Learmonth Pipeline Fabrication Facility

Decommissioning and Closure Plan

APFAC017-HSE-00005

REVISION RECORD SHEET

Revision	Issue Date	Purpose	Description of Updated/Modified Sections (if any)
Draft 1	20.03.2019	Internal Review	NA
Draft	06.05.2019	External Review	Minor revisions following comments from Subsea 7
Final Draft	24.06.2019	External Review	Minor revisions to reflect amended Development Envelope and Development Footprint

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1. PROJECT DESCRIPTION

Subsea 7 proposes to construct and operate an onshore pipeline bundle fabrication facility on Lots 233 and 1586, which is located east of Minilya-Exmouth Road in Learmonth, Western Australia (approximately 35 km south of the Exmouth town site) (Figure 1).

The proposed Learmonth Pipeline Fabrication Facility (the Proposal) is currently under assessment by the Western Australia Environmental Protection Authority (EPA) under the *Environmental Protection Act 1986*.

The Proposal consists of an onshore pipeline Bundle fabrication facility and associated infrastructure, as well as two Bundle tracks approximately 10 km in length. The pipeline fabrication facility will include site offices, staff facilities, messing facilities, storage areas and car park. Other infrastructure will include a launchway, access roads, a spray field (for the discharge of treated wastewater), drainage sump, hydro testing water pond, drains and earthwork areas (Figure 2).

The Proposal site is zoned as 'Rural' under the Shire of Exmouth Local Planning Scheme No. 4. The Development Envelope is located on Crown Land and is subject to the 'Exmouth Gulf' Pastoral Lease which has a term of 39 years, 3 months, 1 day, that commenced on 1 July 2015.

Scale: 1:400000
Aerial Photo: ESRI Satellite
Original Size: A4
Grid: GDA 94 / MGA Zone 50

Notes: Location of proposed Bundle Site.

Subsea 7 Pipeline Fabrication Facility

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Figure 1: Learmonth Pipeline Fabrication Facility Proposal Location

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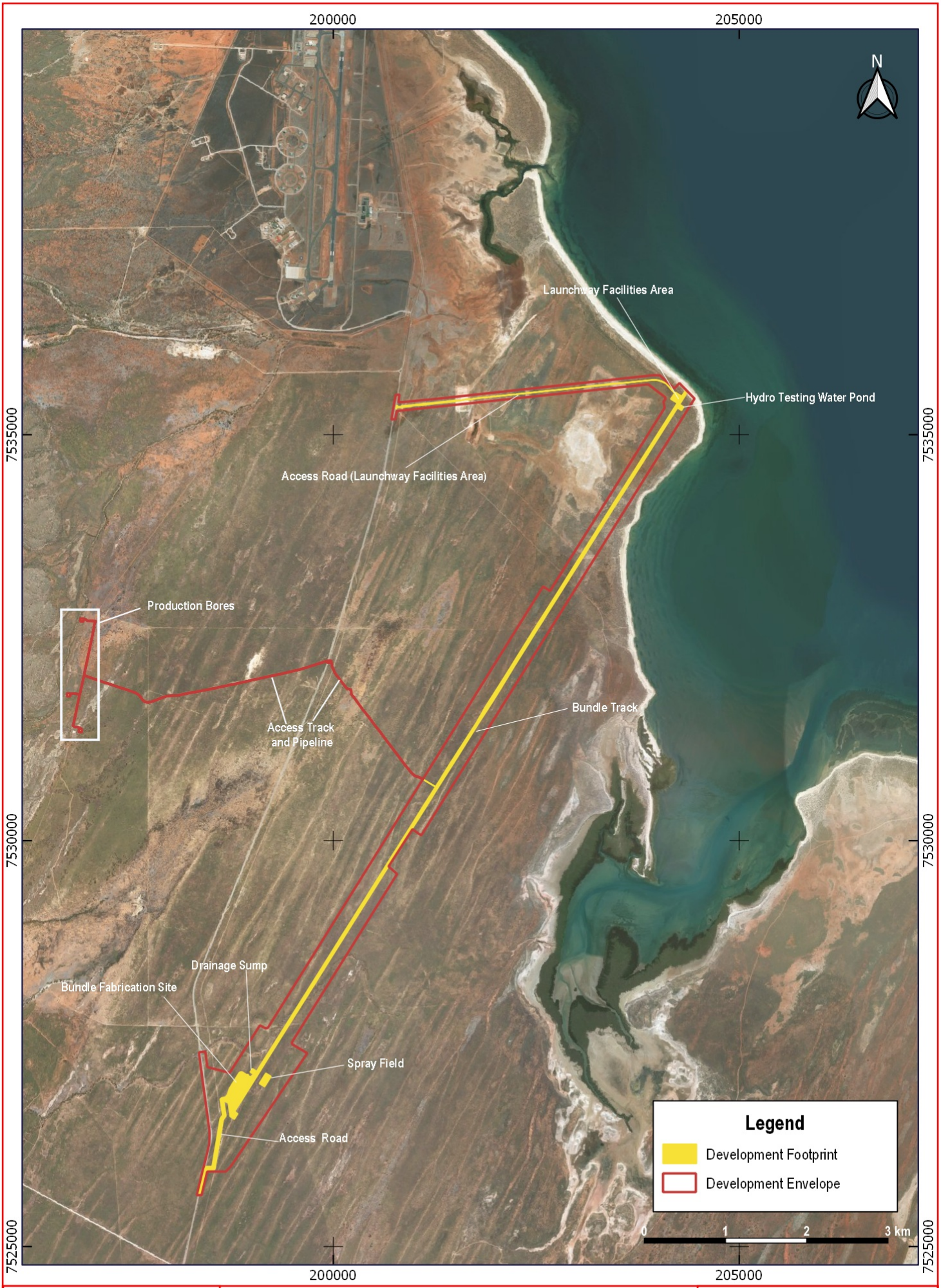

