oil platforms visible from this location towards the north west of the peninsula. Given the temporary, short term nature of the Bundle tow, with up to three Bundle tows a year and a 0.24% visual amenity impact, the Proposal is not likely to impact the natural beauty or aesthetic importance of the WHA.

The second criterion for the inscription of the Ningaloo Coast WHA is its '*important and significant natural habitats for in-situ conservation of biological diversity including threatened species'*. The Ningaloo Marine Park ranks seventh on the world's list of coral reef biodiversity 'hotspots' and second in terms of the number of species found within a limited range (Shire of Exmouth 2018). The Ningaloo Reef is Australia's largest and most accessible fringing reef system; the shallow waters of the reef combined with the deep offshore waters creates a diverse habitat for a variety of corals, fish species and mega marine fauna (whale sharks, humpback whales, dugongs, turtles and manta rays) (Ningaloo Visitor Centre 2018). This natural seascape not only supports a diverse ecosystem, but also an array of opportunities for ecotourism (fishing, snorkelling, diving, marine life observation, recreational uses of beach areas) and marine biology conservation and research.

During the tow route through the Ningaloo WHA the chains hanging beneath the Bundle will not be in contact with the seabed and therefore no direct impacts will occur to BCH. The Bundle tow will not occur during the peak Humpback Whale southern migration period and thus will not interfere with their migratory patterns. Additionally, it is proposed that support vessels will accompany the Bundle tow with trained marine fauna observers (MFOs) on-board to locate and report on marine fauna species within the tow route path. During the Bundle tow, operations will adhere to the Marine Fauna Management Plan. The speed of the tow vessels will be 5 to 6 knots (up to a maximum of 8 knots) during the Surface tow through the WHA which will allow marine fauna to avoid the tow vessels and Bundle. Avoidance measures will be taken, as required, to avoid marine fauna strike.

Given the short-term nature of the tow operations through the Ningaloo Coast WHA, the Bundle tow operation is unlikely to have any significant impacts on BCH or marine fauna. There will be no contact with the seabed

in this area and therefore no direct impacts to BCH. The likelihood of a marine fauna strike is low due to the numerous control measures that will be implemented. The conservation values of the Ningaloo Coast WHA and Marine Park are unlikely to be impacted as a result of the amended Proposal.

4.3.1.2 Visual Landscape, Scenic and Visual Aesthetic Values

In assessing potential impacts to the visual landscape, scenic and visual aesthetic values of Ningaloo Reef Marine Park and WHA, the Vlamingh Head Lighthouse was chosen as a vantage point, for the assessment of potential visual impacts, because:

- It has uninterrupted views out to sea across the heritage area.
- It is a popular tourist destination where the values of the Heritage Area may be appreciated.
- It is the highest point on the northern end of the peninsula, therefore has the largest zone of theoretical visibility (ZTV).

Viewshed analysis suggests that the following components of the project will be visible:

- A 55.7 km section of the proposed tow route (of which 25.4 km is within the World Heritage Area).
- A section of the Bundle parking area.

The proposed Surface tow of the Bundle occurs at approximately 5 to 6 knots (up to a maximum of 8 knots). Therefore the Bundle and tow / support vessels should only be visible from Vlamingh Head Lighthouse for approximately 18 hours 21 minutes per tow (including the expected time for submerged weight checks within the Bundle parking area). The Bundle tow will only occur within the WHA for a total of 3 hours 48 mins. The total visible time of 18 hours 21 mins is considered insignificant when considering the total daylight hours per year (approximately 0.42 % impact per launch).

The proposed changes to the Proposal result in no significant change to impacts given the frequency and duration of Bundle launch and tow operations remain unchanged.

4.3.1.3 Social Values

Many tourists are attracted to the Exmouth region for the experience of whale watching during the migration period for the Humpback whale from early August until late November each year. Subsea 7 has committed to no Bundle launch and tow activities during the peak of this migration season. Therefore whale watching activities within the WHA will not be significantly impeded by either the Proposal or the amended Proposal.

The Ningaloo Coast WHA is used for recreational fishing, boating, kayaking and scuba diving. Out of the 604,500 ha, a maximum of 2,540 ha will be occupied (by an enforced exclusion zone) during a Bundle tow. The tow length within the WHA is 25.4 km long and will take approximately 3 hours, 48 mins to traverse. It is estimated that up to three Bundle tows will occur in a year, this equates to 10.44 hours per year that a Bundle tow will occupy this small area of the WHA. This is not considered a significant impact to recreational users as a result of the Proposal. Whilst the exclusion zone (approx. 500 m) either side of the Bundle tow route will be enforced for six hours during a Bundle tow while the Bundle traverses the WHA, recreational users will not be significantly inhibited whilst traveling through the Gulf or though the WHA.

Some of the key diving locations within the Ningaloo WHA are Exmouth Navy Pier, Murion Islands, Lighthouse Bay sanctuary area, Bundegi Reef and locations along the Ningaloo Reef (Ningaloo Visitor Centre 2018). Activities at these locations will not be prevented by the Bundle tow operations as these locations do not intersect the path of the Bundle tow route or associated exclusion zone. Travel to and from the Murion Islands will be possible during a Bundle tow, though appropriate separation between the Bundle tow vessels and third party vessels, ensured through an exclusion zone around the Bundle tow, will be maintained for safety reasons.

Notification of a proposed launch will be announced via a Temporary Notice to Mariners and supplementary notifications with the support of AMSA (Australian Maritime Safety Authority). Notification will also be

directly sent to all commercial and recreation operators via a mailing list, to which any public stakeholder may register. Details of the launch and exclusion zones will be advertised in local media and public noticeboards.

