

Assessment findings

Assessment ID [4937](#)

Duty holder: ConocoPhillips Australia Exploration Pty Ltd
Facility/Activity: Barossa Gas Export Pipeline Installation
Facility type: Petroleum Activity
Assessment type: Environment Plan (Development)

Findings relating to OPGGS(S)

Regulation Clause ID	Regulation Clause	Topic Scope	Comment
1	Environment Plan is appropriate for nature and scale of activity	General	<p>The activity is clearly scoped and bounded</p> <p>Scope</p> <p>The activity consists of the installation of a 262km long, 26" pipeline and includes: pre-lay survey and includes MBES, SSS, subbottom profiling, visual inspection options (section 3.4.1) and underwater acoustic positioning (s3.4.2). Installation of pre and post lay span rectification and correction works, installation of PLETs & foundations, local stabilisation & scour mitigation, flooding/cleaning/gauging and testing activities, dewatering and pre-conditioning activities, transport of linepipe and structures to the field and vessel support and resupplying activities are also covered under the EP scope. transit of the linepipe supply vessels and support vessels to or from the Operational Area, are outside the scope of this EP. Section 3.1 (Activity Overview) lists the key activities associated with the activity and includes "delivering and transferring linepipe (sections of pipe) to the pipelay vessel"; Need to clarify the scope of vessel movement.</p> <p>Vessels</p> <p>Contracts for vessels have not been awarded however a brief description of the various activity vessels required (prelay/post lay, pipe installation, line pipe, supply and other) is provided in section 3.3. Activity requires up to 15 vessels for the installation activities (table 3.1). EP confirms no bunkering activities within 20km of TWI Islands (s3.3). ISSUE</p> <p>Anchoring - clear commitment that supply vessels will not anchor in the operational area (s3.3.4) and pipelay vessel EPS2.3.1 confirms pipelay vessel will use DP at all times (pg127), s3.3.3 states all linepipe supply vessels have DP capability but do they plan to anchor? In addition the seabed disturbance risk assessment include performance standard EPS2.7.1 which states "all anchoring restricted to the areas beyond named banks and shoals (pg128) however the potential impacts from vessel anchoring have not been identified as a source of risk (s5.2.2) and subsequently not risk assessed. It is unclear what activity this EPS is for (EPS appears not to be linked to pipelay initiation anchoring). The description of the activity and EPS in the seabed risk assessment result in uncertainty around vessel anchoring activities. Please provide details (e.g. when, where and which vessels) anchoring will occur on, noting the increased risks and impacts in areas of shallow water. In addition consultation in appendix E [REDACTED]</p> <p>[REDACTED] pipeline installation activities</p> <p>is broken down into site survey (s3.4.1), underwater acoustic positioning (s3.4.2), installation of supporting structures (S.3.4.3), Span rectification (3.4.4), pipeline initiation anchor deployment, (s3.4.5), pipeline installation (s3.4.6), end termination structures (s3.4.7), seabed footprint (s3.4.8), Flood, Clean, Gauge and Pressure Testing (s3.4.9) and dewatering/Pre-conditioning (s3.4.10). Seabed disturbance activities associated with the installation of supporting structures (s3.4.3) and span rectification (s3.4.4) is described however it is unclear if any of these activities occur within marine park areas or shallow water (from the description of the activity provided). EP would benefit from clear clarification as to the location of these specific activities. Span rectification options include concrete mattresses, grout bags, mass flow excavation, pan shoulder modification, rock dumping vortex induced vibration strakes and mechanical support structures. Descriptions include approximate or "typical" seabed disturbance estimates or figures for each option/method. A initiation anchor (s3.4.5) is required for pipeline installation and consists of a 1,240m² seabed disturbance. Number of times it will need to be deployed (i assume once) needs to be verified and the location where it will be deployed to be confirmed. The estimated seabed footprint from gas export subsea infrastructure is provided in Table 3-6 and includes installation of supporting infrastructures, pipeline, span rectification & stabilisation works plus a 20% contingency with a total of 28.7Ha. Section 3.4.8 states that the calculations are an estimation only. The EP needs a firm commitment of</p>

the maximum seabed disturbance figure. Post installation activities Section 3.4.9 (Flood, Clean, Gauge and Pressure Testing) describes the pigging activities which include the use of chemically treated seawater (biocide, oxygen scavenger and dye). Proposed biocides and the concentrations (based on a for a 2-year preservation period) are listed. RFFWI - Details (including proposed concentration levels) of oxygen scavenger have not been specified. Treated seawater will be discharge to the marine environment after each pig run. Planned discharges from pigging activities is estimated at 15,000 m3 of treated seawater if from FPSO PLET location or ~12,000 m3 o at the Bayu-Undan PLET location. Discharge may occur at seabed (through a vertical diffuser) or surface over 1 to 2 days. An estimate of ~2000 m3 of treated seawater to be discharged after hydrostatic testing. Dewatering and pre-condition activities (section 3.4.10) involves the discharge approx 85,000 m3 of treated seawater (discharged over 3 to 7 days), and up to approx 1,000 m3 of MEG (over a period of less than one day). Majority of the dewatering fluid will occur at the seabed via a vertically orientated diffuser at the FPSO PLET. MEG could be discharged at the seabed or the surface. Chemical selection procedure is described in section 3.5 and all chemicals for subsea activities (and discharge) to be rated as Gold or Silver under OCNS CHARM model; and if not rated under the CHARM model, has an OCNS group rating of D or E. Contingencies - Wetbuckle (3.6.1) and a stuck pig (3.6.2) have been identified as potential contingency activities. Both include the discharge of additional treated seawater. No details on estimated volume have been provided. Non rated subsea chemicals will only be considered after a risk assessment and approval. EP details the risk assessment considerations (technical justifications, additional controls, the proposed use, quantity, receiving environment, ecotoxicity information. QUERY - [REDACTED] to review process.

Location/Operational Area

Operational area is defined as 2,000 m either side of the gas export pipeline route (s3.2.1) except where the width of Operational Area has been reduced to the east and west of the pipeline centreline to remain within the pipeline installation corridor presented in the accepted OPP; and at the PLET locations where it is expanded to 3000m radius. Operational Area encompasses the installation of the gas export pipeline and support vessel movements in the immediate vicinity of the pipelay vessel (s3.2.1). Operational areas is within the CMA, and overlap part of the Oceanic Shoals AMP - The proposed Barossa gas export pipeline route traverses a 30 km section through the Multiple Use Zone and 31.5 km through the Habitat Protection Zone (pg16, S 2.1.4.1). Specific details, including lat and long coordinates, of the entry and exit points for the pipeline in AMP zones are given in Table 3-3. Prelay site surveys (s3.4.1) states that an allowance of 250m either side of the pipeline route is provided. Timing - Activity is proposed to take up to 9 months to complete and occur between Q4 2020 and Q1 2024 (s3.1) and subsequently covers all seasons. Pre-lay survey could commence up to nine months earlier than pipeline installation, and pre-lay span rectification may occur up to 30 days prior to pipeline installation.

Things to Check:

3) Activity description does not clearly define or scope the proposed activities that will occur in shallow water or near sensitive environments. Check to makes sure this is addressed in RA activities in shallow water clearly defined and scoped?

ISSUES - Activity Scope

Pipeline location - The environment plan details a selected route and pipeline construction however the EP does not adequately detail and demonstrate that the chosen location is the most environmentally appropriate. For example the EP states The design of the gas export pipeline route considered the survey data in order to avoid rugose areas of the seabed and highrelief seabed features and therefore the design reduces the number of spans that require rectification. The extent survey work used to inform selection of a preferred route is not clear (e.g. were a number of routes/areas surveyed from which the best outcome was selected or was a single route surveyed?). Please provide further and detail to justify how the proposed pipeline route ensures impacts will be reduced to ALARP. Transport of pipeline - EP includes two options for the transport of pipeline. Section 3.3.3 states general cargo vessels may be used to transport linepipe from the international loading yard to sheltered waters near the Operational Area where the linepipe would then be transhipped onto pipe supply vessels (PSVs) and transported to the pipelay vessel. Alternatively, purpose-built DP general cargo vessels may be used to transport linepipe directly from the international loading yard to the pipelay vessel within the Operational Area. It is unclear if the sheltered waters option is within the proposed EP activity area. If it occurs outside the EP activity area it appears the activity may fall outside of the scope of the approved OPP. Initiation anchor is required - 1200m3 footprint (s3.4.5). Section 5.2.2 (pg 116) states the initiation anchor may be installed at either the Bayu-Undan tie-in PLET location, the FPSO PLET location, or at a point in between. Please provide further information and detail regarding where the initiation anchor will be installed and, identify and evaluate environmental impacts in the context of the specified location/s. Dewatering discharges - The approved OPP states (as a control measure) that the dewatering of flooding fluid will be detailed in the relevant activity specific EP's during the detailed engineering and design studies of the project. The OPP control measure (pg41) also states that the EP's will detail dewatering requirements, including definition of discharge characteristics (i.e. chemical additives and concentrations). Please provide the details of all discharge additives, including proposed concentration levels and thresholds (e.g. oxygen scavenger and dye). The environment that may be affected is suitably understood

General

Operational area sits within a water depth of 33m to 254m and EMBA from 10m to 200m. EMBA based on credible hydrocarbon spill scenario of a vessel to vessel collision (worst case scenario). Operational does not overlap any shoals or banks however several are located in close proximity to the operations area with the nearest being 0.9km (table 4-1). Operational area bathymetry and seabed features consists of smooth to moderate slopes of fine to medium sands/silts and clay, with pockmarks and occasional outcrops in the north and areas of highly irregular relief, smooth sandy/silty seabed and rock/reef outcrops with coarse sediments in the south. The Operational Area passes the Tiwi Islands for approximately 70 km, approximately 6 km at the closest point (s5.2.4). Sensitive Environments

Key Environmental Characteristics of the Operational Area and EMBA are described in table 4-1 and includes two KEFs (s4.4.4) and critical habitat for flatback turtles and olive ridley turtles which overlap both the Operational Area and the EMBA (s4.4.3.4). One BIA (flatback turtle interesting habitat) overlaps operational area and 4 BIAs overlap the EMBA. The EMBA and operation area do not intersect any World or National Heritage places, wetlands of International Importance, or TEC (section 4.4.2.1/table 4.3). 22 listed threatened species and 43 migratory species identified within the EMBA and operational area (section 4.4.2.1/table 4.3). Values and sensitivities of a Commonwealth marine area (including AMPs) and Commonwealth land - Pipeline traverses two zones of the Commonwealth Oceanic Shoals Marine Park: a 30 km section through the Multiple Use Zone; and 31.5 km through the Habitat Protection Zone (s2.1.4). The location of the activity is described in section 3.2 and includes coordinates of start/end of pipeline (table 3-2) and where the pipeline enters/exits the Multi Use Zone and Habitat protection zone areas (table 3-3). Figure 4-10 displays the location of AMP and protection areas in relation to the pipeline. Operational area and EMBA overlap one Commonwealth managed fishery (Northern Prawn Fishery) and five NT managed fisheries (section 4.5.7). Tiwi Islands are a declared Aboriginal reserve and comprise a number of protected sacred sites (s4.5.6) ISSUES

Noting the document is a public document i query the appropriateness of the statements around critical habitats. The EP includes statements that may appear to the reader as contradicting. S4.4.2.1 states "No critical habitats or threatened ecological communities, as listed under Section 207A of the EPBC Act, are known to occur within the Operational Area or EMBA" and then the EP goes on to state that critical habitat for flatback turtles and olive ridley turtles occurs within operational area (table 4.1, s4.4.3.4). EP needs to be clear and not mislead the public. It is noted s4.4.3.4 states "These are not 'critical habitat' as defined under Section 207A of the EPBC Act but rather the classification is based on the EPBC Act Significant Impact Guidelines 1.1 – Matters of National Environmental Significance. Query if these needs to be raised with TH? The requirements that apply will be met

Section 2 details the environmental legislation applicable to the activity and includes the OPP, OPGGS, EPBC, AMP requirements. The activity is subject to conditions of the Class Approval – Mining Operations and Greenhouse Gas Activities for the North Marine Parks Network Management Plan (Table 2-1) and conditions from the Commercial Activity Licence (table 2.2). Both tables list the licence conditions and references the applicable sections of the EP where these requirements have been met. EPBC recovery plans and conservation advices relevant to the gas export pipeline installation campaign are detailed in section 4.4.3.2 & table 4-5. Details include the recovery plan/advice, key threats applicable and the section of the EP risk assessment the requirements have been addressed. Risk assessment tables for each aspect includes a summary of alignment with EPBC Management Plans (where applicable). Please refer to protect matters scope of the assessment. The impacts and risks are suitably understood

The environment that may be affected is suitably understood: The description of the environment provided in section 4 includes socio economic environments, physical and biological, including consideration of protected matters potentially affected by the activity and associated EPBC requirements (section 4.4). Please refer to protected matters see protected matters topic assessment for EPBC specifics. The description of the environment provided is based on a stochastic-model (section 5.3.7) based on a 700m³ MDO fuel tank rupture from a vessel using "moderate" thresholds (10g/m² – sea surface, 100ppb over 96hrs – entrained, 50ppb over 96hrs dissolved). Table 5-21 details the Sea surface and sub-surface thresholds. Worst case spill volume is based on 50% of single largest tank (guidance from AMSA on vessel collisions). The EMBA extends north of PLET location, south towards the Australian coastline and contacts the eastern section of the TIWI Islands.

ISSUE : The spatial extent of the environment that may be affected (EMBA) has been defined using stochastic modelling for hydrocarbons, based on the credible hydrocarbon spill scenario of a vessel to vessel collision and a threshold of 50% of the volume of the single largest tank on a vessel. The EP states the 50% threshold is based on AMSA spill contingency planning for vessel based activities guidance (AMSA 2013a). According to the AMSA "Technical Guideline for the Preparation of Marine Pollution Contingency Plans for Marine and Coastal Facilities Australian Maritime Safety Authority, January 2015", ConocoPhillips have based the activity EMBA on the non-major collision of an Oil Tanker threshold volume. The EP activity description details the largest vessel propose for the activity to be the pipelay vessel, which will contain multiple isolatable fuel tanks with

maximum single tank volume not exceeding 1400 m3. The EP does not provide adequate justification as to why the AMSA oil tanker threshold was selected and not the "other vessel - collision" which would result in the modeling being based on the volume of the largest tank. Please review the worst case spill modelling, EMBA and risk assessment and based on the applicable appropriate worst case spill scenario. A suitable level of rigour has been applied to the ERA given the nature of the activity and the environmental sensitivities

Section 5.1 details the risk assessment methodology with the TH states is consistent with AS/NZS ISO 31000:2009: Risk Management – Principles and Guidelines and appears to be in consistent in practice. ENVID completed in October 2018 and hazard identification processes included a review of OPP present risks and impacts (s5.1.2). ENVID outputs were reviewed in May 2019 to ensure previous outputs remained current based on updated project and environmental information. Risk assessment includes consideration of environmental sensitivities and provides a summary of alignment with EPBC management plans for each aspect.

Activity is clearly scoped and bounded

Pipeline Location/Route (Letter 1.1) - The resubmission includes a high level justification for the pipeline location in section 3.1 with the location selected based on minimising pipeline length in Marine Park Habitat Protection Zone and in KEF areas, reducing span correction activities and eliminates secondary stabilisation, reducing inspection, maintenance and repair requirements during operations & reduced construction time frame (s3.1). The EP has been updated and includes a description of the seabed characteristics for each KP (section 4.4) from two previous geophysical surveys of the pipeline route (Fugro, 2016 and DOF 2018) which provides a greater description of the seabed characteristics. The description of the pipeline route has been significantly improved in the EP resubmission however the EP does not demonstrate or detail that the selected route is the most environmentally appropriate route (e.g. no comparison of other routes). QUERY - Justification of the selected route is based on the high level factors described in section 3.1 as well as the improved seabed mapping/characteristics (s4.4) to try and illustrate the impact (or lack of) based on these premises. e.g. No evidence to demonstrate the selected route is more environmentally appropriate than a route 500m or 1km away.