Scale: 1:60000
Original Size: A4
Aerial Photo: ESRI Satellite
Grid: GDA 94 / MGA Zone 50

Notes: Data sourced from Subsea 7 (2018).

Subsea 7 Pipeline Fabrication Facility

Figure 2: Learmonth Pipeline Fabrication Facility Proposal Development Envelope and Development Footprint

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2. SCOPE AND PURPOSE

The Decommissioning and Closure Plan (DCP, this document) has been prepared to accompany the Public Environmental Review (PER) to satisfy the requirements of the Environmental Scoping Document (ESD) with regard to the care and maintenance, decommissioning and closure of the Learmonth Pipeline Fabrication Facility.

The ESD (Table 5) specifically notes that closure and decommissioning activities are relevant to the following key environmental factors:

- Benthic communities and habitat.
- Coastal processes.
- Marine environmental quality.
- Marine fauna.
- Flora and vegetation.
- Subterranean fauna.
- Terrestrial fauna.
- Inland waters.
- Social surroundings.

The DCP also addresses the following ESD requirements:

- Table 4 Regional Context and Integrating Issues, required work item 3 (Regional Context and Integrating Issues):

  "Provide details of proposed care and maintenance, and decommissioning and closure of the proposal. Provide details of the potential risks and impacts to environmental values, and details of mitigation and management measures to ensure that the impacts are not greater than predicted."

- Table 5 Preliminary key environmental factors and required work, required work item 18 (Coastal processes):

  "Identify the proposed service life of the facility and anticipated service life of the facility and anticipated process of decommissioning. Include details of mitigation, monitoring and management that will apply during and after decommissioning."

The purpose of this DCP is therefore to:

- Describe the proposed care and maintenance, decommissioning and closure[1] of the Proposal.
- Describe the potential risks and impacts associated with closure and the associated mitigation and management measures.
- Describe a conceptual monitoring program to measure success of decommissioning and closure.

[1] The terms 'care and maintenance', 'decommissioning' and 'closure' are explained in the following sections.

3. STAKEHOLDER ENGAGEMENT

Stakeholder engagement is considered integral to effective closure planning. Consultation for the Proposal commenced during the site assessment process and is continuing through the environmental approvals process, as summarised in the PER (Section 3). Discussions regarding site closure have occurred during this consultation, and will continue during the operations phase to ensure appropriate planning and provisioning for closure is completed.

Stakeholder consultation will continue to aim to:

- Make stakeholders aware of the Proposal.
- Identify and record any stakeholder concerns, issues and recommendations.
- Address issues identified by stakeholders and address where practicable.

4. CLOSURE

4.1 CARE AND MAINTENANCE

Care and maintenance in the context of this Proposal refers to the periods in between Bundle projects where no active operations are occurring and the site is maintained in a state of readiness for the next project (nominally for periods of up to six to nine months). The overarching closure objective during care and maintenance is to ensure that the environment is safe, non-polluting and stable.