The presence of the Bundle tow operations within the WHA is not considered significant given the short time it will occupy the area (3 hours 48 mins) and operators (recreational and commercial) will still be able to navigate the area outside of the exclusion zone, and undertake other activities within this area. Impacts to social values and recreational activities in the WHA are therefore not significant as a result of the original or amended Proposal.

4.3.1.4 Commercial Fishing and Recreational Fishing Operations/Businesses and Tourism Activities

During a Bundle launch an exclusion zone will be setup to ensure safety of the operation. This will be a 500 m zone extending beyond the defined Bundle tow route. The exclusion zone will progress relative to the Bundle position, and the approximate timings of this exclusion zone are as follows:

- The launch area adjacent to Heron Pt will have the exclusion zone in place for ~36 hours per launch.
- The Off bottom tow to the parking area will have the exclusion zone in place for ~6 hours per launch.
- The parking area will have the exclusion zone in place for up to 24 hours per launch.
- The Surface tow area (through the WHA) will have an exclusion zone in place for ~6 hours per launch.

Notification of a proposed launch will be announced via a Temporary Notice to Mariners and supplementary notifications with the support of AMSA. Notification will also be directly sent to all commercial and recreation operators via a mailing list, to which any public stakeholder may register. Details of the launch and exclusion zones will be advertised in local media and public noticeboards.

Commercial operations within Exmouth Gulf (fishing, tours, other oil and gas related activities) will be able to continue outside of the exclusion zone. Tour operators will still be able to depart from Exmouth Marina and travel to Ningaloo Reef unhindered. Travel to and from the Murion Islands will be possible during a Bundle tow, though appropriate separation between the Bundle tow vessels and third party vessels, ensured through an exclusion zone around the Bundle tow, will be maintained for safety reasons.

Commercial fishing operators will have advance notice of a Bundle launch and have confirmed that they will be able to schedule activities to avoid the Bundle tow route (as required). The Exmouth Gulf prawn fishery occurs across approximately 300 square nautical miles, so the area affected during a Bundle launch is negligible. This has been confirmed as part of the ongoing engagement with the prawn fishery operators. Impacts to the unvegetated soft sediment habitat within the Offshore Operations Area (Off bottom tow) will be minor, short-term and infrequent given an average of two (maximum of three) Bundle launches per year. Therefore, the change to the Proposal, including the chain footprint, will not significantly impact commercial fishing activities.

The proposed change to Surface tow through the WHA will not have any significant impact to commercial fishing and recreational fishing operations/businesses and tourism activities.

4.3.2 Listed Threatened Species and Communities & Listed Migratory Species

4.3.2.1 Marine Species

A number of listed Threatened Species and communities and listed Migratory species occur, or may occur, within Exmouth Gulf and adjacent to the proposed Bundle tow route (Table 3, Figure 3). The proposed variation to the Bundle tow method (mid-water to Surface tow within Ningaloo Marine Park and chain disturbance of seabed out to the Bundle Parking Area) has the potential to change the impact on these species.

Table 3: Listed Threatened Species and Listed Migratory Species Occurring or Potentially Occurring Within Exmouth Gulf

Scientific Name	Common Name	EPBC Listing	Type of Presence (taking account of desktop and survey data)
Dolphins			
Sousa sahulensis (previously named *Sousa chinensis*)	Australian humpback dolphin	Migratory	Species or species habitat likely to occur in area. Dolphins were observed during surveys (but species not identified).
Tursiops aduncus	Indo-Pacific bottlenose dolphin	Migratory	Species or species habitat likely to occur in area. Dolphins were observed during surveys (but species not identified).
Whales			
Balaenoptera borealis	Sei whale	Vulnerable, Migratory	Individuals may occur in the region on rare occasions.
Eubalaena australis	Southern right whale	Endangered, Migratory	Sightings in more northern waters are relatively rare, but there have been records from Exmouth on the west coast (DoEE 2017a). Not recorded during surveys for the Proposal (Irvine, unpublished).
Balaenoptera edeni	Bryde's whale	Migratory	Species may occur in area. Small numbers recorded offshore of Proposal area during historic surveys.
Balaenoptera musculus	Blue whale	Endangered, Migratory	On their northern migration Pygmy blue whales come into the Perth Canyon in the period January to May, and then move up the coast passing Exmouth in the period April through to August before continuing north, with animals known to frequent Indonesian waters. They tend to pass along the shelf edge at depths of 500m out to 1000 m, moving faster on the southern migration and coming in close to the coast in the Exmouth – Montebello Islands area (McCauley and Jenner 2010).
Megaptera novaeangliae	Humpback whale	Vulnerable, Migratory	Species known to pass Exmouth during the northern and southern migrations, mother and calf pairs known to rest in Exmouth Gulf during southern migration (CWR 2005, Jenner et al. 2001). Contemporary aerial survey programme completed for Proposal (Irvine, unpublished)
Balaenoptera physalus	Fin whale	Vulnerable, Migratory	Individuals may occur in the region on rare occasions but there have been no published reports of this species off Exmouth. .
Physeter macrocephalus	Sperm whale	Migratory	Individuals may occur in the region on rare occasions but there have been no published reports of this species off Exmouth.
Orcinua orca	Killer whale	Migratory	In Western Australia, Orca's are known to frequent the colder, southern waters near Albany. In 2014 a group of up to 27 killer whales were reported to be resident in the Exmouth Gulf for up to two months each year (ABC 2014). Species not recorded during surveys for the Proposal.
Marine Turtles			
Carretta caretta	Loggerhead turtle	Endangered, Migratory	Major nesting at Murion Islands (150 to 350 females breeding per year) and the beaches of the North West Cape (50 to 150 females breeding per year) (DoEE 2017c)
Chelonia mydas	Green turtle	Vulnerable, Migratory	The Green turtle is the most common to the Ningaloo region (Preen et al. 1997). No nesting activity has been recorded on beaches of the Exmouth Gulf, however the mangrove creeks and vegetated shallows of the east coast of the Exmouth Gulf are an important nursery for this species (Oceanica 2006).