Transport of pipeline (Letter 1.5) - Resolved - Conoco have advised in the response to RFFWI (A701199) that transport and transfer of linepipe, whether it is an operation in the offshore area that will be undertaken to exercise a right conferred under the pipeline title is yet to be determined. Conoco have agreed that these activities are outside the scope of OPP and this EP and amended the EP accordingly with the description of line pipe movements to and from the operational area now removed from section 3.4 of the EP, and only a single reference to the transport of linepipe to pipelay vessels occurring daily remaining. In addition the EP has been updated and clearly defines the vessel activities that will occur within the operational area (Table 3-1 Key Activities). Anchoring (Letter 1.6) - EP has been updated with each vessel description e.g. survey (s3.4.1.1), construction (s3.4.2.2), pipe supply vessel (s3.4.3) clearly stating that anchoring within operational area will only occur in an emergency situation, with the exception of pipelay vessels (s3.4.2.1). S3.4.2.1 states "As the pipelay vessel utilises DP, there will be no requirement for seabed anchoring for the purpose of mooring in the Operational Area, unless in an emergency". Furthermore controls and EPS (pg151) refer to "No anchoring within the habitat protection zone"/"restricted to areas beyond named banks and shoals". The RFFWI (A701199) states "In relation to anchoring of vessels, we confirm that there will be no anchoring of vessels within the operational area". Pipelay vessel anchoring commitments (s3.4.2.1) and controls/EPS (pg151) are unclear and allow for potential flexibility for pipelay vessels to anchor whilst not mooring. RFFWI: Please confirm that there is no anchoring for pipelay activities. Seabed Disturbance (Letter 1.9/1.10) - Table 3-6 has been updated and includes further explanation and details on the assumptions of the seabed disturbance figures to support the impact assessment. Total estimated disturbance figure remains at 28.7ha with the seabed footprint for each subsea infrastructure included in s3.4.8. Table 4-9 has been updated to clearly state the number of times the pipeline intersects the KEF's, the length of pipeline, and disturbance within the KEF areas. Seabed disturbing activities are adequately described in section 3.5 for each aspect of the activity to inform the impact assessment process. Some clarity required regarding the footprint disturbance of mattresses with the EP referring to a nominal footprint of 66m2 for each mattress (pg 30) a total footprint of 66m2 for three mattresses of 66m2. Pg 136 also includes references to three or more lateral buckling mattress sites, each comprising three mattresses. RFFWI: Clarity is required around number of mattresses to be installed and the associated footprint for each mattress. RFFWI finding incorporated with EPBC matter finding on seabed disturbance. EP includes reference to potential for additional fibre optic cable crossings that are subject to the routing of the future fibre optic cable to the Barossa field. Please provide additional clarification and description of these activities and/or confirm if they are within scope of the EP. Dewatering discharges (Letter 2.3) - Please refer to General Findings under 2. "Environment Plan demonstrates that the impacts and risks will be reduced to ALARP" below EPBC contradicting statements (Letter 8.1) - Resolved - EP has been updated and distinguishes between critical habitat listed under section 207A and that

detailed under EPBC Act guidelines/recovery plans (e.g. Marine turtles pg 84 - Aside from the aforementioned BIAs and habitat critical to the survival of marine turtles (as defined in the Recovery Plan for Marine Turtles).The impacts and risks are suitably understood EMBA/spill modelling (Letter 1.4) - Resolved - Conoco have confirmed EMBA is based on a non-major collision of an oil tanker (50% of largest tank - spill scenario subsequently 700m³ of MDO) and is adequately justified due to the fact that the pipelay vessel will be double hulled (all fuel tanks are double hulled, internally located and protected by water ballast compartments). In lieu of the Preparation of Marine Pollution Contingency Plans for Marine and Coastal Facilities guideline being voluntary, confirmation of the vessel being double hulled and the nature and scale of the activity (e.g. pipelay vessel & MDO), the EMBA is appropriate for the described activity and associated risks. Advice from Spill risk team was sought and assessment finding confirmed that the spill modelling approach is appropriate for the nature of the activity.

Activity is clearly scoped and bounded

Seabed Disturbance:

Anchoring - The activity description in section 3.4.2 has been updated and clearly states that no anchoring will occur from vessels within the operational area unless in an emergency situation. The activity description in section 3.4.2 aligns with the corresponding EPS (EPS 2.3.1). [C] - Letter point addressed
 Installation of supporting structures:section 3.5.3 has been updated to clarify the number of lateral buckling mattresses at each installation site (3 mattresses), the dimensions for each of the three mattresses (two mattresses are 4m by 3m and one mattress 6m by 3m), and the subsequent seabed disturbance footprint of each site (42m²). In addition scour protection for each lateral buckling mattress is provided. Table 3.6 confirms 5 lateral buckling sites of 42m² plus scour protection disturbance for each site. section 3.5.4 updated to confirm the number of span rectification (mattresses, grout bags, mechanical support structures or mass flow excavations) locations and locations displayed in figures 3-3a to c. Figures delineate between span locations and span locations requiring mass flow excavation and presented against the benthic habitat modelling. Section 3.5.4.3 confirms mass flow excavation is carried as a contingency and may be used if a given span cannot be effectively rectified using mattresses or grout bags.Pre-lay and post-lay span correction techniques have been refined and several techniques (span shoulder modification, rock dump) have been removed from the EP activity description. Pipeline Initiation Structure Deployment (s3.5.5) - now allows for the installation of the structure to occur anywhere along the pipeline however a commitment that a pre & post lay benthic habitat survey will be undertaken to avoid sensitive habitats is included [C] - Letter point addressed
 Reference to fibre optic cable crossings has been removed from the EP as it is no longer relevant [C] - Letter point addressed
 The environment that may be affected is suitably understood
 Seabed mapping - Habitat modelling and description has been provided on section 4.5.6.1 and the description of the area (km²) and percentage of KEF overlapped by the operational area (table 4-10) and provides additional context. Revised habitat mapping at a more appropriate resolution has been provided in figure 4-34. The values of sponges, soft corals and other sessile filter feeders to the KEF has now been assessed. The modelling, additional contextual information (s4.5.6.1) and existing seabed characteristic descriptions and mapping in section 4.4 (including photographic observations) supports the impact assessment conclusion that the habitats present along the pipeline route are well represented within the area, and consist primarily of sandy sediments. [C] - Letter point addressed
 NOPSEMA raised letter points have been addressed and the activity has been appropriately scoped and bound with the EP demonstrating that the EMBA is suitably understood, requirements that apply will be met, the interaction between the activity and the environment analysed, and the impacts and risks are suitably understood.

Matters protected under Part 3 of the EPBC Act

ACTIVITY DESCRIPTION

Activity general details - key characteristics (13(1))
 Table 3-1 (pg 20) provides a tabulated summary of the activity characteristics. Key elements include:
 Involves installation of a new 262km long 26" (outer diam) pipeline in Commonwealth waters, and tie in with the existing Bayu Undan (BU) to Darwin pipeline. There are pipeline end terminations (PLETs) at the ends. Pipeline installation is defined as pre-lay survey, installation of pre and post lay span rectification; installation of PLETs including foundations; flooding, cleaning, gauging and testing; dewatering and preconditioning activities. Timeframe is up to 9 month of pipelay activities sometime between Quarter 4 2020 and Quarter 1 2024.Pre-lay survey could commence up to nine months earlier than pipeline installation up to 15 vessels may be involved
 Proposed operational area is 3000m radius around the PLET locations and a 2000 m buffer either side of the gas export pipeline route (see S 3.2.1 pg 21); the buffer along the proposed pipeline route is reduced in some sections to the east and west of the pipeline centreline to remain within the pipeline installation corridor presented in the accepted OPP.Activity vessels as context for EIA
 The EP states that only a pipelay vessel that utilises a dynamic positioning (DP) system will be used, allowing the vessel to maintain progressive positioning whilst installing the pipeline (laying the pipe) (s 3.3.2.1, pg24).

Construction vessels and the activities that may undertake are summarised in S 3.3.2.2 (pg25). There is no commitment regarding DP capability for these vessels.

ISSUE - Confirm that construction vessels that may undertake activities summarised in S 3.3.2.2 will have DP capability and not anchor while in the operational area. NOTE: Activities, including vessel operations, outside the defined operational areas are out of scope of the EP (pg 10, pg26). Besides vessel movements between the operational area and mainland ports, transshipment of linepipe may occur (S 3.3.3, pg26). The EP describes linepipe transshipping that may take place in "sheltered waters near the Operational Area". As described these areas appear to be outside the operational area and therefore outside the scope of the EP. Environmental management of transshipment may not be regulated if this were to occur. An alternative is also described as having purpose-built DP general cargo vessels to transport linepipe directly from the international loading yard to the pipelay vessel within the Operational Area (pg26).

Pipeline install activities as context for EIA

S 3.4.1 Site surveys (pg27)

As described are unlikely to disturb benthic habitats. Some methods are acoustic, and may involve use of multibeam echo sounder, sub-bottom profiler, side-scan sonar. Methods have potential to disturb turtles depending on frequency and intensity of acoustic emissions.

S 3.4.2 Underwater Acoustic Positioning (pg27)

May be needed for pipeline positioning. systems are installed on the seabed and fully recovered after subsea equipment is properly positioned - any benthic disturbance may be temporary under these circumstances. Activity involves emitting short pulses of medium to high frequency sound - has potential to disturb turtles depending on frequency and intensity of acoustic emissions

S 3.4.3 Installation of Supporting Structures

Lateral buckling initiation mattresses, used to control the flex and movement of a pipeline on the seabed, may be installed in at least three locations along the pipeline route where the route is within NT/RL5. Mattresses may have an overall seabed footprint of approximately 42 m² at each location with a further 140 m² at each location where scour protection is used. Seabed disturbance footprint estimate provided in Table 3-6. (42 x 3 = 126m². Additional 140 x 3 = 420m². Total = 546m².) EP does not indicate lateral buckling initiation mattresses outside of NT/RL5 - limited potential to impact turtles or turtle habitat under those circumstances

The gas export pipeline needs to cross the existing northwest cable system that is located nominally at KP257.3. This is very close to the BU tie in point. This requires nominally three concrete mattresses with a total footprint of 66 m² at the crossing. At this location activity and impacts may include turtle interesting habitat.

Two PLET foundations will be installed (one foundation for each PLET). EP describes one PLET assembly in NT/RL5 and another at the tie-in location on the BU pipeline (Table 3-1, pg20). The expected total footprint at each PLET location for the foundation and scour protection is 875 m² (Total = 1750m²). Benthic disturbance will occur at both PLETs.

S 3.4.4 Span Rectification

It is anticipated that there will be a number of locations along the route that may require pre-lay span correction based on previous geophysical surveys and current engineering. Post-lay span correction may also be required following pipeline installation. Given methods below, these may result in habitat modification (changing from one type to another (e.g. soft to hard substrate), cause permanent removal or burial. They may occur in the AMP and CMA generally. Install methods using vessels has potential to disturb turtles, depending on location, timing and duration.

3.4.4.1 Concrete Mattresses - dimensions for each concrete mattress are typically 6 m by 3 m but could be larger if required to suit installation tolerances and seabed topography.

3.4.4.2 Grout Bags - Post filled grout bags are generally pyramidal in shape and the footprint of each grout bag can be up to 5 m x 5 m subject to span height.

3.4.4.3 Mass Flow Excavation - Mass flow excavation assists pipeline stability by facilitating partial or complete burial of the pipeline in unconsolidated sediments. The direct disturbance footprint of mass flow excavation is dependent on the depth of excavation required. Typical direct disturbance footprints are approximately 5 m either side of the pipeline. Use of mass flow excavation will be limited (ISSUE - describe the process, including decision criteria applied to ensure use is limited to only where it is necessary)

3.4.4.4 Span Shoulder Modification - Shoulder modification is typically carried out on hard substrates by a cutting machine either prior to the pipeline being installed or post installation. The seabed disturbance footprint of shoulder removal is typically narrow and includes the area directly below the pipeline, and up to 5 m either side of the pipeline. Material removed during the modification process will be deposited adjacent to the worksite.

3.4.4.5 Rock Dumping - The direct disturbance footprint of rock dumping for span correction is dependent on the size of the span. Typical direct disturbance footprints are approximately 5 m either side of the pipeline, with the area of disturbance determined by the length and height of span requiring rectification. Rock dumping will be limited (ISSUE - describe the process, including decision criteria applied to ensure use is limited to only where it is necessary)

3.4.4.6 Vortex induced vibration strakes - Vortex induced vibration strakes work by changing the hydrodynamic profile of the pipeline thereby suppressing vortex induced vibration at critical span locations. Their scale is not described in detail. Install don the pipelay vessel itself

3.4.4.7 Mechanical Support Structures - Mechanical support structures are typically used for spans having a clearance higher than 1.5 m. The typical seabed footprint of mechanical support structures is 6 m x 3 m. Scour protection may also be required subject to the seabed conditions; scour protection could extend nominally 3 m around the support structures. S 3.4.5 Pipeline Initiation Anchor Deployment (pg 34) - Commencement of the pipeline installation requires the use of an initiation anchor. The initiation anchor may consist of a suction pile, drag anchor or clump weight/dead-man anchor. The seabed footprint associated with pipeline initiation anchor deployment may be up to 1,240m². S 3.4.6 Pipeline Installation - location of pipelay commencement is not defined. Described as potentially commencing at the FPSO PLET location, the BU tie-in PLET location or an intermediate location along the gas export pipeline, depending on negotiations with BU to Darwin pipe owners. Installed using pipelay vessel.

ISSUE - describe where the initiation anchor will be installed and, identify and evaluate environmental impacts in the context of the specified location(s). Note: it appears decisions regarding where pipelay would/could commence may be contingent on negotiations with BU (see S 3.4.6). S 3.4.7 Pipeline End Termination Structures - method and therefore timing [e.g. at commencement of pipelay (inline install) or post-pipelay (temporary head/removal)] is not defined.

Seabed footprint

Estimates are provided for subsea infrastructure in Table 3-6 (pg35). Values in the Table are not readily reconcilable with information given in Section 3.4 regarding pipeline install methods (e.g. footprint of 262km of 26" pipe + initiation anchor (1,240m²) = 17.4ha, however Table 3-6 estimates the area to be 21.6ha)

ISSUE - please provide further explanation and clarification for how values presented in Table 3-6 are derived. NOTE how does COPA propose to control its impacts to be within the extent described in the EP

HIGH LEVEL FINDINGS REGARDING ACTIVITY DESCRIPTION:

The pipeline installation activity is not clearly scoped and bounded, having a number of ill-defined elements (e.g. unresolved method for install of PLETs/connection with GEP) and high level options proposed to be carried (e.g. timing, commencement location).

ENVIRONMENT DESCRIPTION

Environmental setting [13(2), (3)]:

Matters protected under the EPBC Act

There are no World Heritage Properties within the boundaries of either the Operational Area

There are no National Heritage Places within the boundaries of the Operational Area

There are a number of listed threatened and listed migratory species that may be present in the operational area. The topic of this assessment is focused on marine turtles, which of the range of listed threatened species identified, are considered as being at greatest risk from the activity. (See further findings below)

The operational areas is within and may affect the CMA

The operational areas is within the CMA, and overlap part of the Oceanic Shoals AMP - The proposed Barossa gas export pipeline route traverses a 30 km section through the Multiple Use Zone and 31.5 km through the Habitat Protection Zone (pg16, S 2.1.4.1). Specific details, including lat and long coordinates, of the entry and exit points for the pipeline in AMP zones are given in Table 3-3 (pg21) Water depths range from 33m - 254m. Water depth at BU tie-in PLET is ~55m and the shallowest point is ~33m is approximately 47km upstream of the BU PLET. PLET location coordinates are given in Table 3.2 (pg21). The titleholder's search of the Australian National Shipwreck Database (DoEE, n.d.) identified that there no listed historic shipwreck protection zones overlapping the Operational Area. Seabed habitats and communities:

Intertidal and benthic primary producers are described in S 4.4.2.2. The information given is based on studies undertaken by reputable researchers and some is in the published scientific literature. The nearest features to the Operational Area which may support coral communities include Mesquite Shoal, Goodrich Bank, Marie Shoal and Shepparton Shoal, located 0.3 km to 2 km from the boundary of the Operational Area (S 4.4.2.2, pg51). The description of the benthic environment is mostly of a general nature and, besides the modelled benthic habitat map produced by AIMS (see Figure 4-4), it is not clear what finer resolution activity-specific sea bed and benthic habitat data (e.g. for the pipeline route/corridor itself) COPA has collected or has available to inform impact assessment and management. In this respect, S 3.4.1 states that surveys have already been undertaken for the pipeline route and no debris was identified that would require removal prior to installation (pg 27). This implies there has been some detailed route survey work undertaken. The EP is unclear if any environmental information from these route surveys is included in the EP (e.g. in addition to those surveys listed in Table 4-2, which include a Barossa Pipeline Environmental Survey (Jacobs 2017).