A reduced onsite workforce would be retained to maintain the site and undertake required monitoring and reporting. This workforce is likely to include:

- Fabrication Manager.
- Mechanics.
- Electrician.
- Administration Officer.
- Cleaner.
- Site Workers.
- Stores and Logistics Personnel.
- Water Cart Operator.

During care and maintenance the following activities will be completed:

- An environmental audit of the site to determine the status (environmental risk) of all components of the site.
- All mobile machinery/plant/equipment to be demobilised or washed down and appropriately stored.
- Reduce or cease groundwater abstraction but maintain bores.
- Undertake ongoing environmental management, such as dust suppression, as required.
- Maintain the buildings and infrastructure, including main access roads, in working order.
- General maintenance of Bundle track and launchway.
- Perform monitoring and reporting (as required).

4.2 DECOMMISSIONING AND CLOSURE

Decommissioning in the context of this Proposal refers the processes of dismantling/demolition and removal of infrastructure once operations have ceased. Once these processes are complete, and all rehabilitation[2] has been completed, the site has reached closure. For the purposes of this plan, decommissioning and rehabilitation are expected to occur as coinciding stages.

[2] Rehabilitation is defined as the return of disturbed land to a safe, stable, non-polluting/non contaminating landform in an ecologically sustainable manner that is productive and/or self-sustaining and consistent with the agreed post-Proposal land use. Rehabilitation outcomes may include revegetation, which is defined as the establishment of self-sustaining vegetation cover after earthworks have been completed (DMP 2015).

The Environmental Protection Authority's (EPA) objective for Rehabilitation and Decommissioning is to ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner.

Decommissioning will involve the removal of infrastructure from the site. Detailed planning for decommissioning will begin at least 12 months prior to the anticipated time of closure. This would involve developing detailed work plans for all infrastructure removal, including timing and equipment and personnel requirements.

All transportable infrastructure will be taken offsite for sale, recycling or disposal. Other infrastructure will be broken up prior to removal for sale, recycling or disposal. Any potentially contaminated soils will be identified, assessed and, if necessary, removed or remediated.

The Bundle launchway components, including concrete slabs and rock armour will be excavated and removed. A construction barge will be mobilised for the removal of launchway components offshore, for subsequent recycling or disposal onshore.

All onshore disturbed areas will be re-contoured to restore pre-development surface water drainage patterns and blend with the surrounding environment. Compacted areas would be deep ripped to allow for water infiltration and plant root penetration. The dune system in the vicinity of the Bundle track cut-through will be reinstated to match the shape and structure of the adjacent dunes. Topsoil stripped during construction will be respread over areas to be rehabilitated. Vegetation material cleared during construction will be re-spread on rehabilitation areas.

5. EXISTING ENVIRONMENT

5.1 BENTHIC COMMUNITIES AND HABITATS

Three intertidal BCH types were recorded at Heron Point:

- Fine sand.
- Pavement reef.
- Reef with macroalgae (360 Environmental 2017a).

Six subtidal BCH types were recorded off Heron Point:

- Soft sediment.
- Soft sediment with turf algae.
- Soft sediment with sparse seagrass.
- Soft sediment with filter feeders.
- Reef with macroalgae.
- Reef with macroalgae and filter feeders (360 Environmental 2017a, MBS Environmental 2018).

Within the Bay of Rest several mangrove species were recorded; Grey Mangrove (*Avicennia marina*), Stilted Mangrove (*Rhizophora stylosa*) and Club mangrove (*Aegialitis annulata*) (360 Environmental 2017a).

5.2 COASTAL PROCESSES

Shoreline movement plans show that the shoreline north of the launchway site has experienced accretion over the period between 1949 and 2018, although this general trend has been interspersed with periods of apparent erosion (M P Rogers 2019). South of the launchway site the shoreline has experienced far less movement. For the shoreline at the launchway site there is potential for both northerly and southerly sediment transport to occur due to the possible difference in wave exposure angle. For the shoreline south of Heron Point it is expected that sediment could only be transported in a southerly direction, since there is insufficient fetch length from the south west to generate any significant transport of sediment in a northerly direction.