Scientific Name	Common Name	EPBC Listing	Type of Presence (taking account of desktop and survey data)
Eretmochelys imbricata	Hawksbill turtle	Vulnerable, Migratory	Hawksbill Turtles nest on the Muiron Islands, located approximately 30 km off the coast of Exmouth. Feeding areas for this species potentially occur as far south as Shark Bay (DoEE 2017d). The species was recorded from Sandalwood Peninsula (located at the bottom of Exmouth Gulf) between 1990-1998 (Oceanica 2006).
Dermochelys coriacea	Leatherback turtle	Endangered, Migratory	There are no records of Lleatherback turtles nesting in Western Australia. Furthermore the area is not known as a foraging ground or a nursery. It is unlikely that this species occurs in the Exmouth Gulf (Oceanica 2006).
Natator depressus	Flatback turtle	Vulnerable, Migratory	No nesting sites or rookeries have been recorded in the Exmouth Gulf (DoEE 2017e). Some data on foraging distribution comes from bycatch, with three adult turtles having been caught in trawler nets from the top half of the Exmouth Gulf (Oceanica 2006). An inter-nesting habitat buffer is mapped across the northern end of Exmouth Gulf and to the west (DEWHA 2011).
Other Marine Fauna			
Dugong dugon	Dugong	Migratory	Species or species habitat likely to occur in Exmouth Gulf. Species was recorded during surveys. Foraging habitat not present in proximity to Bundle tow route.
Rhincodon typus	Whale shark	Vulnerable, Migratory	Whale sharks aggregate close to the Ningaloo Reef front during late March to early May following the mass spawning of coral when there is an abundance of food in the form of planktonic larvae and schools of small fish in the waters adjacent to the reefs. Whale Sharks have been sighted within the northern end of Exmouth Gulf (Oceanica 2006). Not recorded within Exmouth Gulf during surveys undertaken for the Proposal (Irvine, unpublished).
Carcharias taurus	Grey nurse shark (west coast population)	Vulnerable	The Grey nurse shark (west coast population) is predominantly found in the south-west coastal waters of Western Australia, but has been recorded as far north as the North West Shelf (DoEE 2017f). There have been occasional sightings of this species near Exmouth and the Muiron Islands (DoEE 2017f). Although the Exmouth Gulf is not considered preferred habitat for this species, it is possible that the Grey Nurse Shark occasionally utilises habitat within the Exmouth Gulf and to the north and west.
Carcharodon carcharias	Great white shark	Vulnerable, migratory	Great white sharks are widely, but not evenly, distributed in Australian waters. Tagging of sharks suggests that the species is highly mobile and movement is often seasonal. In Western Australia tagging has shown the species to move north during spring and return south during summer (DoEE 2017g). The aggregation of calving Humpback whales may attract Great White Sharks to the Exmouth Gulf (Oceanica 2006). For this reason, it is possible that the Great White Shark may occasionally forage within the Exmouth Gulf and to the north and west.
Pristis clavata	Dwarf sawfish, Queensland sawfish	Vulnerable, migratory	There are no known records of the Dwarf sawfish occurring within the Exmouth Gulf (DoEE 2017h). Surveys of Dwarf sawfish have previously encountered individuals over fine substrates (mainly silt) in river channels. There is a low likelihood of this species occurring in Exmouth Gulf.

Scientific Name	Common Name	EPBC Listing	Type of Presence (taking account of desktop and survey data)
Pristis zijsron	Green sawfish, Dindagubba, Narrowsnout sawfish	Vulnerable, migratory	Green sawfish have been recorded in very shallow water (<1 m) to offshore trawl grounds in over 70 m of water (DoEE 2017i). It is possible that the species may occasionally utilise shallow waters within Exmouth Gulf.
Anoxypristis cuspidata	Narrow sawfish	Migratory	Species may occur in wider region, but unlikely to occur in the deeper waters to the north west of Exmouth Gulf.
Aipysurus apraefrontalis	Short-nosed seasnake	Critically Endangered	The Short-nosed seasnake is endemic to Western Australia, and has been recorded from Exmouth Gulf, Western Australia (DoEE 2017b).
Marine Fish			
Manta alfredi	Reef manta ray, Coastal manta ray, Inshore manta ray	Migratory	Single individuals have been recorded in Exmouth Gulf during studies undertaken for the project (Irvine, unpublished).
Manta birostris	Giant manta ray, Chevron manta ray, Pelagic manta ray, Oceanic manta ray	Migratory	Recorded off the North West Cape, could enter the northern portion of the Gulf.
Halicampus grayi	Mud pipefish	Marine	Recorded in Exmouth Gulf (Kangas et al. 2006)
Hippocampus zebra	Zebra seahorse	Marine	Recorded in Exmouth Gulf (Kangas et al. 2006)
Hippocampus angustus	Narrow-bellied seahorse	Marine	Recorded in Exmouth Gulf (Kangas et al. 2006)

Note: Shaded rows indicate species considered likely or potentially impacted by the proposed action (Burke pers comm. 2018).

The potential impacts from the Proposal relevant to marine fauna are:

- Loss or degradation of BCH representing marine fauna habitat (e.g. foraging habitat) during Bundle launch and tow.
- Temporary behavioural response of marine fauna due to noise or light spill during Bundle launch and tow.
- Direct impact (strike or entanglement) during Bundle launch and tow.
- Introduction of introduced marine pests (IMP) via operational vessels (tugs or support vessels).
- Loss or alteration of coastal habitat as a result of changes to coastal processes or hydrodynamic/hydrological regimes.
- Leak or spill of chemicals (including hydrocarbons) impacting marine fauna health.
- Indirect loss or degradation of fauna habitat due to changes in surface water or groundwater flows or quality.
- Loss or alteration of coastal habitat as a result of changes to coastal processes or hydrodynamic/hydrological regimes.