Two KEFs are overlapped by the operational area, which are values of the Oceanic Shoals AMP. These are identified and described in Table 4-9 (pg81). The Carbonate bank and terrace system of the Van Diemen Rise KEF supports regionally important seabed features and associated benthic habitats. While the Operational Area overlaps 116km² (or 2.2%) of

the entire areas of the KEF, the EP states that no shoals or banks associated with the KEF have been identified in the Operational Area. The GEP footprint within the KEF is described as being approximately 18.85 km² (including a 250 m buffer around the proposed route) representing less than 0.17% of the total area of the KEF (pg 117). Note 116km² is equivalent to 11,600ha, and 18.85km represents 1885ha, both significantly greater than any figures given in Table 3-6. The information provided is not sufficiently fine scale to support this conclusion (see issue below).

While the Operational Area overlaps the Shelf break and slope of the Arafura Shelf KEF, the ecological features associated with it (i.e. patch reefs and hard substrate pinnacles) were not observed during the Barossa marine studies program, nor are these topographically distinct features evident from the bathymetry data derived from multiple seismic surveys undertaken across this area (Section 4.3.3). The footprint of the gas export pipeline route within this KEF is approximately 36.75 km² (including a 250 buffer around the proposed route), which represents approximately 0.34% of the 10,844.35 km² total area of the KEF (pg 117). This information is inconsistent with footprint areas in Table 3-6, which states that the GEP has a seabed footprint of 21.6 ha c.f. 3674 ha referred to above.

ISSUE - please ensure the pipeline footprint area is consistent and clear throughout noting that above discrepancies above. This is critical to connecting the footprint with the EIA land acceptable levels of impact/EPOs defined later in the EPOverall seabed and benthic habitat information provided in the EP is not sufficiently detailed or activity-specific to support descriptions of the environment in the EP. Furthermore the EP indicates that further activity specific information may be available to COPA but not provided in the EP.

ISSUE: Please provide activity-specific seabed and benthic habitat data in the EP (e.g. benthic habitat map, based on survey observations C.F. habitat modelling results) to support the case for route selection and impact assessment and management of the installation. The proximity of key shoals and banks relative to the operational area is detailed in Table 4-11 (pg84). The nearest shoal/bank formations are Mesquite Shoal (2.1km), Goodrich Bank (0.3km), Marie Shoal and Shepparton Shoal (0.9km) and Marie Shoal (2.3km). The benthic habitat types found during previous studies of Timor/Arafura sea shoals are described in S 4.4.4.3 (pg83).

Marine turtles:

Six species of listed threatened marine turtles are identified as being potentially present in the operational area (Table 4-4, pg55). These are identified by two protected matters searches (one each for the EMBA and operational area, results of which are provided in Appendix B. That method is suitable to developing broad understanding of the potential presence of turtles in relation to the activity.

Table 4-6 demonstrates understanding of the proximity and relevance of BIAs/HCTS for turtles in relation to the proposed activity (pg59, pg60). Figure 4-5 provides spatial context in relation to the extent to which the operational area overlaps identified HCTS for the olive ridley and flatback turtle (pg 61). Flatback and olive ridley HCTS for nesting/interesting overlap the operational area (Figure 4-5). The EP describes the 20 km internesting buffer of from the Tiwi Islands for green turtles (pg 68). This information is complemented with a map showing interesting and foaging BIAs. While not described the information in Figure 4-7 appears to be an accurate reflection of spatial data for turtle BIAs within the National Conservation Values Atlas. Habitat utilisation by interesting flatback turtles is described based on a 2019 update of an unpublished literature review by Pendoley Environmental Pty Ltd. That review is not provided in the EP.

ISSUE: Given the statutory nature of requirements relating to protection of turtles from threatening processes including those associated with the activity, it is important that the full details of information available to COPA regarding marine turtles is available to inform assessment. Please provide a copy of the 2019 Pendoley Environmental literature review update. Seasonality of listed threatened species, including marine turtles, is summarised in Table 4-7 (pg (60). The 2017 Recovery Plan is cited as the source of information in the table. The peak periods shown in the table do not full reflect information in the recovery plan for relevant stocks in that the seasonality of peak hatching does not appear to be captured [e.g of olive ridley turtles the table does not reflect peak hatching over June to August as per information in the recovery plan for the NT stock (p96 of the recovery plan)].

REQUIREMENTS THAT APPLY [13(4)]

DNP as a relevant person sets out notifications to be included in the EP (pdf 484, Sub1-Stakeholder consultation). Parks advice does not include a requirement to provide information relating to undertaking the actions as per condition 3 of the class approval. This is therefore in line with Table 2-1 of the EP.

Marine turtle requirements:

The EP identifies the Recovery Plan for marine turtles (2017) [Table 4-5, 57]. It is a key requirement that applies for conservation management of the turtle species identified/described in the EP. The EP demonstrates understanding of the key threats, including those associated with pipeline installation (e.g. light, vessel disturbance, noise interference and habitat modification). Table 4-8 (pg 70) &maps' key threats discussed the in recovery plan, sections of the EP and conservation management actions set out in the recovery plan. The information shown in Table 4-8 is an accurate reflection of relevant recovery actions for specific key threats detailed in Section 5.3 of the recovery plan. The overarching recovery actions in Action Area A1 are not specifically reflected in

this table.

ISSUE - update the EP to reflect overarching management actions under Action Area A1 of the recovery plan. AMP requirements:

Table 2-2 lists selected clauses from the Commercial activity licence relevant to activities in the EP (pg 18). Reasons for detailing only a subset of licence conditions in the EP are not given. NOPSEMA is aware of the licence requirements and considers there are other elements of the licence relevant to the activity which the EP must demonstrate are met. For example, the requirement to not conduct Licensed Activities anywhere in the Park outside the Licence Area. There may be other requirements too under the licence relevant to the EP. The EP neither describes licenced activities or the licence area in the context of this proposed pipeline installation activity.

ISSUE - further information is required 1) detailing reasons for selecting clauses COPA consider are relevant to activities in the EP and excluding others, 2) explaining the specific activities addressed by the licence and 3) including a map showing the location of the area covered by the licence in the context of the activity detailed in the EP.

Table 5-9 identifies IUCN reserve management principles and AMP objectives for zones that the activity would take place within (pg 123). Explanation of alignment against the Aust IUCN management principles (see Table 5-9) is effectively redundant, given the North Network management plan is in effect (Ref s XXX EPBC Act, requiring consistency with IUCN Reserve management principles in the absence of a management plan). DNP consultation feedback was that COPA is expected to consider the impacts and risks of activities in the context of the Management Plan objectives and values, including representativeness of the relevant values and

activity footprint on the representative area of the AMP. Table 5-9 presents COPA's case for alignment with zone objectives from the management plan for Cat IV and VI zones. The reasons put forward in the table have regard to representativeness of benthic AMP values. It does not appear that DNP was consulted on COPA's case for alignment and it is unclear if information in Table 5-9 is consistent with any similar information presented to the DNP as part of the application for the commercial activity licence that was issued for pipeline installation.

ISSUE - please explain the relationship between information presented in Table 5-9 (particularly with respect to alignment with AMP zone objectives) and any similar information presented to the DNP in the application for the commercial activity licence. In responding please ensure that the information presented in the EP is not inconsistent with other information considered by Government as part of authorisations processes for the pipeline.

ENVIRONMENTAL IMPACT ASSESSMENT

Seabed disturbance:

Assessment is set out in Section 5.2.2.

The EP states (pg 116) that the gas export pipeline will be installed along the route shown in Figure 3-1. The case for how COPA have decided that that the route in the EP reduces impacts on the seabed and benthic habitats to ALARP and acceptable, given the range of options made available through the OPP (i.e. install in a corridor). For example the EP states that the pipeline route has been surveyed to identify areas of seabed with design of the pipeline route to avoid rugose areas and thereby minimise span rectification requirements. The extent survey work used to inform selection of a preferred route is not clear (e.g. were a number of routes/areas surveyed from which the best outcome was selected or was a single route surveyed?)

ISSUE - further information is needed to justify how the proposed pipeline route ensures impacts will be reduced to ALARP. There is insufficient information provided to support conclusions drawn regarding potential impacts to the ecological integrity of nearby reefs, shoals and banks (see) from pipeline installation activities that may alter water quality. For example, claims that particles of native sediments between 63um-2mm will be deposited rapidly are not supported with published literature. No predictions or supporting published literature are presented that support the conclusions that resuspended sediments will not be advected to nearshore areas that may host benthic primary producer habitat at concentrations that will affect benthic primary producers. This is particularly relevant given that information provided does not appear to account for the potential that sediment generated by some activities such as shoulder modification or rock dumping may be different to native sediments and therefore behave differently and affect receptors in different ways. Seabed formations that support structurally and biologically complex habitats are near to the operational area but conclusions regarding potential (or lack of) impact are not supported by well founded predictions that are connected to the way the activity will be implemented.

ISSUE - Provide further support to conclusions regarding the potential for impacts associated with turbidity and sediment deposition processes associated with pipeline installation.

The EP details areas of benthic habitats, as a percentage of the proposed route surrounded by a 250 m buffer, derived from benthic habitat modelling (Table 5-7, pg 118). The EP also states that modelling used to derive these values has been verified by subsequent field observations and been found to reliably predict benthic habitat types (Heyward et al., 2017; Radford et al., 2018). Presenting information this way (as percentages) does support

demonstration that the seabed disturbance impacts will be consistent with the EPO - no permanent impact beyond the physical footprint. The EPO also refers to both direct and indirect sources of disturbance to the seabed and associated benthic habitats and the connection between indirect impacts to the direct footprint of the GEP is unclear. To do this the EP requires more information to clearly and consistently define the location and extent of the physical footprint of the GEP and to predict with supporting science the extent and also recovery potential of the areas of seabed habitat that may be impacted beyond the physical footprint of the GEP.

ISSUE - To support the definition and achievability of the EPO, provide further information to clearly and consistently define the location and extent of the physical footprint of the GEP and to predict with supporting science the extent and also recovery potential of the areas of seabed habitat that may be impacted beyond the physical footprint of the GEP. ISSUE - Please clarify the intent of the EPO with respect to how direct and indirect sources of disturbance are to be taken into account in considering compliance with the physical footprint of the GEP.

The EIA for benthic habitat disturbance impacts on turtles indicates that of the potential foraging habitats that are listed in Table 5-7, only filter feeding habitat lies within the proposed gas export pipeline route (Figure 4-4), primarily along the western coast of Bathurst Island. As conclusions regarding the type and extent of habitat disturbed is based on benthic habitat models, the EP must explain the sources of uncertainty, how it is proposed to be managed and how COPA conclude that management measures proposed will be effective and ensuring impacts are not greater than predicted.

ISSUE - Further information is required to demonstrate the habitat modelling's reliability for the operational area. For example, describe the level of sampling within the operational area that underpins conclusions regarding reliability of model predictions (may be scientific studies or route survey data or other work commissioned) or describe the level of confidence that can be ascribed to model predictions.

The EIA's focus on OR and FB turtles is reasonable given knowledge regarding nesting intensity and extent of internesting habitats which, for these species, overlap the operational area. The EIA is silent on potential impact to green turtles. While the internesting BIA for this species does not directly overlap the operational area, the EIA should include some evaluation to support conclusions regarding the acceptability of risks to the Coburg green turtle stock.

ISSUE - please provide evaluation to allow conclusions to be drawn regarding the acceptability of risk to nearby green turtle stocks (e.g. parts of the Coburg green stock that nests on the Tiwi islands)

The EP states (pg 121) that the depth profile of the proposed gas export pipeline route is below the typical diving depths of internesting female flatback and olive ridley turtles. The EP illustrates this in Figure 5-3 (pg 121). The statement appears to be supported by reference to a tagging study recording OR turtle internesting dive depths. In terms of FB turtles the evidence-based for the statement above is less clear. The EP also states (pg 121) that "Based on available bathymetry, locations of internesting flatback turtles from these studies are consistent with relatively shallow (ISSUE - with respect to understanding of flatback turtle internesting habitat preference, please provide further information to clarify the basis for the statement on page 121 "Based on available bathymetry, locations of internesting flatback turtles from these studies are consistent with relatively shallow (

CONTROLS

Controls are listed in the tables on pg 127 & 128. Based on the description in the EP, some seabed disturbance controls are not consistent with, or not clearly as per, the definition of a control measure in the regulations - i.e. a system, and item of equipment a person or a procedure. For example "No planned anchoring on named Shoals and Banks", "No pipeline installation activities within olive ridley turtle internesting BIA". Improved description of controls will also likely have a positive impact on clarity of EPSs.

ISSUE - please revise the descriptions of seabed disturbance control measures to ensure alignment with the definition in Regulation 4.

Controls are proposed on pg 130 to manage benthic habitat impacts associated with initiation anchor placement and span rectification activities. The intent of these measures is to carry out further surveys to inform further impact assessment to assist in managing impacts and risks. The EP does not demonstrate it is appropriate to further defer impact assessment and selection of specific control measures to ensure that the impacts are appropriate.

ISSUE - please provide further environmental impact evaluation to support selection of controls that are suitable for reducing impacts to ALARP for initiation anchor placement and span rectification activities

EP describes pre-lay survey to identify "debris, seabed features or obstructions along the pipeline route". The EP also refers to an allowance of 250 m either side of the pipeline route, allowing for localised re-routing if "any significant obstructions and areas of spanning" are identified during the pre-lay survey (S 3.4.1, pg 27). ISSUE: Please explain how, in addition to identifying obstructions and spans, the pre-lay survey be used to avoid and minimise impacts of pipeline construction to benthic habitats?

EIA - Light emissions - Section 5.2.4

Light from the highest point on a 65m high pipelay vessel is estimated to be visible at a distance of 29km. This distance is estimated using the formula presented on page 142. No reference is provided for the formula suitability. The EP requires further information to demonstrate that the formula used is a suitable one for environmental impact assessment purposes. Key context is that the operational Area passes the Tiwi Islands for approximately 70 km (approximately 6 km at the closest point).

Higher intensity lighting could be expected at lower deck levels, though the basis for statements such as "it is estimated that hatchlings would need to be within 500 to 1000 m of a vessel to become attracted to the light..." are not supported because the EP does not contain predictions of light intensity and environmentally-relevant light spill from vessels.

The EP states that "...vessels in the majority of the Operational Area will not be directly observable from the shore"; however there are no predictions of the extent (also noting the finding above) of operational area over which light spill may be at environmentally relevant intensities in BIAs and the habitat critical to survival of marine turtles. Impact assessment conclusions on pg 143 are also underpinned by reference to the temporary nature of operations along any one section of the pipeline route, however these references are not well explained by reference to relevant facts and reasoning. For example the EP states that "...vessels are mobile and will not be on any one location for extended periods of time..." (pg 143) and "...limited duration that the gas export pipelines campaign will be in close proximity to these habitats" (pg 144) but the duration and timing of these activities is not clearly detailed or connected to the EIA. ISSUE - further written information is required:

to justify the use of the formula on page 142 to predict visibility of light from the activity and for predicting environmentally-relevant light spill; to describe the intensity of light generated at deck levels and predict the extent of spill at environmentally relevant intensities at key sensitive areas; to describe the extent of the operational area over which light spill may be at environmentally relevant intensities in BIAs and the habitat critical to survival of marine turtles or the anticipated duration of activities within that extent; including the provision of the unpublished report by Pendoley Environmental Pty Ltd 2019 which is drawn on to support environmental impact assessment. The EP includes information regarding the risk of turtle hatchlings being attracted to vessels and this resulting in increased predation (pg 143). Impact assessment is underpinned by information regarding turtle swimming capacity and water currents in the vicinity of the Tiwi islands, however the sources of this key information are not provided.

ISSUE - please provide references for information regarding 1) turtle swimming capacity in relation to water currents and 2) ocean current speeds in the vicinity of the Tiwi islands. The ALARP justification content on pg 145 states that "impact assessment determined the risk to hatchlings from light emissions is low and consistent with the requirements of the Recovery plan for marine turtles in Australia 2017-2027". Table 4.8 of the EP (pg 70) sets out key threats and conservation management requirements of the marine turtle recovery plan. For light pollution, COPA's Table 4-8 includes the action to (from A8 in the recovery plan) to "Identify the cumulative impact on turtles from multiple sources of onshore and offshore light pollution". It is not evident how COPA's EIA for the activity is not inconsistent with this action.