5.3 MARINE ENVIRONMENTAL QUALITY

A water and sediment quality assessment (360 Environmental 2017b) found that:

- The physical parameters (temperature, salinity, and dissolved oxygen) were typical of the north western Australian coastline. No significant variation was observed vertically throughout the water column, except for measurements of higher turbidity nearer to the seabed.
- Turbidity increased with distance from the shoreline, correlating to an increase in fine sand proportion within sediments with increasing distance offshore.
- The levels of light attenuation fell well within regional measurements.
- Consistent with results of previous regional studies, the total and dissolved nutrient concentrations within the Gulf are limited. The chlorophyll and overall nutrient content measured was consistent within the regional and local context of the Gulf area.
- There was no indication of existing contamination within the study area.

Although the Gulf has been recorded to have a naturally turbid state due to wind, waves and tidal currents causing resuspension of the fine sediments, when measured for this Proposal, the turbidity values were found to be in the low range for tropical north-west Australian waters (360 Environmental 2017b).

A recent ocean current monitoring programme was completed by GHD (2018a) within Exmouth Gulf. The monitoring period included two full tidal cycles (22 May – 21 June 2018) and comprised two deployment locations. Additional instrumentation was deployed with the current monitoring equipment to record turbidity and photosynthetic available radiation (PAR) data. The average turbidity recorded at the launchway location was 4.3 NTU (or 3.6 if the storm of 5 June 2018 was excluded from the dataset). The average turbidity recorded in the vicinity of the Bundle parking area was 3.6 NTU. Additional turbidity measurements were made in November/December 2018, at a site 2 km offshore along the tow route and at a site 4.5 km offshore along the tow route. Numerous short-term turbidity peaks were recorded at up to approximately 30 NTU. Turbidities of above 10 NTU were recorded for longer durations (Subsea 7 2019).

5.4 MARINE FAUNA

A diverse marine fauna occurs in the Exmouth Gulf region, including conservation significant species such as Humpback whales, Humpback dolphins, Dugongs and turtles. Humpback whales are present in the Gulf during spring each year, with whales predominantly using water greater than 7 m depth for resting during their southward migration. Aerial surveys undertaken in 2018, between early August and early November (Irvine 2019) recorded relatively low numbers of Humpback whales (approximately 100) during the first half of August, before the numbers increased to a maximum of approximately 800 by mid-September. From this peak, numbers rapidly declined to approximately 50 by early November.

Dugong activity occurs predominantly on the east coast of the Gulf where there is shallow seagrass habitat. Turtles are present throughout the Gulf, with the highest densities in the southern and eastern regions.

Exmouth Gulf is known as an area of national and international conservation significance for a number of migratory bird species. During a survey of migratory shorebirds within the Shorebird2020 'Bay of Rest North' survey area in October 2018, during the southward migration, 345 birds were recorded roosting at high tide, with 179 being migratory shorebirds, the most common being Red-capped Plover, Greater Sand Plover and Grey-tailed Tattler (Western Wildlife 2019). No migratory shorebird recorded approached the 1% population criterion, 0.25% staging criterion or 0.1% national significance criterion for their species. In January 2018 the most abundant species utilizing the Heron Point area were the Bar-tailed Godwit, Eastern Curlew, Great Knot and Grey-tailed Tattler. Again no migratory shorebird recorded approached the 1% population criterion, 0.25% staging criterion or 0.1% national significance criterion for their species (Western Wildlife 2019).

5.5 FLORA AND VEGETATION

Project specific surveys identified 126 flora species, representative of 87 genera and 32 families within the survey area. The majority of the taxa that were recorded within the survey area included Fabaceae (24 taxa), Chenopodiaceae (10 taxa) and Poaceae (10 taxa). Surveys identified *Acacia* spp. as the most frequently occurring genus, with the majority of vegetation within the Development Envelope comprising of *Acacia* shrubland vegetation communities. No TECs or Priority Ecological Communities (PECs), designated as Critically Endangered occur within a 10 km radius. No recorded vegetation types within the survey

area are considered to represent a Threatened Ecological Community or Priority Ecological Community.

The vegetation condition of the survey area ranged from Very Good to Completely Degraded, with the majority (83%) of the area considered Very Good (360 Environmental 2018). All vegetation types mapped within the surveys for the Proposal are considered typical in the Carnarvon bioregion.

One Priority flora species, *Corchorus congener* (Priority 3) has been recorded as abundant within the Development Envelope and across the wider area (360 Environmental 2018).

Eight introduced species were found during the flora survey, although none were listed Declared Pests or Weeds of National Significance (WoNS) under the *Biodiversity and Agriculture Management Act 2007* (BAM Act).