The proposed change to the Proposal results in a change to one of these potential impacts, '*Direct impact (strike or entanglement) during Bundle launch and tow*', as a result of the:

- Reduced interaction between the Bundle towheads and seabed during launch.
- Change from a mid-water tow of the Bundles out through Ningaloo World Heritage Area to a Surface tow of the Bundles.
- Slight amendment of the Bundle tow route (including the section through Ningaloo World Heritage Area) (Figure 3).

Given that the number of Bundle launches (nominally two, but up to three per year), the speed of the tow (up to 8 knots during Surface tow) and the location of the tow route (within deep (> 20 m water) mid-way between the North West Cape and the Muiron Islands) remain the same, the change in potential impacts to marine fauna is considered negligible.

The reduction in seabed disturbance adjacent to Heron Point, due to the more buoyant Bundle towheads, will result in a reduction in impacts to near-shore BCH (including 'Reef with macroalgae' and 'Reef with macroalgae and filter feeders'). The change to a Surface tow method will increase the vertical clearance between the Bundle and the seabed, resulting in a further reduced risk of impact to BCH, and a greater ability for marine fauna to pass beneath the Bundle and remain clear of the ballast chains.

The key management measures to reduce the risk of impact to listed Threatened Species and listed Migratory species during a Bundle tow are:

- No bundle launches during the main period of Humpback whale usage of Exmouth Gulf (a three month period during August, September and October).
- Bundle launch and tow speed not to exceed 8 knots.
- Marine Fauna Observer (MFO) on lead support vessel, to identify marine fauna within 500 m ahead of tow, to allow avoidance measures to be implemented.

It is therefore considered that the proposed changes to Proposal do not represent a significant change in the risk to listed species.

4.3.2.2 Terrestrial Species

A number of listed threatened species and communities and listed migratory species occur, or may occur, adjacent to the onshore Proposal envelope (Figure 1 and Table 4).

Table 4: Listed Threatened Species and Listed Migratory Species Occurring or Potentially Occurring Adjacent to the Onshore Proposal Envelope

Scientific Name	Common Name	EPBC Listing	Type of Presence (taking account of desktop and survey data)
Terrestrial Fauna			
Dasyurus hallucatus	Northern quoll, Digul	Endangered	Not known to occur within region.
Petrogale lateralis lateralis	Black-flanked rock-wallaby, Moororong, black-footed	Endangered	Likely to occur within the Cape Range. Unlikely to occur within Development Envelope.
Rhinonicteris aurantia (Pilbara form)	Pilbara leaf-nosed bat	Vulnerable	Given the lack of records for this species in the area (and region) and the lack of suitable habitat, the Pilbara leaf-nosed bat is considered as Unlikely to occur.
Pezoporus occidentalis	Night parrot	Endangered	There is an absence of nearby records and a very limited number of records in WA, consequently the Night parrot is considered Unlikely to occur.
Subterranean Fauna			
Milyeringa veritas	Blind gudgeon	Vulnerable	The Cape Range is the type locality and primary habitat for this species. Species may be present within or adjacent to Proposal Development Envelope. The nearest species records or potential species habitat is 8.5 km west of the project area (DoEE 2017j).
Ophisternon candidum	Blind cave eel	Vulnerable	The Cape Range is the type locality and primary habitat for this species. Species may be present within or adjacent to Proposal Development Envelope. The nearest species records or potential species habitat is 23 km north of the project area (DoEE 2017k).

Note: shaded rows indicate species considered likely or potentially impacted by the proposed action (Burke pers comm. 2018)

Further information submitted to the DoEE on 22 November 2017 (Ref 2061AZ), following the initial referral on 18 October 2017, stated that '*Site investigations are currently being undertaken to determine the best options for obtaining this potable water and therefore the location of these bores are yet to be determined*.'

Since then a comprehensive programme of drilling has been completed to support the finalisation of the Proposal water sourcing strategy and to facilitate the construction of stygofauna sampling bores. This work has allowed the location of the proposed production bores, and associated water supply pipeline, to be confirmed (Figure 1).

Given the proposed groundwater abstraction volume and rate remain unchanged from the original Proposal (Table 1), no change in the potential impacts to subterranean fauna is considered to result from the amended Proposal. Studies are continuing to characterise the aquifers, subterranean fauna habitat and subterranean fauna communities present within and adjacent to the Development Envelope. Given the minor clearing associated with the amended development footprint (Figure 1) and wide representation of the impacted vegetation types beyond the Development Envelope (Figure 2), the risk of impact to terrestrial fauna as a result of the amended Proposal remains virtually unchanged.

4.3.3 Commonwealth Marine Areas

The Commonwealth Marine Area is defined in the EPBC Act as any part of the sea, including the waters, seabed, and airspace, within Australia's Exclusive Economic Zone and/or over the continental shelf of Australia. Generally, the Commonwealth Marine Area stretches from the territorial sea baseline to the outer limit of the

Exclusive Economic Zone, 200 nautical miles from the baseline. Key environmental impacts required to be assessed for Commonwealth Marine Areas are:

- Establishment of pest species.
- Impact on marine ecosystem functioning or integrity.
- Effect on a population of a marine species.
- Substantial change in water quality.
- Accumulation of potentially harmful chemicals in the marine environment.
- Impact on heritage values.