ISSUE - further information is required to demonstrate that the EP is not inconsistent with relevant recovery actions identified in Table 4-8 for light pollution, particularly with respect to identification of cumulative impacts.

Controls - light emissions:

On pg 142 the EP states that "...pipe welding deck for modern pipelay vessels is typically encased within the vessel structure, reducing light spill to the marine environment when compared to vessels where the welding deck is open". It appears a vessel with enclosed pipe welding deck would have potential to control impacts, yet it is not a control measure considered. Furthermore pg 23 of the EP states that ConocoPhillips Marine Vessel Vetting Process (Section 7.2.3) outlines the requirements that must be met and confirms that vessels meet or exceed the standards and criteria set by standard industry practice, international regulations, and relevant authorities such as AMSA. While Section 7.2.3 sets out a range of requirements and standards for marine operations, none relate to environmentally-relevant lighting standards. Furthermore, while the EP considers replacement of vessel lighting with "turtle friendly lighting", the EP does not explicitly consider either selection of/giving preference to suitable vessels fitted with turtle friendly lighting, use of shielding devices, or adoption of procedures to minimise vessel lighting while maintaining sufficient lighting for vessel and workforce safety.

ISSUE - ensure that all alternative, additional and improved controls measures are evaluated (e.g. procurement/marine vessel operations standards and requirements including only vessels with enclosed pipe welding deck).

The EP discounts not undertaking installation activities during peak turtle interesting season (pg 145). The justification given appears to be based on a seasonal limit applying to all installation activities (i.e. along the entire length of the pipeline route). COPA do not appear to have evaluated seasonal limitations being applied to only those elements of the installation activities that generate greatest potential for impact to marine turtles and their habitat utilisation (e.g. activities in the vicinity of the Tiwi islands/HCTS).

ISSUE - additional content is required that evaluates seasonal control measures to manage impacts of the installation to ALARP, in particular seasonal controls that apply only to those elements of the installation activities that generate greatest potential for impact to marine turtles and their habitat utilisation (e.g. activities in the vicinity of the Tiwi islands/HCTS).

EIA Noise emissions - section 5.2.3

Context for EIA, including information relating to vessel noise and output noise levels for various survey and positioning equipment that form part of the activity, is given on pg 134. The levels are principally provided as SPLs. Impacts to marine reptiles are considered on page 136. Impact threshold levels for impulsive noise are presented in Table 5-13 as both SEL (for impairment) and SPL (for behaviour) (pg 136). The thresholds underpin the EIA. For example in evaluating impacts of sub-bottom profile equipment, the EP states that "...noise levels that could result in impairment (PTS and TTS) are not expected to be emitted during the gas export pipeline installation campaign". However, it is not clear how this assessment is made since information on output levels on pg 134 is couched as SPL and thresholds for impairment are in SEL. The EP indicates that SBP equipment may emit noise at a frequency and level that could result in behavioural responses from turtles but concludes that typically thresholds have only extended tens of metres from the source however it is possible (depending on water depth, seafloor geology etc..) that noise levels, at the behavioural threshold may extend a few hundred metres. Evidence and reasons for this conclusion are not evident in the EP.

ISSUE - Further written information is required to:

clarify the activity-specific assessment of potential impacts from impulsive noise, given information on equipment output levels are presented in SPL and impairment thresholds in Table 5-13 are presented in SEL explain, with reference to suitable predictions, threshold levels and/or published literature, the predicted extent and duration of behavioural impacts of underwater noise; based on the above and other information in the EP, explicitly evaluate the potential impacts from underwater noise on turtles in the context of all relevant recovery actions (including in Action Area A1) in the Recovery Plan for Marine Turtles in Australia (2017), drawing conclusions regarding how the EP is or is not consistent with the relevant recovery plan requirements. Controls - noise emissions:

The EP outlines controls and justification for discounting them on pp 138-139. The EP does not consider controls on the timing of surveys and placement of locating equipment to manage impacts to ALARP.

ISSUE - ensure that all alternative, additional and improved controls measures are evaluated (e.g. procurement/marine vessel operations standards and requirements including only vessels with enclosed pipe welding deck).

ACTIVITY DESCRIPTION

Linepipe handling (letter item 1.5)

COPA has modified the EP clarify that to the extent that transport and transfer of linepipe occurs outside the Operational Area, it is outside the scope of this EP. With this information the activity is scoped and bounded

Vessel anchoring (letter item 1.6)

In general, additional content added to the s3.4 of the EP confirms that for the different types of vessels described, no anchoring will occur in the operational area. See exception below for the pipelay vessel

p26, s3.4.2.1 - The EP states that as the pipelay vessel utilises DP, there will be no requirement for seabed anchoring for the purpose of mooring in the Operational Area. It is noted that EPS 2.3.1 (p143) states that the pipelay vessel will use DP at all times during pipelaying operations. The new additional text creates ambiguity in the EP in terms of the need for anchoring the pipelay vessel other than for mooring.

CONFIRMATION REQUIRED: please confirm that the pipelay vessel will not be anchored in the operational area for any purpose as part of the activity (other than in an emergency).

Pipeline install activities as context for EIA

Estimated seabed footprints (letter item 1.9, 1.10)

p37, Table 3-6 - includes additional content that sets out assumptions and helps explain the basis for estimates of seabed footprints of the proposed subsea infrastructure. This information establishes a key foundation for informing COPA's impact assessment process for seabed disturbance impacts.

p30, s3.5.3 - regarding the footprint of infrastructure, the EP appears to be internally inconsistent with respect to mattresses. It states - that nominally three mattresses each with a footprint of 66 m2 shall be included at the crossing of the existing northwest cable system at KP257.3. Then it states - Nominally three mattresses with a total footprint of 66 m2 shall be included at each additional crossing that may be associated with a future fibre optic cable to the Barossa. p136, s5.2.2 - also states that three or more lateral buckling mattress sites, each comprising three mattresses, will be installed along the gas export pipeline route within NT/RLS

CLARIFICATION REQUIRED: To provide clarity and consistency to the activity description and impact assessment please clarify the seabed footprint and locations of mattresses (for different type of mattresses if different types are proposed).

Scope and purpose of pipeline crossing construction activity

p30, s3.5.3 - states there is potential for additional fibre optic cable crossings subject to the routing of the future fibre optic cable to the Barossa field. Nominally three mattresses shall be included at each additional crossing. Installation of mattresses for the fibre optic cable crossing will be done by a construction vessel.

A future fibre optic cable to the field is not included in the EP, though is referenced in terms of potential requirements for additional pipeline crossing construction (e.g p30). This creates ambiguity with respect to EP scope EP and the purpose of pipeline crossing construction activity covered by the EP scope (i.e. whether for crossing existing fibre optic cable (p27, s 3.4.2.2) or for a future fibre optic connection to the field (e.g. p30).

CLARIFICATION REQUIRED: Will any pipeline crossing construction for future fibre optic cable be undertaken under this EP? If so further information clarifying how it will be connected to the optic fibre cable activity if that is authorised under a separate processes, and locations and timing of this work is needed.

ENVIRONMENT DESCRIPTION

Seabed habitats and communities:

Route-specific seabed and benthic habitat information (letter items 1.7 and 1.8)

p54, s4.4 - Additional information is provided which is based on findings from two geophysics surveys of the route. This gives more detailed description of the bathymetry and the nature of the seabed along the pipeline route. The information is relevant and materially enhances the pipeline route description. It does not provide materially more information on benthic habitats and communities along the route. COPA reference information originally provided in s4.3.3 and 4.4. The habitat map information is not at a scale where it is able to be interpreted for the assessment of the EP and relevant habitat information is obscured by the shading used to show the GEP route.

ADDITIONAL INFORMATION REQUIRED: Please provide a benthic habitat map(s) for the GEP route at a scale that can be used to inform the assessment (e.g. identifying segments matched to the bathymetric figures generated from the geophysical surveys), ensuring that relevant habitat information is not obscured.

Marine mammals:

In terms of cetaceans, the EP notes there are no BIAs or HCTS for listed marine mammals that are overlapped by the operational area. The Blue Whale recovery plan shows an area shaded as likely distribution just to the west of the Tiwi island. The EP content reflects this in that it states it is considered possible

that individual pygmy blue whales may be encountered in low numbers within the Operational Area. Noting specific requirements of the blue whale recovery plan relevant to BIAs the recovery plan and associated EPBC Act/DEE documentation was reviewed to verify appropriate EP content. Review of the Blue Whale recovery plan found that it points to the marine bioregional planning process for BIA information. The north region bioregional plan in turn points to the NCVA. The NCVA data supports content of the EP insofar as the NCVA does not show BIA areas for pygmy blue whales in the vicinity of the operational area. Similarly the description of distribution and habitat utilisation by other species including humpback whale, dugong and other listed threatened and migratory marine mammal species demonstrates regard given to relevant conservation advice and marine bioregional plans through broadly consistent content [C]

ENVIRONMENTAL IMPACT ASSESSMENT

Seabed disturbance:

From Heyward et al (2017)...They state that "interpreting the regional habitat model results should be done with caution particularly at fine scales. It is also important to note that large areas of the model outside the sites detailed in Figure 57 have no validation data and model accuracy cannot be assessed in these regions. It should also be noted with caution that while over the entire regional model performed well for most habitat categories, the "None" category had the poorest performance most frequently under predicting filter feeder (including whips) and Halimeda communities..."

From Radford and Puotinen

(https://maps.northwestatlas.org/files/montara/html_popups_oceanic_shoals/Spatial_benthic_habitat_model_for_the_Oceanic_Shoals_CMV_6dec16.pdf?_ga=2.9642357.1761345111.1574408987-197722425.1558055791)

) the coarse-scale data not only predicts a different relative proportion of the class types, but misses entire features evident in the fine-scale data. Decisions about poorly modelled habitat types (abiotic, filter feeders, macroalgae and seagrasses) should be made with care, and should consider how the model typically misclassified these types, as shown in the confusion matrix. "This coarse-scale habitat map of the entire Oceanic Shoals should be used to target future field surveys in areas of particular interest where validation data is currently missing to collect additional field data. This will enable the development of fine scale habitat models of higher quality"

Extent of potential benthic impacts to KEFs

For the Carbonate bank and terrace system of the Van Diemen Rise KEF, Table4-9 (p95) clarifies that the pipeline passes through the KEF twice, approximately 40 km to the north

and 10 km in the south. This equates to a footprint of 3.3 hectares (0.033 km²) or 0.0001% of the total KEF area.

For the Shelf break and slope of the Arafura Shelf KEF, Table 4-9 (p95) clarifies that approximately, 70 km of the pipeline passes through this KEF, equating to 6.4 hectares, or 0.064 km², which represents less than 0.001% of the 10,844 km² total area of the KEF. Table 5-9 (p139-140) includes some proportional quantification of the extent of impact to the seabed in the AMP. COPA predicts that the physical footprint of the pipeline and indirect impacts from installation (allowing a 250 m buffer either side) within the Habitat Protection Zone would result in the loss of approximately 0.05% of the filter feeder habitat present in Habitat Protection Zone, or 0.009% of the total filter feeder habitat available within the Oceanic Shoals Marine Park.

The EP state that the Jacobs (2017) study found sediment particle size distribution from 12 sites along the pipeline route and reports sizes ranging between 63 µm and 2 mm. It also predicts that suspended sediments will redeposit with 12 hours and from half of all sites expected >90% deposition in less than one hour.

ISSUE - this prediction does not provide any information regarding the predicted extent of impacts and demonstrate that these will be within the acceptable level.

ISSUE - The Jacobs 2017 study is described as being limited to waters from 25-80m deep and appears to have tested native surface sediments. Study indicated that most resuspended sediments would be deposited within 12 hrs or less, with sediments from half of all sites expected to have > 90% deposition in less than an hour. It is not evident that the native sediment samples would be representative of sediments in deeper water and those liberated by span correction techniques. In describing the benthic environment of KEFs, the EP states that Geophysical surveys, benthic habitat mapping and modelling of the gas export pipeline route shows that the seabed within the KEFs is largely bare sediment, with small areas inhabited by burrowers and crinoids. The EP also concludes that given that the geomorphology will not be significantly altered from pipeline activities, impact to the KEFs will be negligible.

Sponges are documented values of the Carbonate bank and terrace system of the Van Diemen Rise, however the EIA in relation to KEFs referenced above does not refer to these benthic communities.

ISSUE - In order to draw conclusions about the quantum of impact to KEFs the EP requires EIA that specifically addresses documented values of the KEFs based on understanding of these values within the area affected contextualised by their relative importance over the broader area of the KEF. This may need to include information in the EP that connects areas that support known KEF values (e.g. sponges and octacorals) which may be affected with the understanding about types and distributions of benthic communities within the proposed pipeline route.

The time in suspension metric for impact does not inform assessment of how much sediment may be resuspended and subsequently settle and where.

Selected pipeline route reducing impacts to ALARP (letter item 1.1)

A brief summary is provided in section 3.1 of the EP that outlines:

that since the OPP was developed, COPA has conducted further field surveys and engineering studies; that a number of potential pipeline routes within the corridor assessed; and the claimed impact and risk reductions and environmental benefits associated with the proposed route in the EP. Some information is also provided in Section 2.1.4.1 regarding the process for assessment and granting of the commercial activity licence by the DNP. COPA explain that the DNP's licence application considered the alternative gas export pipeline routes identified by COPA both through and around the Oceanic Shoals Marine Park. Each of the alternative routes were subjected to an assessment process that considered the footprint of the proposed activity, feasibility and practicability (which the EP explains included a comparative assessment of each route based on potential impacts of the pipeline against environmental, societal, safety, technical and economic criteria.

Underwater noise (section 5.2.3) (letter item 3.7):

As per COPA's response, s5.2.3 of the EP has been substantially re-written, and has had considerable volume of content deleted.

Effects thresholds for marine turtles are quoted in Table 5-10 (p152). These thresholds cover behavioural effects, TTS, recoverable injury and mortality and potential mortal injury. The EP suggests the table content is based on the work of Popper et al 2014. Review of that literature finds that Popper et al 2014 proposed thresholds for masking effects in marine turtles.

ISSUE - Table 5-10 has not been updated and still does not include thresholds for, or assessment of potential impacts associated with, masking effects in marine turtles. This information is needed for a complete and defensible evaluation of impacts.

New content is included in the EP for potential effects of underwater noise on marine mammals. A considerable volume of content has also been deleted. The EP states includes a number of statements that are not clearly supported. For example:

it is conservatively predicted that behavioural impacts to individual marine mammals may occur within 1 to 2 km of the pipeline vessel and 0.5 to 1 km of other activity vessels (What's the basis for this? If it is the FPSO modelling why is this transferable to a pipeline or other vessels...noting the FPSO does not run thrusters for DP which can be very loud) With regard

to potential physiological impacts, sounds from oil and gas construction and service vessels can exceed the acoustic injury levels required for PTS within tens of metres from the vessel for LF and VHF cetaceans (What is the basis for this?) Noise levels that result in TTS impacts on VHF cetaceans and LF cetaceans may extend hundreds of metres from the vessel whereas impacts to HF would only extend tens of metres from the vessel. (what is the basis for this statement?)TTS is not expected for dugongs as the threshold is above the expected noise emissions from vessels (What is the threshold being applied?, What are the expected noise source emissions from vessels and how does this propagate?)ISSUE - the evaluation of potential impacts from underwater noise emissions requires further activity-specific context, technical facts and reasoning to support the analysis and conclusions drawn against defined acceptable levels.

New content has been added for an evaluation of impacts on turtles from survey equipment and positioning equipment (). It is basic information that provides little quantitative or even semi-quantitative EIA, despite the activity occurring in an identified HCTS for two species of marine turtle. For example, the EP states that "Based on available threshold criteria (Finneran 2017 and NSF, 2011) JASCO analysed potential impacts of survey and positioning equipment on turtles". The source of the JASCO assessment is not identified, the representativeness of equipment analysed by JASCO for the current activity is not justified. The EP also states "Some SBP equipment emits noise at a frequency that may be heard by turtles and therefore impulsive thresholds for impairment and behavioural impacts have been considered", but does not draw any conclusion about the potential for injury. The EP also states that "Typically, ranges to the threshold for behavioural response are within tens of metres from the source (McPherson and Wood, 2017, Reiser, C.M et al, 2011) with the exact range depending upon the source, tow depth and environment (water depth, seafloor geology etc.)" While this may be accurate, the nature of the source levels are not described to demonstrate that the extent of effects on turtles may be in this typical range or not. The assessment does extend to evaluate the potential impact of exposure to underwater noise on turtle behaviour in a HCTS.