5.6 SUBTERRANEAN FAUNA

Reviews to assess the likelihood of subterranean fauna within the proposed Bundle site identified that the presence of troglofauna was unlikely due to unsuitable sediment (fine grained units) supporting too small of pore spaces for appropriate habitat, and no known karstic habitat (Invertebrate Solutions 2017, Bennelongia 2017).

A three phase stygofauna survey was conducted to document the stygofauna species present in, and adjacent to, the Development Envelope and to determine whether stygofauna may be impacted by the Proposal. Twenty bores were sampled, with each bore sampled three times (in October 2018, January 2019 and April 2019) (Bennelongia 2019). A total of 180 specimens belonging to 11 species were collected during the three phases of the survey. All species collected were crustaceans and comprised two amphipods and nine copepods. The Blind shrimp (*Stygiocaris stylifera*), listed as a Priority 4 species, was recorded from bores within the proposed borefield (Bennelongia 2019). This species is also known from the northern end of the Cape Range Peninsula. Stygofauna were not collected from any of the bores in the sand plain adjacent to the proposed fabrication shed and sprayfield locations (Bennelongia 2019). No significant impacts as a result of the Proposal are expected.

5.7 TERRESTRIAL FAUNA

Four broad fauna habitats were identified within the Development Envelope with all considered widespread and common in the Exmouth region (360 Environmental 2017c).

Field assessment indicated the presence of 40 species from 29 families, including six conservation significant species, the latter all being birds. No critical habitat for any of the species was recorded in the Development Envelope (360 Environmental 2017c). It was considered unlikely that the nine confirmed SRE species of land snails that occur within the region occur within the Development Envelope (Invertebrate Solutions 2017).

5.8 INLAND WATERS

The topography of the site is characterised by an the elevation ranging from approximately 25 m Australian Height Datum (AHD) inland to 0 m AHD at the coast and generally slopes from the south west end to the north east. Topographical data indicates the site drains internally, with a coastal dune preventing discharge to the ocean (GHD 2018b). Surface water modelling showed that there will be very little change to maximum water levels as water is allowed to pass under the Bundle track through a culvert and an open drain conveys flows along the Bundle track alignment, ending up in the same end location as

current flows. Other than these points, surface water flow patterns are expected to remain similar to baseline flow patterns, and changes to flow velocities are not expected to alter any natural scour or sediment deposition characteristics of the area

The groundwater flow direction was found to be largely consistent with the topography, with a general easterly flow direction, with groundwater discharging along the coast. Within the proposed fabrication shed area, groundwater appears to be flowing in an east south easterly direction, whereas in the area closer to the proposed Bundle launchway, groundwater was flowing in a more easterly direction. The greatest depth to groundwater is around 22-32 m below ground level (bgl) depending on location. The shallowest depth to groundwater is found in the low lying bores located closest to the coast where groundwater occurs at a depth of less than 1.5 m bgl. In the main fabrication area, groundwater is found to occur at a depth of between 12 and 17 mbgl.

Groundwater quality at the site is typified by two distinct groundwater signatures:

- Salt dominant groundwater (hypersaline i.e. higher salinity than sea-water) in bores located in the main project footprint.
- Fresh to slightly brackish groundwater for those bores sampled in the western area representing the proposed groundwater supply area.

5.9 SOCIAL SURROUNDS

The Exmouth region is located within the Western Australian Planning Commission's (WAPC) Gascoyne Planning Region and is subject to the strategic regional land-use plan – The Ningaloo Coast Regional Strategy Carnarvon to Exmouth (WAPC 2004) (Ningaloo Coast Regional Strategy). Exmouth is the gateway to the Ningaloo World Heritage Area, including the Ningaloo Marine Park and Cape Range National Park. The town is situated in the disparity between the flat, low lying Ningaloo Coast and the steep topography of the Cape Range. The landscape provides quality scenic values and an array of outdoor activities including fishing, boating, scuba-diving, swimming, whale-watching, camping, hiking and four-wheel driving. The community has reported that the general Heron Point area is used for recreational four-wheel driving, camping and fishing via various access tracks across the Exmouth Gulf Station. Heron Point and its immediate surrounds is not a gazetted or a Shire approved camping site.