The change to a Surface tow method through the Ningaloo WHA will mean that, as the Bundle enters the Commonwealth Marine Area, the Bundle will be on the surface. When the water depth exceeds 100 m the Bundle tow speed will be reduced slightly, and the tension from the trailing tug reduced, to allow the Bundle to be lowered through the water column to sit at a depth of approximately 50 m. Once this depth is reached, and the Bundle is stable, the tow will enter CDTM mode which will continue until the Bundle reaches the offshore gas field.

The only change from the original Proposal is that it is proposed that the Bundle will be towed along the surface for a portion of the Commonwealth Marine Area, rather than being below the surface, to maximise clearance between the Bundle and the seabed. It is therefore considered that the proposed changes to Proposal do not represent a significant change in the risk to the Commonwealth Marine Area, including the establishment of pest species or impacts to the marine ecosystem, marine species, water quality or heritage. Potential impacts to World Heritage Properties and National Heritage Places are addressed in Section 4.3.1.

4.4 IMPACTS OF THE PROPOSED VARIATION ON MNES NOT CONSIDERED IN THE REFERRAL OR ASSESSMENT OF THE ORIGINAL PROPOSAL

Not applicable.

4.5 ALTERNATIVES, MITIGATION MEASURES AND OFFSETS TO COMPENSATE FOR ADDITIONAL IMPACTS ON MNES

Not applicable – no additional impacts on MNES expected.

5. SUMMARY

The environmental significance of the Proposal amendments are considered minimal, with a positive outcome in relation to potential direct impacts to nearshore BCH, which was of particular concern to the local community.

The increase to the onshore footprint (7 ha) is not considered likely to significantly change the direct impacts to flora and vegetation, or terrestrial fauna.

The increase in seabed disturbance (370 ha within the Bundle parking area and 1464 ha within the Offshore Operations Area (Off bottom tow)) due to the Bundle chain footprint is not expected to result in a significantly greater impact to BCH or marine fauna given:

- The seabed within the Bundle parking area and Offshore Operations Area is composed of unvegetated soft sediment.
- The Bundle parking area and Offshore Operations Area fall within the areas actively trawled for prawns.
- Disturbance to the seabed will be minor, short-term and infrequent given an average of two (maximum of three) Bundle launches per year.

- The BCH within the Bundle parking area and Offshore Operations Area does not represent key marine fauna habitat.

Subsea 7 has maintained regular consultation regarding the proposal amendments with key stakeholders, including the local community. The feedback to date indicates that the majority of stakeholders do not view the amendments as significantly altering the risk profile of the proposal.

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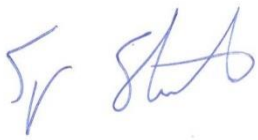
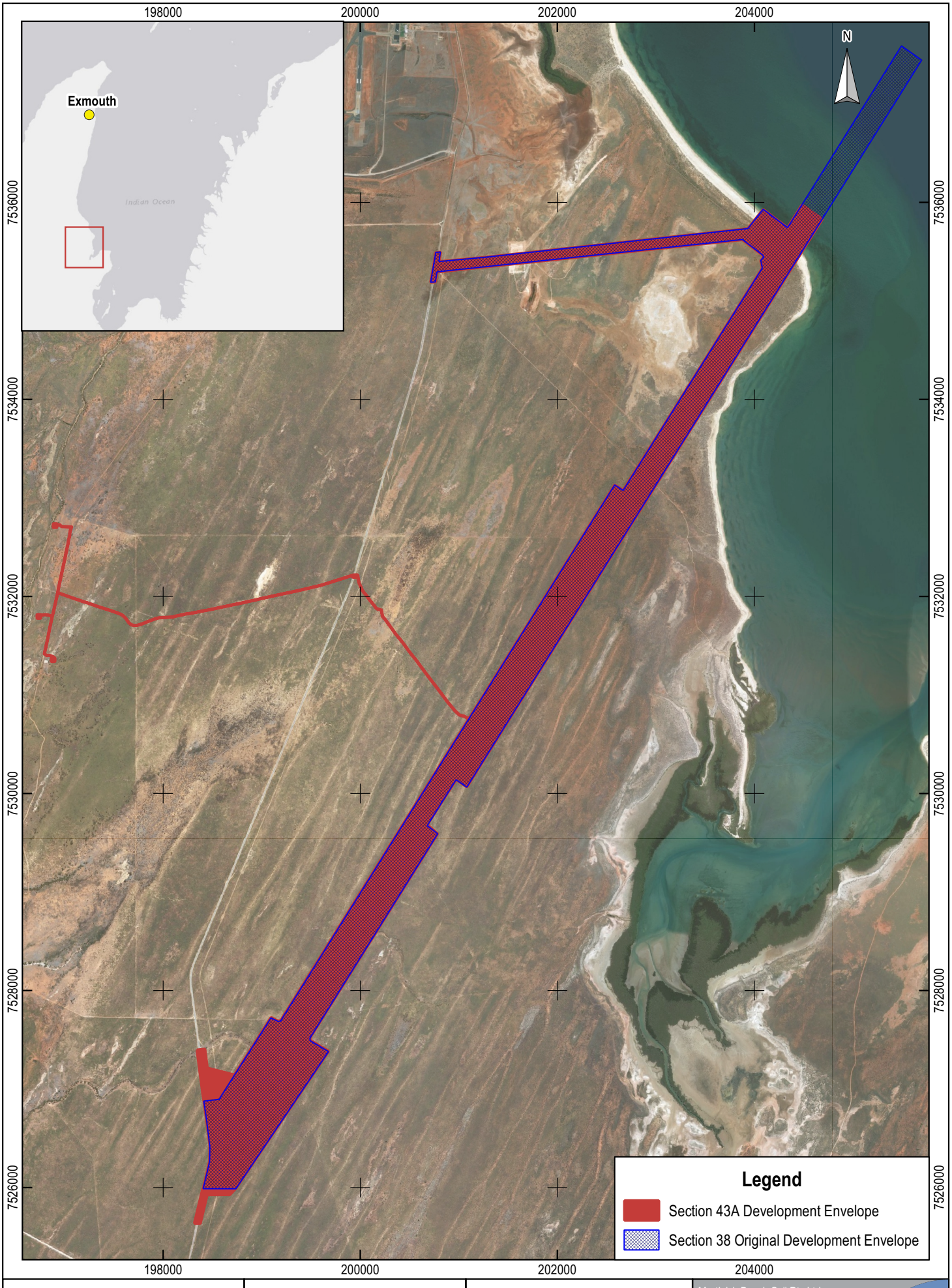
Yours sincerely
MBS Environmental



Spencer Shute
Principal Environmental Scientist

Enclosed: Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Attachment 1, Attachment 2.