EIA does not appear to consider the effects of positioning equipment which operate at low frequency by emitting short pulses between 19 and 24 Hz (p150).

ISSUE - the evaluation of potential impacts from underwater noise emissions requires further activity-specific context, technical facts and reasoning, and deeper analysis of the potential consequences given the location of the activity in HCTS for two listed threatened species .

The request sought further explanation of predicted extent and duration of impacts of underwater noise. The EP does provide some estimation of potential impact extent with reference to relevant thresholds (e.g. Popper thresholds for continuous noise sources). It also states things like "survey equipment will only be used for a short duration", but does not define this in EIA more clearly. Given that the activity may overlap peak breeding periods in HCTS and that key sources of sound will move (e.g. the pipelay vessel) the EP requires estimates of the duration that sound levels above thresholds will affect the HCTS (and BIA) and analysis of the potential impact of this exposure.

ISSUE - the response does not address the request to consider the duration of exposure to underwater noise or analyse the potential impact of that duration of exposure.

REQUIREMENTS THAT APPLY (letter item 1.13)

The EP includes additional information relevant to the DNP commercial activity licence (s2.1.4.1, p17). This information enhances the understanding of requirements that apply and allows COPA to describe how the requirements will be met.

The EP however also includes statements that limit the scope of the EP and sets out requirements of the DNP's licence relevant to environmental management. It is not clear whether given the scope limitations, acceptance of the EP will ensure licence requirements are met.

p11, s1.2: EP states that "Activities outside of the defined Operational Area, are outside the scope of this EP. These activities will be undertaken in accordance with relevant legislation – most notably, the Navigation Act 2012 (Cth) – and therefore fall within the jurisdiction of the Australian Maritime Safety Authority (AMSA)" p19, Table 2-2: details conditions of the DNP licence relevant to environmental management including that "The Licensed Activities conducted within the Licence Area must be conducted in accordance with an environment plan"; ISSUE: The EP requires content that defines the 'licensed activities' and the 'licence area' to allow assessment to be made about whether the EP would adequately address DNP licence requirements. ISSUE: Table 2-2 points to Section 7 of the EP in relation to how COPA will meet the requirement of condition 5.1 of the DNP licence. Information was not evident in Section 7 relevant to this condition and is needed to demonstrate compliance with Reg 13(4).

Timing of the activity (letter item 1.2)

p145 - The EP has been updated with further evaluation of the temporal control of the activity to reduce impacts to listed threatened turtles. Specifically the EP evaluates dividing the pipeline installation scope into multiple campaigns to minimise work performed during the peak interbreeding periods within important habitat for listed marine

turtles. COPA has provided reasons for its decision to reject this control on p146. These reasons focus on the limited control COPA have over start times and mainly relate to project and operational risks that may be generated by seasonal exclusions. The environmental background the the case presented for discounting seasonal control of the activity is that COPA argue that unlike other turtle populations (e.g. on the North West Shelf of WA), the olive ridley and flatback turtle nesting seasons on Bathurst Island do not exhibit discrete nesting seasons. The EP states there is low level nesting year round, with a peak in nesting and internesting during winter months. COPA conclude that a seasonal exclusion would therefore not avoid all turtle nesting and internesting activity but may avoid the known peaks. COPA also conclude that impact to turtles from the activity will be low.

p146 - In lieu of a commitment to manage the start time of the pipelay, the EP commits COPA to control the activity by sequencing activities to minimise the time pipelay, and associated activities, are performed within peak internesting periods in important habitat for listed marine turtles (C2.10). An EPS (PS2.10) is also included that requires Planning for pipelay installation (including span rectification) to consider turtle internesting season with peak periods avoided if reasonably practicable.

Activity Description:

CONFIRMATION REQUIRED (2.1): please confirm that the pipelay vessel will not be anchored in the operational area for any purpose as part of the activity (other than in an emergency).

RESPONSE: Section 3.4.2 has been updated to clarify that there will be no anchoring of any vessels within the Operational area - C

CLARIFICATION REQUIRED (2.2): To provide clarify and consistency to the activity description and impact assessment please clarify the seabed footprint and locations of mattresses (for different type of mattresses if different types are proposed).

RESPONSE: Section 3.5.3 Has been amended to include further details on the locations and footprint of mattresses, clarifying that the 66 m2 is the combined footprint and Figure 3.3 show the locations.- C

CLARIFICATION REQUIRED (2.3): Will any pipeline crossing construction for future fibre optic cable be undertaken under this EP? If so further information clarifying how it will be connected to the optic fibre cable activity if that is authorised under a separate processes, and locations and timing of this work is needed.

RESPONSE: section 3.5.3 has been updated as it is no longer relevant. there is now no reference to additional fibre optic cable crossing. - C

CLARIFICATION REQUIRED (2.5): Please provide a benthic habitat map(s) for the GEP route at a scale that can be used to inform the assessment (e.g. identifying segments matched to the bathymetric figures generated from the geophysical surveys), ensuring that relevant habitat information is not obscured. - C

- Figures 4-10 to 4-27 show higher resolution habitat and bathymetry mapping along the GEP. From the figures it is evident that KP165 to KP230 may host higher densities of soft/hard corals, filter feeders and burrowers/crinoids. Filter feeders also potentially present between 150 and 170. These figures are at a suitable scale to inform the impact and risk evaluation.

- Table 4-4 shows predictive accuracy for filter feeders is 92% for the Oceanic shoals habitat model.

REQUIREMENTS THAT APPLY (letter item 1.13)

ISSUE: The EP requires content that defines the licensed activities and the licensed area to allow assessment to be made about whether the EP would adequately address DNP licence requirements. Table 2-2 points to Section 7 of the EP in relation to how COPA will meet the requirement of condition 5.1 of the DNP licence. Information was not evident in Section 7 relevant to this condition and is needed to demonstrate compliance with Reg 13(4).

RESPONSE: Section 2.1.4.1 of the EP has been updated to clarify that the license area as defined in the DNP license is the same as the operational area defined in the EP. consequently all activities will occur within the licensed area and there will be no activity outside of the operational area. Section 7 details the implementation strategy for the EP which demonstrates how the EP will be implemented to meet condition 5.1 of the DNP Commercial Activity license. -

CLARIFICATION - The EP describes construction vessel activity including for FGT, where vessels may be stationary for up to 14 days. Is activity where vessels may be on station for these lengths of time proposed in the HCTS for marine turtles? If so, please evaluate impacts (noting this is longer than the pipelay vessel would be in any single location), include content to demonstrate impacts are acceptable and that measures are proposed to reduce impacts to ALARP.

RESPONSE: It has not been clarified if the statement "Construction vessels may be in the Operational Area for the duration of offshore operations, however, these will generally be in one location for less than 3 days unless performing flood/gauge/testing operations where the vessels will be stationary up to 14 days." (p. 195) However it is clarified on p.204 in light impact EIA that this will only occur at either end of the pipeline. The end is >24 km from nearest nesting area for turtles which is closer than the northern end. - COMPLIES

Finding: Based on addition of the above content to the revised EP, the activity is now clearly scoped and bounded and it is evident that the requirements that apply will be met.

ENVIRONMENTAL IMPACT ASSESSMENT

Seabed disturbance:

Sponges are documented values of the Carbonate bank and terrace system of the Van Diemen Rise, however the EIA in relation to KEFs referenced above does not refer to these benthic communities.

ISSUE - In order to draw conclusions about the quantum of impact to KEFs the EP requires EIA that specifically addresses documented values of the KEFs based on understanding of these values within the the area affected contextualised by their relative importance over the broader area of the KEF. This may need to include information in the EP that connects areas that support known KEF values (e.g. sponges and octacorals) which may be affected with the understanding about types and distributions of benthic communities within the proposed pipeline route.

RESPONSE: Additional context has been added to section 4.5.6.1 to describe the benthic communities present within the overlap of the KEFs with the operational area. This is supported by benthic habitat maps at an appropriate resolution to enable EIA. Based on the confusion matrix, errors in classification of filter feeders are based largely on misclassification of whips/ gorgonians which do not appear to be present within the KEF/Operational area overlap - consequently it is unlikely that sponges have been missed from classification in this habitat mapping. Updated habitat modelling has been used to inform the assessment of potential impacts to the KEF with a consideration for sponges and other sessile filter feeders as defined values of the KEF also included. The response table indicates that accuracy of filter feeder identification is high at 92% but misses the context that whips are often incorrectly classified as gorgonians. The outputs of the benthic habitat model are supported by the photographic observations taken along the pipeline route during a geotechnical survey (p.178).

Finding: Additional context has been added to the revised EP to provide a more robust understanding of the EMBA. The value of sponges and sessile filter feeders to the KEF has now been assessed and further details on the habitat model and suitability of that model provided. Based on the information presented, the habitats present along the pipeline route are well represented within the area, and for the most part comprise sandy sediments. Patches of harder substrate supporting sessile filter feeders including sponges and soft corals comprise a portion of the pipeline route, approx 24%. Based on the presented information, the EP demonstrates that the environment that may be affected is suitably understood.

Marine Turtles

CLARIFICATION REQUIRED (3.4) - Table 5-10 has not been updated and still does not include thresholds for, or assessment of potential impacts associated with, masking effects in marine turtles. This information is needed for a complete and defensible evaluation of impacts.

RESPONSE: Table 5-15 (prev 5-10) has been updated has been updated to include a threshold for masking effects, but still does not reflect appropriate, relevant or contemporary thresholds for marine turtles.

ISSUE: Potential impacts and risks to marine turtles from noise generated by the activity cannot be evaluated in the absence of appropriate thresholds. The thresholds for injury and behavioural disturbance presented in the EP do not reflect the most contemporary, relevant or appropriate context. These thresholds need to include Finneran et al. (2017) thresholds for TTS and PTS from continuous and impulsive noise, and NSF (2011) and McCauley et al. (2000a) thresholds for behavioural disturbance and behavioural response. - Captured under 10a(c)

CLARIFICATION REQUIRED (3.5 & 3.6) - the evaluation of potential impacts from underwater noise emissions requires further activity-specific context, technical facts and reasoning to support the analysis and conclusions drawn against defined acceptable levels.

- the evaluation of potential impacts from underwater noise emissions requires further activity-specific context, technical facts and reasoning, and deeper analysis of the potential consequences given the location of the activity in HCTS for two listed threatened species .

- the response does not address the request to consider the duration of exposure to underwater noise or analyse the potential impact of that duration of exposure.

RESPONSE: - clarification that the Allseas Solitaire was used in the Zykov et al. study which is similar to Allseas Audacia proposed for this project. no clarification of locations or time of year which are important for assessing whether the outcomes are relevant to this study. -

ON HOLD TO BE ADDRESSED UNDER ACCEPTABLE LEVELS

Finding: Based on the addition of requested context to the EP, the impacts and risks of the activity, and their interaction with the environment is suitably described.

2	Environment Plan demonstrates that the impacts and risks will be reduced to ALARP	General	<p>Planned Discharges:</p> <p>Section 5.2.7 still carries two options for the disposal of flooding activity water at both PLET locations (Bayu-Undan Tie in & FPSO). Minor increase from 12,000 to 15,000m³ for Bayu-Undan Tie in option. No change to dewatering (85,000m³) or hydrotest depressurising water (2,000m³) discharge volumes. Section 5.2.7 updated and now refers to chemical concentrations in mg/L (previously ppm) Levels of acceptable impact have been revised and updated and provide further delineation and definition. Acceptable levels have been defined applying definitions from the EPBC Act Significant Impact Guidelines, Recovery Plans and Marine Parks Management Plan and are defined on the basis of ‘no substantial change that may modify, destroy, fragment, isolate, disturb various environmental receptors (e.g. marine ecosystems, KEFs, specified species) or no substantial change to specified species, that may lead to a reduction in the area of occupancy of the species’; EP adequately demonstrates that that predicted levels of impact will be within the defined acceptable level to key environmental receptors. Chemical modelling and evaluation - EP has been updated to confirm hydrosure is the hydrotest chemical treatment package. Table 24 details the function, chemical, CAS No, composition and pipeline concentration % . ‘Table 5-24 states Chemical composition of the hydrotest chemical treatment package equivalent to that required in the Barossa pipeline’ with the reference to equivalent leading to some ambiguity. However Hydrosure MSDS checked and confirmed the presented chemical composition in table 5-24 is that of Hydrosure 0-3670-R supporting the modelling presented in section 5.2.7 [C] - Letter point addressedReference to equal or equivalent chemical treatment package - section 5.2.7 has been updated and confirms the the proposed biocide and oxygen scavenger mixture to be used in the Barossa pipeline is hydrosure-0-3670R [C] - Letter point addressedMedian hydrotest chemical concentration modelling percentiles & maximum footprint for the discharges - Pg222 reaffirms the chemical concentration in the receiving environment is not to exceed a median (50th percentile) concentration of 0.06 mg/L beyond the mixing zone. Dilution modelling provide for 12,000 m³ discharge at the Bayu-Undan tie-in PLET (surface & seabed modelling) and 85,000 m³ discharge at the FPSO PLET (seabed modelling). Modelling presented as:maximum instantaneous concentration recorded within the plume for the duration of the model simulationplan views of concentrations and vertical transects through the centre of the plume at distinct points in time throughout the simulationTime series of concentrations at two points through which the plume passes to show the ephemeral nature of plume50th percentile (median) concentration calculated at each grid point in the model over the course of the model simulation.12,000m³ flooding - Maximum concentration over the entire discharge simulation period (footprint) is provided in figures 5-16 (surface) and 5-21 (bottom) discharge points. Tidal dispersion of concentrations for both discharge points have been updated and are legible. Time series modelling for both surface (figure 5-18 to 5-20) & seabed (figure 5-23 & 5-24) modelling shows a strong current that leads to rapid dispersion and dilution of concentration at both discharge heights. Minor concentration build up in slack waters but proposed 50th percentile (median concentration) environmental criteria as well as the 99% species protection concentrations level (for continual discharges) will be met and achievable. Modelling supports the claim that median concentrations at any one point predicted to reduce below the 99% species protection concentration within close proximity to the point of discharges and impacts to key environmental receptors (e.g. shoals, reefs & banks) will be unlikely 85,000m³ dewatering:50th percentile (median) concentration has been calculated at each grid point in the model over the course of the model simulation. This is for comparison with the environmental criteria threshold and provides an assessment of impact as it represents duration of exposure at any one location and not just the peak which could occur for a just a single time step in the model (60 secs). Maximum concentration over the entire discharge simulation period (footprint) is provided in figures 5-25. Modelling shows localised reduction in water quality surrounding discharge location with the plume moving in a southwest direction. Ecotox data (table 5-25) provides ‘no observed effect level (NOEC) for 12.5 mg/L and modelling shows concentration does not exceed this at any given point in time. Time series modelling (Figure 5-27, 5-28 & 5-29) demonstrate that the set environmental criteria (median concentration of 0.06 median hydrotest chemical concentration) for the 85,000m³ seabed discharge results in a small localised impact (within 200m of discharge location). Modelling supports impact assessment for most receptors. No impacts from discharge to BIAs or EPBC listed species based on discharge location. Impacts to threatened and migratory species (e.g. turtles) deemed unlikely based on the depth of water and short duration exposure concentrations and supported by modelling results. Impacts from the 85,000m³ discharge at FPSO PLET to KEFs Van Diemen Rise KEF have been ruled out based on the location being void of the KEF values (s4.4.1 & s4.5.6). Modelling verifies AMP will not be impact from bulk water discharge due to distance from discharge point. [C] - Letter point addressedLabelling errors and legibility of modelling - Modelling figures 5-16 through to 5-29 have been updated and are correctly labelled and legible - [C] - Letter point addressed</p> <p>FCGT Support Activities - Section 5.2.4 has been updated to confirm FCGT support vessels will be on site for 14 days and the impact from light emissions has been assessed. Impacts to the closest turtle nesting beaches from FCGT support vessels has been ruled out based on the closest distance (>24km) occurring outside of the modelled light impact from the vessels [C] - Letter point addressed</p>
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Seabed disturbance:

S5.2.2 has been updated and the source of risk separated into direct (placement of material such as mattresses onto the seabed) and indirect impacts (sediment impacts from mass flow excavation) with a description of each source and factors influencing the different impacts. Sediment plume modelling has been conducted based on the worst case scenario conditions (neap tide slack waters) and based on the site with the maximum volume of sediment requiring excavation (mass flow excavation at KP249.7). This modelling replaces the previously referenced Jacobs 2017 study and the potential impacts assessed against the results of the sediment modelling. Sediment plume modelling includes particle size distribution. Seabed disturbance activities have been reduced to mattresses, grout bags and mass flow excavation with span shoulder modification and rock dumping removed from the EP. Mass flow excavation is the largest source of indirect impact to seabed disturbance. Table 5-8 lists the benthic habitat classes within 250m of the operational area and the percentage that lies within the operational area, with bare sediment representing 87%, Filter feeders 8.5% and Burrowers/crinoids 2.9%, all other classes are less than 1%. Benthic habitat model predicts isolated outcrops of hard corals between KP210 to KP231 (pg 171) and the direct and indirect impacts have been assessed. Direct impacts are limited to directly below the placed infrastructure and are minor in nature (875 mm width along the length of the pipeline and up to 18 m² at each support structure location), with the impact to communities and habitat well represented throughout the region (pg 171). Indirect impacts: Sediment deposition modelling on a flood and a Ebb tide show deposition (5mm to 500mm) to occur within 200m of discharge location (figure 5-5) and suspended sediment concentration peak at 1800mg/L after 1hr at 200m from the mass flow excavation site then reduce rapidly to 100-200mg/L (Figure 5-8/5-9), with suspended sediment returning to background levels within a single tidal cycle. Impacts to corals from sediment is not expected with low impact pan rectification methods (placement of grout bags and mattresses) selected in areas where coral maybe in the vicinity of the pipeline (pg172). Impacts to sponges has been deemed unlikely on the basis of the plume modelling, strong currents and scientific studies (WAMSI Dredging Science Node - WAMSI, 2019). Impacts to benthic communities has been separated out into sections within the KEF & AMP (pg 176) and benthic habitat that sits outside these areas (pg 172). EPS and MC have been revised and update to verify the laying of pipeline occurs on bare areas of seabed (EPS2.11.1) & limit mass flow excavation activity duration (EPS2.13.1) to support the impact assessment predictions. Modelling in addition to the additional context on benthic communities support the impact assessment conclusions that direct and indirect to biodiversity or ecological integrity of benthic communities from unconsolidated sediment, will be localised - [C] - Letter point addressed. The EP as demonstrated that ALARP has been considered independently, methods are systematic, followed and applied thoroughly and outcomes are reproducible and defensible.

Planned

Activity Timing/ALARP - Please refer to EPBC matter assessment findings for activity timing related findings.

Seabed Disturbance (Letter 1.8 , 1.9, 1.10 & 4.1)

Table 3-6 (pg 37) has been updated and includes further details on the seabed disturbance infrastructure calculation assumptions. This information provides additional context on the seabed disturbance calculations used for the impact assessment and provides some clarity on support for the overall disturbance figure of 28.7ha. Table 4-9 (pg 101) details the KEFs overlapping the Operational Area and EMBA updated and states the length of pipeline (in km's), total foot print in Ha's and the subsequent total% of the KEF's. The EP has been updated and includes a description of the seabed characteristics for each KP (section 4.4) from two previous geophysical surveys of the pipeline route (Fugro, 2016 and DOF 2018) which provides a greater description of the seabed characteristics. This survey (Section 4.4) and habitat mapping (Figure 4-19 and Figure 5-3) appropriately demonstrate that the majority of the seabed is bare sand (with the balance made up of burrowers/crinoids and filter feeders) which is well represented in the wider region. EP has been updated and includes a description of the seabed characteristics for each KP (section 4.4) from two previous geophysical surveys of the pipeline route (Fugro, 2016 and DOF 2018) which provides a greater description of the seabed characteristics. TH response to RFFWI letter point 4.1 states "direct impact is defined as disturbance directly beneath the pipeline and associated structure and indirect is defined as impact from suspend sediment. EP refers to sediment lab analysis that indicated most resuspended sediments would be deposited within 12 hrs or less, with sediments from half of all sites expected to have > 90% deposition in less than an hour (pg 56). Seabed disturbance impacts are presented on a time basis and no spatial description on the impact to support the potential impact statements to Bathymetry and Seabed Features (pg 133) from mobilised unconsolidated sediment. Unclear if the 12 samples that the impact assessment is based on is an accurate representation of the sediment along the entire length of the pipeline. ISSUE: Please detail the spatial distribution of sediment from seabed disturbance activities to support the impact statements that impacts (direct and indirect) from unconsolidated sediment will be localised. See RFFWI below. ISSUE: Please see additional findings under "Extent of potential benthic impacts to KEFs" regarding representative sampling of seabed sampling for sedimentation EIA

under the "Matters protected under Part 3 of the EPBC Act - Environment Plan is appropriate for nature and scale of activity". RFFWI# - Please detail the spatial distribution of sediment from seabed disturbance activities to support the impact statements that impacts (direct and indirect) from unconsolidated sediment will be localised. Chemical selection process (Letter 2.2) - Section 3.6 has been updated to state that the 'pseudo ranking' for individual substances will be defined based on the CHARM model or on the OCNS ranking system. Details of the OCNS ranking system has been provided in Table 3-9 (pg 43) which includes adjustment criteria and definitions for biodegradation terms. The use and inclusion of the ranking system plus the additional details of the proposed risk assessment adequately demonstrate the chemical selection process and ecotoxicity considerations. The proposed system can be verified should non OCNS chemicals be selected during an inspection.

Discharges:

FCGT Chemical Options & discharge characteristics (Letter 2.3 & 2.4) - Section 5.2.7 has been updated and a single chemical treatment system is detailed consisting of one biocide (Alkyl dimethyl benzyl ammonium chloride), an oxygen scavenger (Ammonium Bisulphite), and two solvents (Dipropylene Glycol Methylether & Ethylene glycol). The EP has been updated and multiple biocide options have been removed and are no longer carried in the EP. Table 5-12 lists the function, chemical, formula, CAS No, % of treatment system and the pipeline concentration. Potential impacts of each chemical additive are described (pg 174). Section 5.2.7 states the listed (table 5-12) chemical treatment package presents the chemical composition of a typical chemical treatment package that will meet the pipeline preservation objectives and "this or an equivalent package will be used in the Barossa pipeline". Control measures listed to address the chemical treatment package uncertainty (and subsequent discharges to the environment) is the chemical selection process (s3.5). ISSUE: Section 5.2.7 presents the chemical composition of a typical chemical treatment package that will meet the pipeline preservation objectives and states "This or an equivalent package will be used in the Barossa pipeline". The reference to an "equivalent chemical package" is ambiguous. Please clearly define equivalent in relation to alternative chemicals. See RFFWI below FCGT & Bulk Dewatering Discharge Locations (Letter 2.4) - Table 5-11 has been updated and clearly details the discharge activity source, volume, location and depths. One discharge location is provided for bulk dewatering of entire pipeline (85,000m³) at 3m above seabed. Two options are carried in the EP for FCGT water discharges (12,000m³) - (FPSO PLET or Tie-in PLET) and at two possible depths (1m below surface or 3m above seabed). Modelling is provided for all discharge options for FCGT discharges - 12,000m³ (figure 5-6/Figure 5-10) and pipeline dewatering - 85,000m³ (Table 5-16, Figure 5-13) however modelling is based on Hydrosure 0-3670R chemical package which is "similar" to what is being proposed. ISSUE: Please demonstrate that the characteristics of Alkyl dimethyl benzyl ammonium chloride are similar such that the modelling presented within the EP and the subsequent evaluation are appropriate. See RFFWI below Bulk dewatering thresholds & modelling (Letter 3.1) Dispersion modelling and ecotoxicity effects have been used to assess the impact being assessed is toxicological effects to marine organisms in the receiving water for the discharge. Ecotoxicity of hydrosure (similar chemical treatment biocide) has been utilised for the impact assessment with chronic and acute EC10, EC50 LOEC and NOEC results presented. Threshold has been updated in s5.2.7 (pg 194) with the chemical concentration in the receiving environment (beyond the mixing zone) not to exceed a median concentration of 0.06 ppm (or mg/L). Threshold is based on species protection levels calculated from statistical distribution of the NOECs at a 99 % level of species protection level for a similar chemical treatment package (Hydrosure 0-3670R) approved for use on a recent WA pipeline project (e.g. wheatstone). Proposed chemical package does not accumulate within the marine environment and is considered biodegradable with negligible potential for bioaccumulation. See RFFWI/ISSUE listed above regarding chemical used for modelling. 12,000m³ FCGT discharge has been modelled: Surface discharge at PLET tie-in and results are presented in table 5-15, figures 5-6 to 5-9. Seabed discharge at PLET Tie-in and results are presented in figures 5-10 to 5-12. Plume at 0.06mg/L threshold ISSUE - Discharge modelling figures are of poor quality and eligible. Please resubmit higher quality figures (e.g. Figure 5-6, 5-10 & 5-13). See RFFWI below 85,000m³ bulk pipe dewatering discharge has been modelled: Seabed discharge at FPSO PLET and results are displayed in table 5-16, figures 5-13 to 5-16. ISSUE: Figure 5-16 states it is for the "FPSO PLET surface discharge: median hydrotest chemical concentration however the figure key states the presented results are for "Bottom discharge of hydrotest 50th percentile predicted for 7 days. See RFFWI below Modelling - 85,000m³ - (pg 180) Figure 5-10 presents modelling results for the subsurface discharge. At 200 m from the discharge (within the centre of the plume), concentration peak at 6.2 mg/L, whilst the 95th percentile and median concentrations over the duration of the discharge are 0.5 and ISSUE: EP does not adequately demonstrate the maximum footprint for the concentration peak (e.g. what is the concentration peak at the furthest point from the discharge location). Dewatering location overlaps KEF but not expected to impact values of the KEF based on surveys of the FPSO PLET location. Impacts to flatback interbreeding BIA and critical habitat at Bayu-Undan PLET is deemed unlikely based on the water depth of 54m and interbreeding females residing in waters of RFFWI# - The extent of the environmental impact and footprint from the bulk discharge modelling

remains unclear due to discrepancies and unclear information. Please address the following points to support the the environment impact and evaluation from Pipeline Hydrotest and Dewatering planned discharges:

Modelling and subsequent impact evaluation from planned discharges (pipeline hydrotest and dewatering) is based on the chemical Hydrosure 0-3670R which is described as "similar" to Alkyl dimethyl benzyl ammonium chloride which is listed as the proposed chemical for the Barossa gas pipeline activities. Please demonstrate that the characteristics of Alkyl dimethyl benzyl ammonium chloride are similar such that the modelling presented within the EP, and the subsequent evaluation, are appropriate. Section 5.2.7 presents the chemical composition of a typical chemical treatment package that will meet the pipeline preservation objectives and states "This or an equivalent package will be used in the Barossa pipeline". The reference to an "equivalent chemical package" is ambiguous. Please clearly define equivalent in relation to alternative chemicals. Section 5.2.7 provides the concentration peak within the centre of the plume along with the average median concentrate however the EP does not adequately display or detail the maximum footprint for the discharges (e.g. what is the concentration peak at the furthest point from the discharge location. This issue is further hampered with the discharge modelling figures eligible (e.g. Figure 5-6, 5-10 & 5-13). Median hydrotest chemical concentration modelling presented in figures 5-9, 5-12 and 5-16 is for 50th percentile and not the described 95 percentile described in the impact assessment. Modelling present in Figure 5-16 states it is for the "FPSO PLET surface discharge: median hydrotest chemical concentration however the figure key states the presented results are for "Bottom discharge of hydrotest 50th percentile predicted for 7 days. Please clearly present all planned discharge modelling to demonstrate the impact footprint from planned discharges and support the impact evaluation.

RFFWI# - Section 5.2.4 describes construction vessel activity including for flood/gauge/testing operations, where vessels may be stationary for up to 14 days. The location of these activities is not described, but this will be important in relation to the potential for the activity to impact the environment.

Unplanned

Dewatering of pipeline due to an unplanned event (Letter 3.2) - Wet Buckle (section 3.7.1) has been updated and include additional justification on the limited information available and commits to an investigation and a "detailed assessment" which will inform the direction the pipeline shall be dewatered from to minimise the environmental impact. There are no further detail on what the detailed assessment will include/consider. Modelling of bulk water discharge demonstrates 0.06 mg/L threshold will be localised with a temporary reduction in water quality. Unable to verify the claims due to the above mentioned modelling issues (see RFFWI above)

Method

The method for determining ALARP is described in Section 5.1.4.1, and the method is appropriate. Each of the impact and risk evaluation tables for the various risk aspects provides an ALARP evaluation using this method, with consideration of other controls. A generic statement has been added to each ALARP summary that 'no credible additional controls were identified'. For the ALARP evaluations, a limited number of additional controls were considered. ALARP is considered for each risk independently from acceptability. The risk assessment evaluation method appears systematic

Planned impacts

Sections 5.2 details the planned impacts - physical presence (with other users and seabed disturbance), emissions (underwater noise, light and atmospheric), planned discharges (vessel activities and pipeline dewatering/commissioning)

Impacts to fisheries - Acceptability statement in OPP (pg 282) states residual risk is considered low as there are no areas of significant importance for commercial fishing or other marine user within the physical footprint of the project. Subsequent OPP includes EPO "infrastructure will not be developed in key areas of importance for commercial fishing". EP (s5.2.1) details the potential impacts to commercial fishing as 154 fishing vessel days and 816 hours of fishing activity resulting in a fishing intensity of Impacts to Sensitive Fauna/Timing of activity - ISSUE OPP (pg306) states pipeline installation will take into consideration season presence/activity of marine turtles to prevent impacts to peak seasonal interesting periods (April to September) should it need to be installed within these key periods within 60km of TIWI islands. EP activity period is sometime between Quarter 4 2020 and Quarter 1 2024 (table 3-1). OPP includes details of additional processes that will undertaken to identify how the pipeline will be installed to reduce impacts to ALARP.

ISSUE: Activity Timing/ALARP - The OPP states the installation schedule of the gas export pipeline will take into consideration seasonal presence/activity of marine turtles to prevent significant adverse impacts during peak seasonal interesting period for flatback (June to September) and olive ridley turtles (April to August) in proximity to the Tiwi Islands. ConocoPhillips state in the submitted EP that "the timing of the campaign is dependent on a number of factors including the availability of vessels, contracting and mobilisation process, project approvals. Therefore, the actual timing of the campaign is still subject to a planning process". In accordance with NOSPEMA decision making guidelines, (10A(a) and 10A(b) environment plans must explore

alternative, additional, or improved control measures relative to the design envelope of the activity, and consider particular periods, locations or activity phases that increase the impact on the environment due to increased sensitivity and/or vulnerability. Please revise the EP to adequately demonstrate that peak seasonal interesting period for flatback and olive ridley turtles have been considered and will be managed to ALARP.

S5.2.2 Seabed disturbance

Pipeline route remains within the Oceanic Shoals marine park and therefore there is no requirement for dredging or trenching (pg462).

ISSUE: Seabed Disturbance:

Information pertaining to sea bed disturbance is not consistent throughout the document. The activity description of the EP (s5.2.2) states that the estimated total seabed footprint is 28.7ha (table 3-6) whilst the risk assessment (pg 119) states the disturbance to be approximately 22 ha. In addition section 5.2.2 states the the footprint of the gas export pipeline route within this KEF is approximately 36.75 km² (including a 250 buffer around the proposed route), which represents approximately 0.34% of the 10,844.35 km² total area of the KEF (pg 117). 36.75km² converts to 3675 ha which contradicts the footprint disturbance areas in Table 3-6. NOPSEMA notes the EP utilises multiple units (i.e km² and hectares) throughout the document when discussing seabed disturbance which results in confusion and discrepancies around seabed disturbance impacts. The environment plan (s3.4.8) states that the overall nominal footprint from the gas export pipeline installation campaign has been estimated and the the calculations are an estimation only. Please revise the footprint of the activity and include firm measurable commitments around maximum seabed disturbance. S5.2.7 Planned discharges - Pipeline dewatering/precommissioning

Planned discharges include:

12,000m³ or 15,000m³ from FCGPT activities at either the Bayu-Undan pipeline PLET location or FPSO PLET location locations. Discharge may be surface or subsurface (via a diffuser). Duration of discharge 1 to 2 days. 2000m³ of hydrotest water subsea or surface release at either end of the pipeline 85,000 m³ of treated seawater and 1000 m³ of MEG (discharged over 3 to 7 days) at the FPSO PLET location. Bulk dewatering, including MEG, will be a subsea release through a vertically orientated diffuser at the FPSO PLET location, in the Barossa field, however, MEG may be routed to the surface for release if sampling is required. Modelling has been provided for bulk dewatering values and FCGT values (pg157) and completed for subsea and surface discharges (pg158). Modelling volumes based on OPP volumes (96,710m³) however EP has reduced these volumes to 85,000m³ (pg157). Modelling based on all biocide options (plume threshold 1ppm) as it biocide has the higher toxicity and is the primary chemical. Residual discharge concentration of the biocide was assumed to be the same as the initial dosing concentration (pg156). Modelling Threshold (pg157) considered to represent a conservative LC50 value (i.e. concentration at which there is mortality of 50% of a group of specific test species) and/or EC50 value (median effective concentration, concentration at which 50% of the test organisms are immobilised) for the three biocides (It should be noted that ecotoxicology tests are typically undertaken over 24 to 96 hours). Using these tests results as a threshold for impact assessment is conservative as in the offshore environment the concentrations and exposure durations will vary and be influenced by local oceanographic conditions.