Subsea 7 has had ongoing engagement with the Yamatji Marlpa Aboriginal Corporation (YMAC), acting for the Gnulli Native Title Claim Group (Gnulli NTCG) throughout the development of the Proposal and has obtained an Infrastructure Heritage Agreement with YMAC, acting for the Gnulli NTCG. The agreement sets out the process for managing potential impacts on heritage as a result of the implementation of the Proposal (SJC Consultants 2019). In accordance with the agreement, two Aboriginal heritage surveys were undertaken for sites of archaeological and ethnographic significance, with representatives of the Gnulli NTCG. No sites of archaeological significance were recorded by the heritage survey team (SJC Consultants 2019).

6. POTENTIAL RISKS AND IMPACTS

6.1 CARE AND MAINTENANCE

The potential risks and impacts to each of the key Environmental factors during care and maintenance are outlined in Table 1.

EPA Factor	Care and Maintenance	
	Risk/Impacts	**Mitigation Measure**
Benthic Communities and Habitat	None (no activities occurring that pose a risk of impact to BCH)	NA
Coastal Processes	Ongoing presence of the launchway affecting longshore sediment transport	Beach profiles to be monitored as during active operations phase and mitigation measures implemented as required.
Marine Environmental Quality	None (no activities occurring that pose a risk of impact to Marine Environmental Quality)	NA
Marine Fauna	None (no activities occurring that pose a risk of impact to Marine Fauna)	NA
Flora and Vegetation	Spread of existing weed and/or the introduction of new weed species.	Mitigation measures as for operations: • Implementation of weed hygiene system. • Earth moving machinery (if required for track or dune maintenance) will be cleaned of soil and vegetation prior to entering or leaving the Development Envelope. • No weed affected soil, mulch or fill will be brought into the Development Envelope. • Vehicles and equipment will keep to designated roads and tracks.

EPA Factor	Care and Maintenance	
	Risk/Impacts	**Mitigation Measure**
	Spill or leak of hazardous materials causing damage to flora and vegetation.	• Low volumes of hazardous materials held onsite with any spill having highly localised impacts. • Robust hazardous materials storage and handling procedures as per operations. • Onsite presence maintained and routine inspections completed to ensure any leak or spill is detected and reported.
Subterranean Fauna	Minor risk of impact through groundwater abstraction and wastewater discharges (abstraction and discharge volumes will be less than for operations) and spills/leaks of hazardous materials.	Mitigation measures as for operations: • Chemical storage and handling procedures to prevent leaks or spills. • Refuelling to occur on concrete or HDPE-lined pads to contain any drips and spills. The pads will drain to a sump to allow removal of collected material. • Spill kits will be located at strategic locations throughout the project area and employees trained in their use. • Spills will be cleaned up and contaminated soils will be removed from site by a licensed third party. • Remediation and rehabilitation of any contaminated areas. • Monitoring of groundwater levels to provide an early warning of drawdown beyond modelled levels.
Terrestrial Fauna	Spread of existing weed and/or the introduction of new weed species reducing habitat values.	Mitigation measures as for operations: • Implementation of weed hygiene system. • Earth moving machinery (if required for track or dune maintenance) will be cleaned of soil and vegetation prior to entering or leaving the Development Envelope. • No weed affected soil, mulch or fill will be brought into the Development

EPA Factor	Care and Maintenance	
	Risk/Impacts	**Mitigation Measure**
		Envelope. • Vehicles and equipment will keep to designated roads and tracks.
	Predation or competition by feral animal species attracted to shelter and any waste stored onsite, impacting on populations of native terrestrial fauna.	Low impacts due to limited activity occurring onsite during care and maintenance. Mitigation measures as for operations: • Minimise access to waste and water for feral animals. • Feral animal control if required.
	Spill or leak of hazardous materials impacting fauna or fauna habitat if present adjacent to facilities.	• Low volumes of hazardous materials held onsite with any spill having highly localised impacts. • Robust hazardous materials storage and handling procedures.
	Movement of machinery or vehicles may cause injury or death to terrestrial fauna.	Low impacts due to limited activity occurring onsite during care and maintenance. Mitigation measures as for operations: • Vehicle traffic will be confined to defined roads and tracks and have speed limits implemented and enforced. • The site induction program will provide information on fauna of conservation significance, including their appearance and habitats.
Inland Waters	Change in surface water drainage patterns due to infrastructure.	• Maintenance of surface water diversion infrastructure (i.e. culverts under Bundle track). • Drainage infrastructure onsite inspected frequently for effectiveness and maintained.
	Impact to groundwater levels due to abstraction.	• Adhere to limit on groundwater abstraction to comply with abstraction licence. • Monitoring of groundwater levels to provide an early warning of drawdown beyond modelled levels.