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Subsea 7
Learmonth Bundle
Fabrication Facility

Figure 1

Change to onshore development envelope (site access road and production bores and pipeline)

Martinick Bosch Sell Pty Ltd
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Fax: (08) 9226 3177
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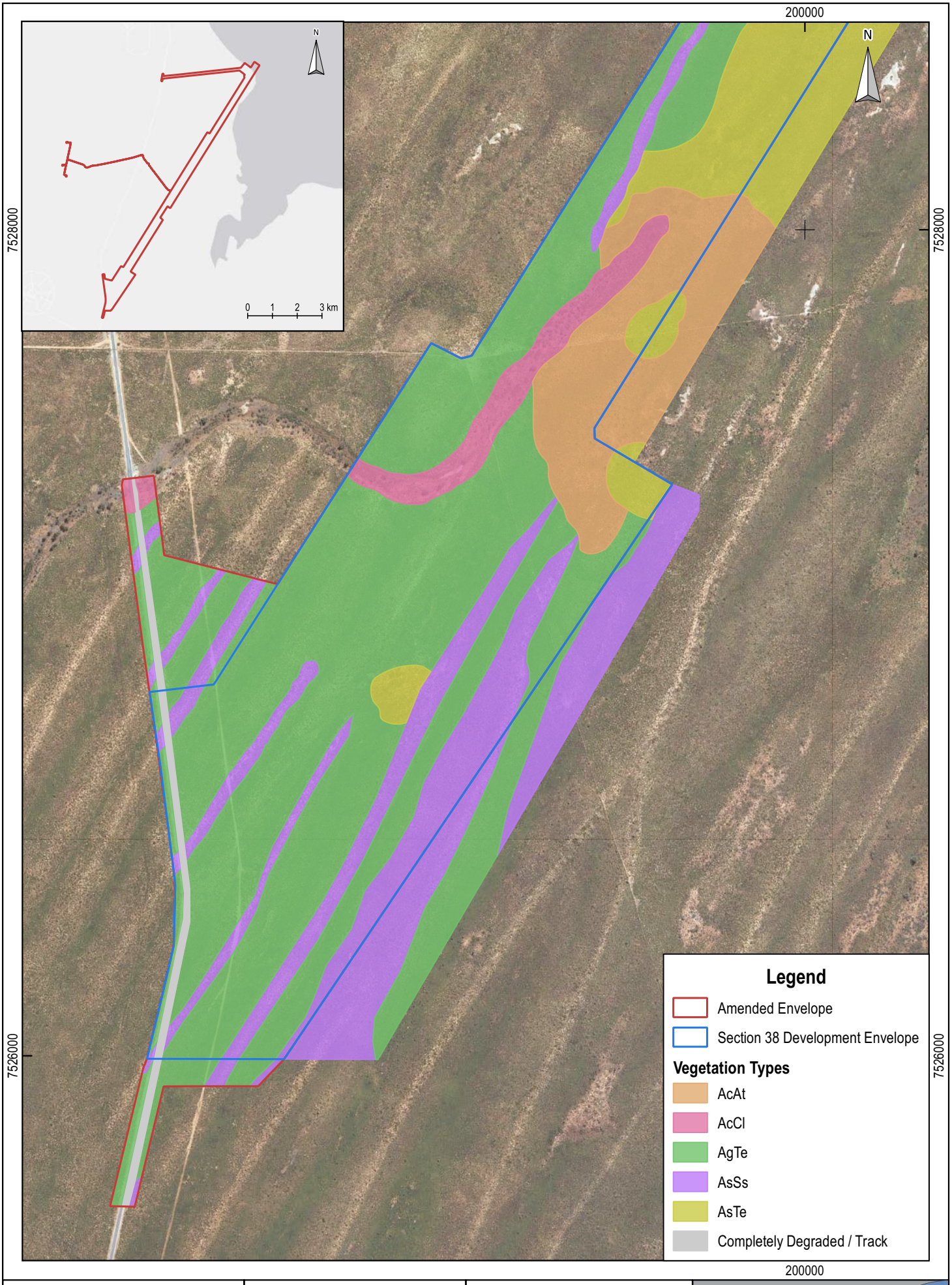