ISSUE - Discharge Modelling: For the purpose of modelling bulk dewatering, a threshold of 1 ppm has been selected. On page 157 a description is provided for the basis for this threshold. However, given the nature (biocide) and scale (96,710m³) of this discharge, the information provided is insufficient to support the application of this threshold. Please provide a suitably robust scientifically supported justification for the application of this threshold, including details of cited studies to demonstrate their relevance in supporting the threshold. If necessary, please update the threshold and provide an appropriate evaluation of impacts and risks.

Modelling results are as follows:

Bulk dewatering modelling indicates plume to be 0.92km (THPS and Hydrosure 0-3670R) to 1.27km (Glutaraldehyde biocide) from discharge point for the biocide options. FCGT modelling - Significant plume modelling distances for the biocide chemical options (FGT - release Glutaraldehyde = 3km (surface release) from the release location and 2.41km subsurface. THPS and Hydrosure 0-3670R biocide 1.09 km from the discharge location for a surface release and 1.22 km for a subsurface release. The impacts to benthic communities from FCGT discharges (pg 160) states that the nearest feature (shoal and bank) is located 3km from the Bayu-Undan pipeline PLET (water depth 54m). Modelling of the surface release option shows the plume extends 3km which puts it in the vicinity of the nearest feature should this discharge site be selected. EP is silent on the vertical profiling of the plume. If the EP proposes to keep multiple discharge locations.

Key management controls and environmental performance outcomes from OPP (pg381-382) align with the proposed EP control measures and standards.

ISSUE

Planned Discharges:

Chemical selection process - Section 3.5 describes the chemical selection process that will be implemented for all chemicals. An environmental risk assessment is proposed when chemicals non rated chemicals may be required and the EP includes reference to the risk assessment including an evaluation of ecotoxicity thresholds and the establishment of an

alternative pseudo rating that will be applied. Please provide further details regarding the ecotoxicity thresholds and alternative pseudo ratings that the risk assessment will base the chemical assessment considerations on. In relation to FCGT discharges, a number of options are carried, including: location of discharge ((12,000m³ or 15,000m³ depending on the end the pipeline is flooded from), as well as a range of biocides (page 158). Carrying these options does not represent the appropriate level of planning required for the EP, particularly as the footprint associated with them is substantially different. Please provide more certainty on options to be utilized for the activity, or alternatively demonstrate that carrying these options still results in risks being reduced to ALARP. In addition, Figure 5-5 displays the surface and subsurface modelling for FCGT discharges from 'a release location', however the discharge location in these figures is not defined. Please provide the modelling for both surface and subsurface FCGT discharges in relation to the two disposal locations (Bayu-Undan pipeline PLET location and FPSO PLET location) and sensitive environments. The EP states dewatering/precommissioning the discharge plumes is expected to travel in close proximity to the seabed (pg 160), there is the potential for localised exposure of benthic habitats and associated species within the vicinity of the discharge location. The modelling provide does not consider vertical profiling to demonstrate that benthic communities. In addition, the nearest feature e.g shoal and bank (pg 160) is located 3km from the Bayu-Undan pipeline PLET (water depth 54m). Modelling (pg 158) of the surface release option shows the plume extends 3km which puts it in the vicinity of the nearest feature should this discharge site be selected. The EP does not adequately demonstrate that benthic communities will not be impacted from planned discharges. Planned discharge modelling demonstrate a significant difference in the size of the plume for the 3 biocide options. This has not been considered when demonstrating ALARP or acceptability. Risk assessment of dewatering and FCGT discharges does not include assessment of alternative controls such as non continuous discharge. Please assess additional controls in order to demonstrate risks of discharges are to ALARP and acceptable levels. QUERY - Modelling of discharges is from one discharge location (figure 5-5). Does consideration need to be given to the two release options noting they are 260km apart?

Planned discharges - Vessel (s5.2.6) & Atmospheric (s5.2.5) - Risks and impacts from atmospheric and vessel discharges are considered negligible. Standard maritime industry controls and practices are proposed (e.g. MARPOL, Marine Order 91, 95, 96, 97). EP adequately demonstrates impacts and risks are negligible and managed to ALARP. Noise S5.2.3 and light (S5.2.4) - please refer to protect matters - "Environment Plan is appropriate for nature and scale of activity"; findings

Unplanned impacts

Section 5.3 details the unplanned impacts - physical presence (dropped objects, IMS, fauna collision), unplanned discharges (treated seawater, waste, vessel collision, bunkering incident, minor subsea spills, dry gas release)

Dropped objects (s5.3.1) and IMS. Dropped objects risks are low. Primary control measures align with OPP (pg 388) EP includes a commitment (pg 166) that all dropped object incidents to assess the environmental risk and the potential to recover the object, and objects will be recovered where safe and practicable to do so. Risks from drop objects appear appropriate and to ALARP.

IMS - EP states 81% of the Operational Area is bare sediment (s4.4.2.3) and introduction of IMS (and therefore IMS-related impacts) in deep waters or in areas of bare sediment is considered improbable. Increased risk of IMS colonising areas within the shallow water area of the southern section of the gas export pipeline route (pg 68). Proposed controls in the EP are the Key management additional controls from the OPP and not additional information has been provided. For example - the EP includes EPS9.3.1 - A Quarantine Management Plan will be developed and implemented, which will include as a minimum; outline of when an IMS risk assessment is required as the associated inspection, cleaning and certification requirements.

ISSUE - IMS standards include "management measures" that do not clearly specify or detail the controls or control measure considerations. Please refer to finding under "Environment Plan provides for appropriate performance outcomes, standards and measurement criteria";

Fauna Collision (s5.3.3) -

Unplanned Pipeline Event (s5.3.4)

Section 3.6 include contingency activities that would require the discharge treated seawater. Please provide the worst case/maximum discharge volumes for the contingency options and demonstrate these discharges will not impact benthic communities and sensitive receptors. Section 5.3.4 confirms worst case contingency volumes is the full pipeline volume (85,000m³)

ISSUE: Dewatering of pipeline due to an unplanned event (e.g. wet buckle or stuck pig).

Worse case discharge volume would be complete pipeline volume (85,000m³) and could occur anywhere along the pipeline route. Potential impacts from subsurface discharge are described (pg 178) with a plume of up to 3 km from the discharge location. Surface release of treated seawater are discussed with predictions extending up to 3 km, however the plume would remain on the surface of the water) therefore it would not impact the submerged bank. The EP does not include modelling of bulk water discharge (85,000m³) to support these impact statements. Please provide the model to adequately demonstrate

			<p>impacts and risks from unplanned worst case spill scenario (from a discharge point anywhere along the pipeline) are ALARP and acceptable.</p> <p>s5.3.7 - Unplanned discharge - MD from vessel collision - Please see the issue identified in "Environment Plan is appropriate for nature and scale of activity" findings above regarding modelling worst case spill modelling.</p> <p>s5.3.8 - Unplanned discharge - Refuelling - bunkering spill volume based on 10m3. Volume based from transfer hose inventory and spill prevention measures including 'dry break' or 'break away' couplings, rapid shutdown of fuel pumps and spill response preparedness, with 10 m3 considered to be the maximum volume that could escape from the hose prior to shut down. Controls include quick connection couplings, Visual inspection of hose prior to bunkering, weather assessments, emergency shutdown tests, continual visual monitoring during bunkering, bunkering to occur min 20km from Tiwi Islands. Exclusion of night time bunkering control considered but ruled out.</p> <p>Gas release (150,000m3) from Bayu-Undan Pipeline pipeline rupture (caused from anchoring) is included in section 5.3.9. Activities at the southern end of the pipeline pose the risk to this operational pipeline. Raise in existing anchoring RFFWI responses</p>
3	Environment Plan demonstrates that impacts and risks will be of an acceptable level	General	<p>Please refer to the findings "Environment Plan is appropriate for nature and scale of activity" which identify multiple aspects around the activity and description that require addressing in order to provide appropriate context for key components and risks of the activity (e.g. pipeline route and seabed disturbance). This additional clarification is required before impacts and risks can be demonstrated to meet an acceptable level. The description of the environment and potentially affected sensitive receptors, details of consultation and requirements (including relevant legislation, conservation advices & recovery plans etc.) are adequately described to provide appropriate context. The evaluation of impacts and risks follows a risk management process that is claimed to be consistent with ISO 31000 (see S 5.1) and shown to be so in practice. This approach has been consistently applied across all risk aspects.</p> <p>Section 5.1 states the EP takes a broad definition of 'acceptable' taking into account the principles of ESD, relevant legislation/requirements, internal company context and external context (environmental consequences, stakeholder expectations), which is appropriate. Please refer to "Environment Plan demonstrates that the impacts and risks will be reduced to ALARP" and "Environment Plan provides for appropriate performance outcomes, standards and measurement criteria" findings.</p> <p>ISSUE: Throughout the risk assessment the acceptable levels of impact are not clearly defined. EP sets out COPA's considerations regarding acceptability of environmental impacts and risks, but it does not define the acceptable levels of impact. e.g. considerations and reasons for determining acceptability of environmental impacts in relation to seabed disturbance however, the acceptable level(s) of impact itself is not defined.</p> <hr/> <p>Defining acceptable levels of impact (Letter 3.3) - Levels of acceptable impacts have been added to each of the environmental risks associated with planned activities (s5.2). Levels of impact are defined as no 'significant impacts' on the values marine park or listed threatened/migratory species (MNES), as well as activities being conducted in accordance with AMP management plans, conservation advice, recovery plans, threat abatement plans as well as licence conditions. The defined levels are at a high level and require further refining and defining on a project scale (e.g. what constitutes a 'significant impact' in particular for defining for several environmental risks (e.g. light impacts to turtles, seabed disturbance). Define acceptable levels of impact must align with EPBC guidelines, recovery plans and MAP management plans. Please refer to EPBC RFFWI</p> <hr/> <p>Section 5.1.4.2 has been updated to further define the acceptable level of impacts with significant impact. Table 5-1 defines significant impact for each receptor defined and clearly references and aligns with the source of the published guidance (e.g. MNES Significant Impact Guidelines, recovery plans, conservation advice and marine park management plans). Furthermore the acceptable levels of impact are included in each aspect of the risk assessment in section 5.2. Acceptable levels of impact appear appropriate and demonstrate that the predicted impacts with each aspect of the activity will be within these defined levels.</p> <p>In general, evaluation presented is supported with suitable evidence and supporting information (e.g. modelling) and incorporates relevant controls where required such that the outcomes are defensible. The EP adequately demonstrates that acceptable levels are defined, considered independently, methods are systematic, have been followed and applied thoroughly, and outcomes are reproducible and defensible</p>

3	Environment Plan demonstrates that impacts and risks will be of an acceptable level	Matters protected under Part 3 of the EPBC Act	<p>SEABED DISTURBANCE</p> <p>The EP provides content on pg 131 that sets out COPA’s considerations and reasons (though not suitably supported or connected to impact assessment) for determining acceptability of impacts. This information does not provide relevant context because the EP does not clearly define what the acceptable level of impact to the seabed and seabed habitats is.</p> <p>ISSUE: Please specifically define the acceptable level of impact to the seabed. Then make the necessary changes to the EP content such that the EIA including underpinning predictions and conclusions are benchmarked against that defined acceptable level of impact. Please make amendments to EP content to include specific justification, with reference to COPA’s acceptability considerations where appropriate, for why the defined acceptable level is appropriate.</p> <p>MARINE TURTLES</p> <p>Light emissions and noise emissions:</p> <p>The EPOs are about there being no significant impacts to marine fauna from the gas export pipeline installation campaign. With this approach, ensuring this outcome is met requires clear connections to be made between sources of impact, their subsequent impact on the environment and controls selected and decisions regarding effectiveness. The EP requires additional information to describe the connections between sources of impact and effectiveness of controls and what specific measures will be implemented to monitor and manage effectiveness of the selected controls during the activity.</p> <p>ISSUE - please describe the connections between sources of impact and effectiveness of controls and what specific measures will be implemented to monitor and manage effectiveness of the selected controls during the activity to demonstrate that the EPO will be met.</p> <hr/> <p>DEFINITION OF ACCEPTABLE LEVELS</p> <p>The titleholder has defined acceptable levels of impact to the seabed as follows (p133): The seabed disturbance and any sediment resuspension caused by installing the Barossa pipeline and supporting structures (including span rectifications) will be acceptable if: No significant impacts on the values of the Oceanic Shoals Marine Park. Activities within an Australian Marine Park must be conducted in accordance with the requirements of the management plan and licence conditions. No significant impact on threatened or migratory species listed as MNES. Management of activities must be aligned with conservation advice, recovery plans and threat abatement plans. Short term impacts to water quality do not impact ecosystem function. Modification or loss of seabed habitat that is widely represented in the region.</p> <p>The titleholder has defined acceptable levels of impact from noise emissions as follows (p150): No significant impacts on the values of the Oceanic Shoals Marine Park. Activities within an Australian Marine Park must be conducted in accordance with the requirements of the management plan and licence conditions. No significant impact on threatened or migratory species listed as MNES. Management of activities must be aligned with conservation advice, recovery plans and threat abatement plans</p> <p>The titleholder has defined acceptable levels of impact from light emissions as follows (p159) No significant impact on threatened or migratory species listed as MNES. Management of activities must be aligned with conservation advice, recovery plans and threat abatement plans.</p> <p>METHODOLOGY FOR EVALUATING WHETHER ACCEPTABLE LEVEL OF IMPACT TO THE SEABED ARE MET:</p> <p>The method used to evaluate acceptability of impacts is a logical one. It now provides for the titleholder to provide high-level analysis based in information in the EIA section against each one of the acceptable level statements. It appears that the intent of this process is that if the analysis can show that predicted impacts once managed appropriately are within the acceptable level statements, then the impacts of the activity are acceptable. This method if applied diligently and consistently is defensible [C]</p> <p>DEMONSTRATING ACCEPTABLE IMPACTS</p> <p>Seabed disturbance</p> <p>Demonstrating acceptability of impacts is set out in a table starting p148. The demonstration draws little directly from the EIA section above meaning the titleholder’s explanation is not clear or defensible as presented. This problem is exasperated by the fact the acceptable statements are high level and unclear in terms of what an unacceptable impact may look like. ISSUE - The acceptable levels should, where possible, more clearly define the key terms that are fundamental to defining acceptable (significant impact, values) thereby allowing predictions of impact made in the EIA to be connected back to the acceptable levels</p> <p>ISSUE - The demonstration of acceptability that addresses each of the acceptability statements needs to more clearly, quantitatively (where possible) and better connect predictions of impact (extent, severity and persistence) and their consequences with the acceptability statement to explain how the impacts are acceptable. Currently the demonstrations focus on the management that will be</p>
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implemented, not on the impacts and their acceptability, either with or without management intervention. (e.g. reference % of habitats disturbed within defined areas (park zones, KEFs))

For impacts to listed threatened or migratory species, the process is applied by referring back to an analysis of alignment with EPBC Management Plans section to conclude that the management of the activity is aligned with these plans (specifically the Marine turtle recovery plan). ISSUE - However the EP requires a more clear and explicit assessment of impacts against each specific requirement of the recovery plan so as to demonstrate that accepting the EP would not be inconsistent with the recovery plan. In terms of demonstrating that the proposed modification or loss of seabed habitat is widely represented in the region, the EP does not adequately account for uncertainty in the modelling results which are clearly communicated by both researchers who carried out benthic surveys as well as those who implemented the model. ISSUE - In order to demonstrate that habitat disturbed or lost as a result of the activity is actually widely represented, particularly in the Oceanic Shoals Marine Park, COPA needs to better explain how this will be assured through commitment to appropriate benthic surveys or providing further explanation as to how the currently proposed controls will provide assurance that the acceptable level will be met (e.g. pre and post lay benthic habitat surveys are only proposed at initiation anchor location(s) and it is currently unclear how (if any) span-specific procedures described as control C2.12 address benthic protection matters)

Noise emissions
Demonstrating that acceptable levels are met requires clearly defining the key terms that are fundamental to defining acceptable (significant impact, values) thereby allowing predictions of impact made in the EIA to be connected back to the acceptable levels

Light emissions

Demonstrating that acceptable levels are met requires clearly defining the key terms that are fundamental to defining acceptable (significant impact, values) thereby allowing predictions of impact made in the EIA to be connected back to the acceptable levels (e.g. significant impacts, what does an impact that is not significant look like?)