EPA Factor	Care and Maintenance	
	Risk/Impacts	**Mitigation Measure**
	Contamination of surface or groundwater due to wastewater discharge or spills/leaks of hazardous materials.	• Discharge of wastewater undertaken to minimise potential groundwater/ surface water contamination. • Low volumes of hazardous materials held onsite with any spill having highly localised impacts. • Robust hazardous materials storage and handling procedures.
Social Surrounds	The presence of the fabrication facility may potentially reduce aesthetics of the visual landscape.	• Local stakeholder group to be maintained during Care & Maintenance period for continued information sharing.

Table 1: Risks and Impacts During Care and Maintenance

6.2 DECOMMISSIONING AND CLOSURE

The potential risks and impacts to each of the key Environmental factors during decommissioning and closure are outlined in Table 2.

EPA Factor	Decommissioning and Closure	
	Risk/Impacts	**Mitigation Measure**
Benthic Communities and Habitat	The works associated with the removal of the launchway are likely to generate localised turbidity associated with disturbance of surface sediments. As for the construction phase, the area within the immediate vicinity of the launchway footprint (< 50 m) has been defined as a Zone of Moderate Impact (the ZoMI) within which impacts on benthic organisms may occur, but are recoverable within a period of five years. Given the tolerance of such BCH types (refer Subsea 7 2019); any impacts are expected to be more short term (< 1 year).	• Silt curtains deployed as required to contain sediment plume. • Suspension of turbidity-generating construction activity as required. • Launchway decommissioning activities limited to daylight operations.
Coastal Processes	Upon decommissioning of the facility it is anticipated that the shoreline would realign following removal of the launchway. This realignment would likely result in some erosion of the northern shoreline, where any accretion has occurred in response to the presence of the structure. Concurrent sediment accretion along the southern shoreline would occur as the sediment is transported southwards (Subsea 7 2019). It is anticipated that such changes would occur over a relatively short duration (months).	Management of onshore sediment accretion via monitoring and sand bypassing.
Marine Environmental Quality	The works associated with the removal of the launchway are likely to generate localised turbidity associated with disturbance of surface sediments.	• Silt curtains deployed as required to contain sediment plume. • Suspension of turbidity-generating construction activity as required.
Marine Fauna	Direct impact or temporary low level underwater noise emissions during launchway removal.	• Deployment of silt curtains around active decommissioning areas to assist in preventing

EPA Factor	Decommissioning and Closure	
	Risk/Impacts	**Mitigation Measure**
		marine fauna from entering these areas. • Use of a Marine Fauna Observer (MFO) during marine decommissioning activities to ensure no listed marine fauna enter within a 'marine fauna exclusion zone' of 50 m surrounding active works (e.g. removal of rock fill or pre-cast slabs). • Launchway decommissioning activities limited to daylight operations.
Flora and Vegetation	Spread of existing weed and/or the introduction of new weed species.	• Earth moving machinery will be cleaned of soil and vegetation prior to entering or leaving the Development Envelope. • Vehicles and equipment will keep to designated roads and tracks. • A weed hygiene system will be implemented to avoid the spread of existing populations and the establishment of new populations within the Development Envelope. • Weed control to be implemented following closure as required.
	Spill or leak of hazardous materials causing damage to flora and vegetation.	• Hazardous materials will be stored in accordance with relevant Australian Standards. • Refuelling will occur on concrete or HDPE-lined pads to contain any drips and spills. The pads will drain to a sump to allow removal of collected material. • Spill kits will be located at strategic locations throughout the project area and employees trained

EPA Factor	Decommissioning and Closure	
	Risk/Impacts	**Mitigation Measure**
		in their use. • Spills will be cleaned up and contaminated soils will either be treated in situ or removed from site by a licensed third party. • Remediation and rehabilitation of any contaminated areas.
	Indirect loss or degradation of native vegetation due to dust emissions.	• Vehicles and equipment will keep to designated roads and tracks. • Water cart used during ripping of compacted surfaces or respread of topsoil to prevent significant dust emissions. • Respread of cleared vegetation over rehabilitation areas to protect the soil from erosion. • Progressive rehabilitation will be undertaken on impacted areas (as required).
	Poor establishment of native vegetation following closure.	• Deep rip compacted surfaces prior to respread of topsoil. • Respread of cleared vegetation over rehabilitation areas to protect the soil from erosion. • Seeding of rehabilitation areas to promote return of native vegetation. • Fencing of site maintained during rehabilitation to prevent grazing by sheep or cattle.
Subterranean Fauna	None (no activities occurring that pose a risk of impact to subterranean fauna)	NA