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Figure 2

Vegetation types within the additional onshore development envelope areas

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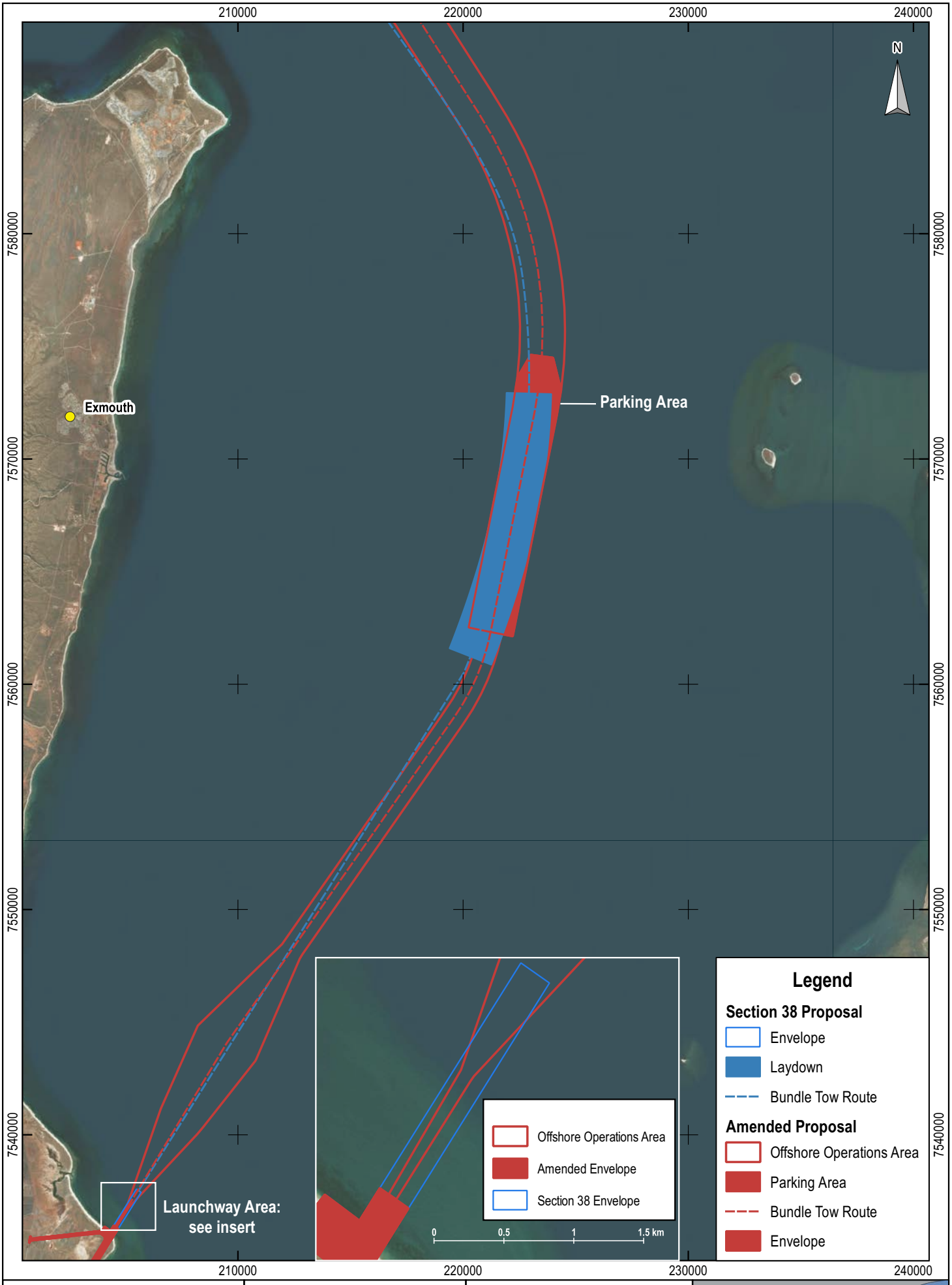

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Figure 3

Change to development envelope (Bundle launchway area, laydown area and tow route)

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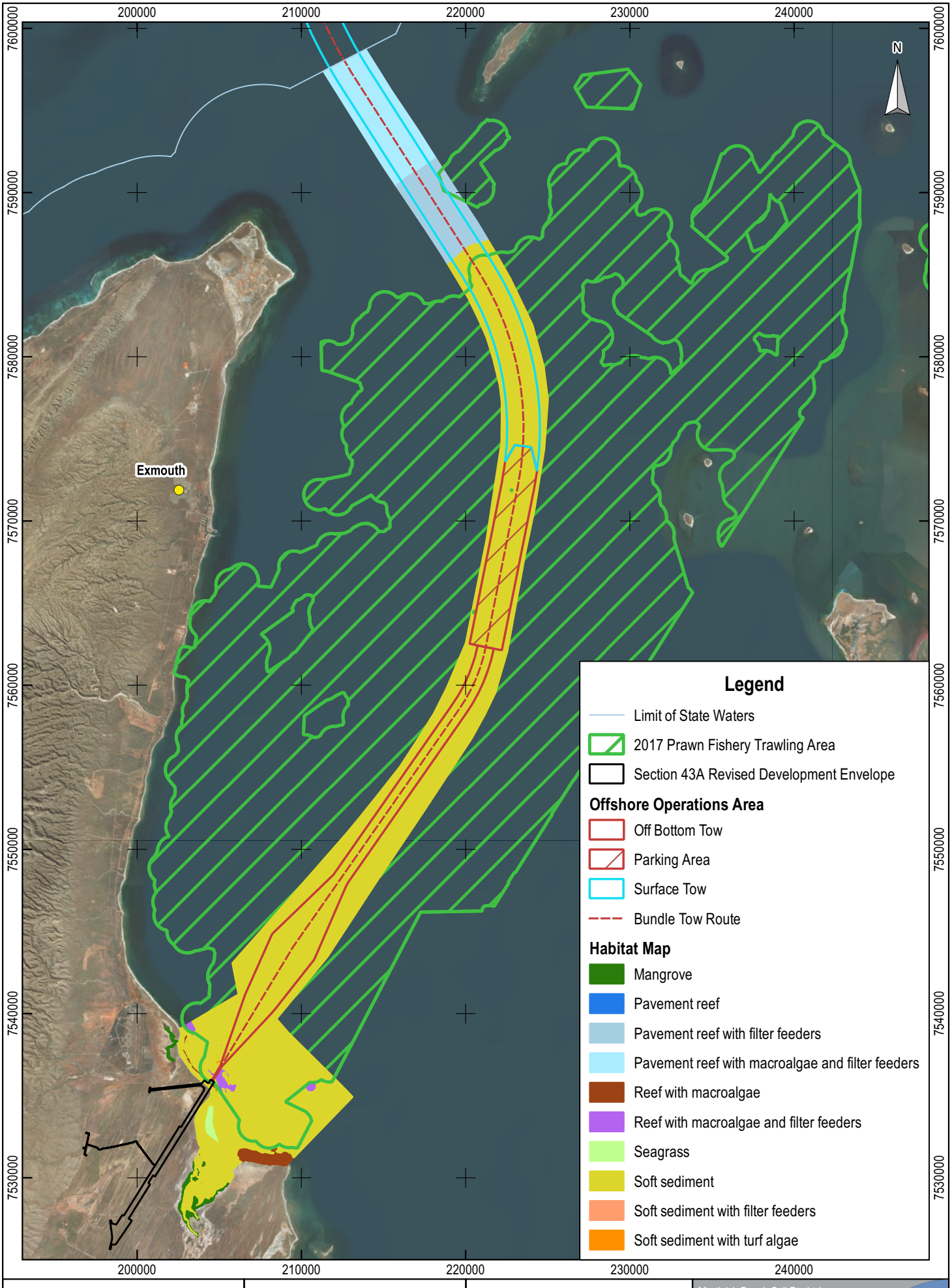

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Grid: EPSG:28350

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Figure 4

Offshore Operations Area, mapped BCH and the Exmouth Gulf Prawn Fishery Area

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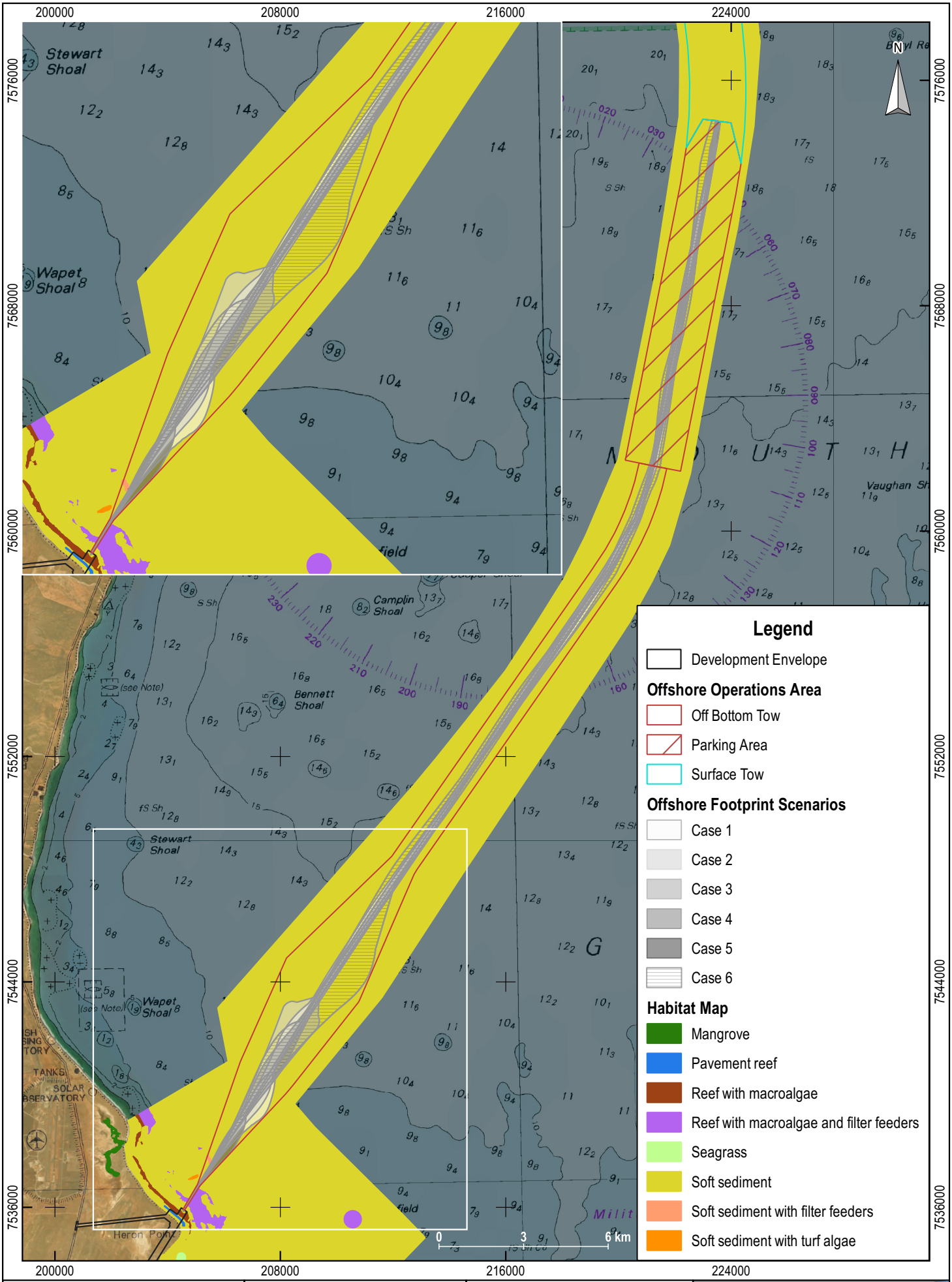

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Aerial Photo: ESRI Satellite and Commonwealth of Australia (2018)
Grid: EPSG:28350

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Figure 5

Potential Cumulative Direct Impact to BCH following multiple Bundle Launches

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