EPA Factor	Decommissioning and Closure	
	Risk/Impacts	**Mitigation Measure**
Terrestrial Fauna	Removal of infrastructure and recontouring of site may cause a temporary loss of fauna habitat	• Minimise disturbance beyond infrastructure footprint.
	Spread of existing weed and/or the introduction of new weed species causing habitat degradation.	• Earth moving machinery will be cleaned of soil and vegetation prior to entering or leaving the Development Envelope. • Vehicles and equipment will keep to designated roads and tracks. • A weed hygiene system will be implemented to avoid the spread of existing populations and the establishment of new populations within the Development Envelope. • Weed control to be implemented following closure as required.
	Decommissioning works or vehicle movements may cause injury or death to terrestrial fauna.	Mitigation measures as for operations and care and maintenance: • Vehicle traffic will be confined to defined roads and tracks and have speed limits implemented and enforced. • The site induction program will provide information on fauna of conservation significance, including their appearance and habitats. • Fauna will be recovered and relocated if displaced during decommissioning and closure.
Inland Waters	Change in surface water drainage patterns following infrastructure removal.	• Reinstatement of natural drainage patterns. • Post-closure drainage design to be stable under

EPA Factor	Decommissioning and Closure	
	Risk/Impacts	**Mitigation Measure**
		future extreme weather events. • Post-closure inspection of drainage patterns to identify any erosion or stability issues, which will be remediated.
Social Surrounds	The removal of the fabrication facility may temporarily reduce aesthetics of the visual landscape.	• Stakeholder engagement prior to decommissioning and closure. • Minimise duration of decommissioning and closure.

Table 2: Risks and Impacts During Decommissioning and Closure

7. CONCEPTUAL MONITORING PROGRAM

7.1 CARE AND MAINTENANCE

Monitoring during care and maintenance will include:

- Inspection of work areas to identify and chemical leaks or spills.
- Inspection of fences to ensure sheep and cattle are excluded from the site.
- Inspection and maintenance of surface water management infrastructure to ensure it remains sediment and debris free.
- Inspection of surface water management infrastructure and surrounding areas to monitor for erosion impacts.
- Inspection of launchway vehicle crossing to ensure this can be safely navigated by the public.
- Regular monitoring of groundwater levels in accordance with abstraction licence conditions.
- Survey of beach profiles adjacent to launchway (annual).
- Inspections, including photographic monitoring, of shoreline adjacent to launchway (annual).

7.2 DECOMMISSIONING, CLOSURE AND POST CLOSURE

7.2.1 Decommissioning

Twice daily (approximately 10am and 2pm) visual monitoring of turbidity will be completed during launchway removal. In the event of persistent turbidity, an assessment of water quality at the 50 m boundary of the site will be completed, with mitigation measures implemented as required.

7.2.2 Post Closure

Post closure monitoring will include:

- Annual inspection of fences to ensure sheep and cattle are excluded from the site during the rehabilitation period (see below).
- Annual inspection of surface water management infrastructure and surrounding areas to monitor for erosion impacts (for three years post closure).
- Periodic monitoring of groundwater levels, as required to demonstrate a return to pre-development levels.
- Annual monitoring of the shoreline position for a period of three years to monitor recovery of pre-development beach alignment.
- Annual monitoring of rehabilitation success, using fixed quadrats/plots for a period of five years. Indicative completion criteria will be as follows:
    - Vegetation is comprised of local species based on soil physical characteristics and local comparative sites.
    - Average % vegetation cover within rehabilitated areas comparable to that of surrounding areas with comparable physical attributes.
    - Vegetation demonstrates ability to become self-sustaining by having reproductive structures (eg. flowers, fruit or seeds) and the concurrent

presence of multiple life stages of plants (e.g. seedling, juvenile, mature and senescent).

- Presence of weed (introduced) species within rehabilitated areas does not exceed that in surrounding areas with comparable physical attributes.

8. REFERENCES

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