The EP proposes that the activity would take place within habitat critical to the survival for EPBC Act listed threatened flatback and olive ridley turtles and would not be managed avoid peak breeding periods for these species.

In relation to impacts of artificial light, the Department of the Environment and Energy has recently published draft National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds (the Guidelines) to inform environmental impact assessment (EIA) and management for this issue. The draft Guidelines restate key requirements of the Recovery Plan for Marine Turtles including that management of light should ensure turtles are not displaced from habitat critical to their survival and that anthropogenic activities in biologically important areas are to be managed so that the biologically important behaviour can continue. The Light Pollution Guidelines, considering the Recovery Plan requirements, also set out an aim which is to ensure that at important nesting beaches females continue to nest on the beach, post nesting females return to the ocean successfully and hatchlings orient in a seaward direction. This aim is considered key context for an acceptable level of impact to marine turtles from light emissions.

The EP does not demonstrate that impacts from light emissions on marine turtles meet this aim or are of an acceptable level. For example, the EIA for light emissions:

Does not explain how the relative importance of turtle breeding areas on the Tiwi islands (established in section 4.5.2.6) that may be affected by artificial lighting has been taken into account to inform clear and well-founded conclusions about acceptability of impacts (e.g. How important are these areas for recovery of the relevant stocks? How distinct and significant are winter peak breeding periods relative to breeding that takes place over the remainder of the year) applies findings of a study into lighting effects from a drill rig by ERM to inform impact assessment but does not justify why findings from this study would be directly applicable to the activity (e.g. It is not clear if lighting on the drilling rig was of the same nature as that proposed for the activity or if it included light shielding/directionality controls or utilised any specific form of lighting not proposed for this activity (e.g. turtle friendly lighting)); does not address impacts on the successful return to the sea by post-nesting adult turtles as per the Guidelines. Specifically the EP does not detail and evaluate potential impacts of light emissions (both in terms of direct light spill and sky glow) on the success of post-nesting adult females returning to the sea (e.g. the evaluation does not consider the nature of the nesting beaches including dune/cliff heights and aspect as factors that influence how a turtle may perceive and respond to direct light or light glow after nesting events); inadequately evaluates the potential impacts of light emissions from the activity on hatchling ability to successfully orient in a seaward direction, particularly in relation to indirect light glow that may affect nesting habitat when hatchlings are emerging; includes insufficient details of the work that underpins conclusions about the potential impact if hatchling turtles were trapped by vessel light spill. Specifically the EP does not include details about the field study referenced in the Pendoley (2019) review that found hatchlings being trapped by light spill from a pipelay vessel 10km off Barrow Island study, but not being predated to demonstrate it is a scientifically-sound and representative basis on which to inform the impact evaluation for this activity (e.g. what were the specific aims of the study? Was the survey/observational design and effort specifically applied to

measure potential for predation? Are findings published?). The titleholder should more comprehensively evaluate light impacts and present well founded case for why these are considered acceptable, including by specifically explaining how the predicted impacts are not inconsistent with relevant statutory criteria and guidance materials. In the event that it is not possible to demonstrate the impacts are acceptable for the activity as described it may be necessary to consider the application of additional, alternative and different controls, including temporal avoidance of peak breeding periods.

Critical context for demonstrating the impacts of the activity are acceptable is the titleholder's demonstration that the EP is not inconsistent with a recovery plan for an EPBC Act listed threatened species. The summary of alignment with EPBC Act management plans in respect of light emissions and requirements of the Recovery Plan for marine turtles sets out findings and conclusions of the EIA, but it does not clearly explain how, if these findings and conclusions are accurate and will be achieved with confidence, the specific relevant requirements of the recovery plan will be met.

RFI:

ISSUE - The EP describes construction vessel activity including for FGT, where vessels may be stationary for up to 14 days. Is activity where vessels may be on station for these lengths of time proposed in the HCTS for marine turtles? If so, please evaluate impacts (noting this is longer than the pipelay vessel would be in any single location), include content to demonstrate impacts are acceptable and that measures are proposed to reduce impacts to ALARP.

ISSUE - The EP describes lighting on the pipelay vessel and explains that floodlights are the most intense and in the case of the cantilever floodlights among the highest, lighting. The ALARP case regarding replacement of lights on vessels discounts this measure, however the approach to the assessment appears to be replacement of all fixtures or nothing. It is unclear whether the assessment has considered replacement of particularly bright and high lighting with more turtle friendly solutions and whether it consider replacement of globes only (as it currently implies entire fixtures would be replaced). Please provide content that demonstrates consideration for replacement of at least some particularly important lighting (e.g. the bright and high lighting) and confirms that globe only replacement was evaluated.

Acceptable levels of impact and their application in EIA.

Table 5-4 has been amended to define significant impact levels for different receptors. - COMPLIES

DEMONSTRATING ACCEPTABLE IMPACTS

Seabed disturbance

RFI ISSUE - The acceptable levels should, where possible, more clearly define the key terms that are fundamental to defining acceptable (significant impact, values) thereby allowing predictions of impact made in the EIA to be connected back to the acceptable levels (letter point 1.1)

RESPONSE: significant impacts have been defined in table 5-4 - C

RESPONSE: Significant impact guidelines statements as well as statements from relevant species and marine park management plans has been included in table 5-4 (p.148), with the statements that COPA determines any impact below these thresholds to be of an acceptable level. For the purpose of this EP, these significant impact definitions are taken to also be the defined acceptable levels. - COMPLIES

RFI ISSUE - In order to demonstrate that habitat disturbed or lost as a result of the activity is actually widely represented, particularly in the Oceanic Shoals Marine Park, COPA needs to better explain how this will be assured through commitment to appropriate benthic surveys or providing further explanation as to how the currently proposed controls will provide assurance that the acceptable level will be met (e.g. pre and post lay benthic habitat surveys are only proposed at initiation anchor location(s) and it is currently unclear how (if any) span-specific procedures described as control C2.12 address benthic protection matters) [LP 3.1]

- Please provide further information including predictions of the extent of indirect impacts to benthic communities from sediment mobilisation and deposition;

-Please provide further information including: facts and reasons to demonstrate the representativeness of Jacobs (2017) sediment study findings to sediments that may be liberated to the water column in order to support impact predictions for the activity

- Please provide further information including: details of the span-specific rectification plans described as C2.12 and an explanation of any difference between the proposed consideration of environmental impacts and risks by this control and how those impacts and risks evaluated in the EP, noting the EP must evaluate all environmental impacts and risks. - These have been ruled out -

RESPONSE: clarification that rock dumping and span shoulder modification has been ruled out and further details on mass flow excavation provided in section 5.2.2. Sediment sampling has been conducted to demonstrated along the pipeline route and particle size distributions to inform sediment modelling of mass flow excavation. sediment modelling used the maximum mass flow evacuation volume to determine the maximum amount of sediment that may be liberated into the water column and how far that sediment would be transported as well as deposition rates to allow for an assessment of the potential impacts.

Fig 3-3 shows the span and mass flow excavation locations along the pipeline overlaid with the high resolution habitat map, it does not appear that these locations coincide with areas of important benthic habitat. - COMPLIES

RFI ISSUE - The demonstration of acceptability that addresses each of the acceptability statements needs to more clearly, quantitatively (where possible) and better connect predictions of impact (extent, severity and persistence) and their consequences with the acceptability statement to explain how the impacts are acceptable. Currently the demonstrations focus on the management that will be implemented, not on the impacts and their acceptability, either with or without management intervention. (e.g. reference % of habitats disturbed within defined areas (park zones, KEFs)).

RESPONSE: Table 5-10 demonstrates alignment of the EP with the management principals and plans for marine parks and connects the prediction of effects with the % overlap of park zones and KEFs. - COMPLIES

Protected Matters

For impacts to listed threatened or migratory species, the process is applied by referring back to an analysis of alignment with EPBC Management Plans section to conclude that the management of the activity is aligned with these plans (specifically the Marine turtle recovery plan).

RFI ISSUE - However the EP requires a more clear and explicit assessment of impacts against each specific requirement of the recovery plan so as to demonstrate that accepting the EP would not be inconsistent with the recovery plan.

RESPONSE: The EP includes a section at the end of each impact and risk evaluation table to compare predicted levels of impact with specific context from management and recovery plans to demonstrate that acceptance of the EP would not be inconsistent with a recovery plan. eg. p 186-188, the content aligns with the relevant context of legislative instruments.- COMPLIES

Noise

RFI

It is predicted that behavioural impacts to individual marine mammals may occur within 1 to 2 km of the pipelay vessel and 0.5 to 1 km of other activity vessels. The basis for this prediction is not evident.

- The EP refers to a modelling study of noise generated by an FPSO and it appears to be applied to predict impacts for the pipelay and other vessels. The basis for using noise modelling for an FPSO, which typically does not continuously run DP thrusters (whereas the activity description indicates that the pipelay vessel likely will), is not clear.
- With regard to potential physiological impacts, the EP suggests that sounds from oil and gas vessels may exceed levels for PTS and TTS within tens of metres to 100s of metres from vessels, depending on the species of cetacean. The basis for this information is not evident in the EP.
- The EP states that TTS is not expected for dugongs as the threshold is above the expected noise emissions from vessels. However, information about noise source emissions from vessels and how this may propagate, and the threshold applied to draw the above conclusion is not provided.

RESPONSE: The noise impact assessment section (5.2.3) has been rewritten to address queries, and includes estimated source levels for underwater positioning systems but not for other sources of noise. Table 5-14 uses existing modelling studies that are not too dissimilar to the proposed activity to estimate ranges to TTS/PTS and behavioural effects for marine mammals. Appropriate thresholds for marine mammals have been reported in the EIA. There are no important habitats for marine mammals within the operational area, the nearest marine mammal BIA is > 66 km away consequently impacts from noise will be negligible and transient and limited to slight, temporary impacts to transient individuals. The operational area overlaps with HCTS marine turtles, with noise impacts including potential behavioural disturbance within 100s of metres of the vessel. While the EP does not include appropriate thresholds for marine turtles exposure to continuous noise (physiological effects @ 180 dB SEL 24 hr and 175 dB SPL for behavioural), based on the presented information for HF cetaceans which have a more conservative potential for physiological impacts of 173 dB SEL 24 hr for continuous noise, physiological impacts to marine turtles within ISSUE: Potential impacts and risks to marine turtles from noise generated by the activity cannot be evaluated in the absence of appropriate thresholds. The thresholds for injury and behavioural disturbance presented in the EP do not reflect the most contemporary, relevant or appropriate context. These thresholds need to include Finneran et al. (2017) thresholds for physiological impacts from continuous noise. Based on the Finneran paper, physiological effects are possible at noise levels of 180 dB SELcum24hr, which may be reached within - See findings below

Light

RFI ISSUE - The EP describes lighting on the pipelay vessel and explains that floodlights are the most intense and in the case of the cantilever floodlights among the highest, lighting. The ALARP case regarding replacement of lights on vessels discounts this measure, however the approach to the assessment appears to be replacement of all fixtures or nothing. It is unclear whether the assessment has considered replacement of particularly

bright and high lighting with more turtle friendly solutions and whether it consider replacement of globes only (as it currently implies entire fixtures would be replaced). Please provide content that demonstrates consideration for replacement of at least some particularly important lighting (e.g. the bright and high lighting) and confirms that globe only replacement was evaluated.

RESPONSE: Additional control measures including replacing the highest and brightest light globes (as suggested above) and housekeeping measures have now been evaluated in the EP p.212-215. additional controls such as shielding and orienting lights and only conducting crew transfers during daylight operating vessels within 10 km of marine turtle nesting habitat during peak nesting and hatchling emergence season. - COMPLIES

RFI Issue: Does not explain the relative importance of turtle breeding areas on the Tiwi islands (established in section 4.5.2.6) that may be affected by artificial lighting, and how this has been taken into account to inform conclusions about acceptability of impacts (e.g. How important are these areas for recovery of the relevant stocks? How distinct and significant are winter peak breeding periods relative to breeding that takes place over the remainder of the year);

RESPONSE: Section 4.5.5.6 has been updated to include further information on nesting at Tiwi islands however the importance of peak nesting to year-round nesting levels have not been discussed. Peak hatchling emergence timings and depth utilisation of inter nesting turtles, have now been included, eg. p.103 context that flatback and olive ridley turtles utilising nesting beaches West bathurst island utilised depths 0 to over 100 m for feeding. nesting and internesting June to Aug, emergence Jul to Sep. suitable internesting habitats 50 to 10 km from coastline. Olive ridley nesting peak between april and june with emergence between june and august. interesting OR turtles within 48 k of beach and waters

RFI Issue: Applies findings of a study into lighting effects from a drill rig by ERM to inform EIA but does not justify why findings from this study would be directly applicable to the activity (e.g. It is not clear if lighting on the drilling rig was of the same nature as that proposed for the activity or if it included light shielding/directionality controls or utilised any specific form of lighting not proposed for this activity (e.g. turtle friendly lighting));

RESPONSE - Light modelling report has been included and the results integrated into the EIA. Light modelling includes the combined light emissions of two operating vessels. - COMPLIES

RFI Issue: does not address the potential for the activity to impact the successful return to the sea by post-nesting adult turtles as per the Guidelines. Specifically, the EP does not detail and evaluate these potential impacts both in terms of direct light spill and sky glow considering the nature, orientation and aspect of nesting beaches relative to the activity location;

RESPONSE - Light modelling conducted by Pendoley environmental considers both light spill and light glow in their 3d light model ILLUMINA. the farthest distance to light levels that have the potential to be biologically significant is 3.4 km. The nearest nesting beach is ~ 6 km away and consequently light glow and spill are not expected to disrupt the return of post nesting turtles to the ocean. It is reported that there is no evidence of attraction of turtles to lighting from offshore facilities when they are in the water. - COMPLIES

RFI Issue: inadequately evaluates the potential impacts of light emissions from the activity on hatchling ability to successfully orient in a seaward direction, particularly in relation to indirect light glow that may affect nesting habitat when hatchlings are emerging;

RESPONSE: The light modelling indicates that light received at the nesting beaches will not be at a biologically relevant level and consequently while it may be visible it is not expected to result in behavioural disturbance to inter-nesting turtles or result in disorientation or misorientation of emerging hatchlings. - COMPLIES

RFI Issue: includes insufficient details of the work that underpins conclusions about the potential impact if hatchling turtles were trapped by vessel light spill. Specifically the EP does not include details about the field study referenced in the Pendoley (2019) review that found hatchlings were trapped by light spill from a pipelay vessel 10km off Barrow Island study, but were not predated (e.g. what were the specific aims of the study? Was the survey/observational design and effort specifically applied to measure potential for predation? Are findings published?). This is needed to demonstrate it is a scientifically-sound and representative basis on which to inform the impact evaluation for this activity, given the environmental setting;

RESPONSE: additional context has been provided around the potential attraction of hatchlings to light spill on the water. hatchlings have been recorded actively swimming against currents which slows offshore dispersal. mean swim speed 0.5 m/s, documented swimming against currents of 0.3 m/s (based on a study that recorded max current speed of 0.3 m.s so is possible they can swim against faster currents). currents in operational are range from around 0.3 m/s on neap tides to up to 1.1 m/s. given strength of currents it is assessed that the likelihood of hatchlings swimming against currents is unlikely. Hatchlings may be attracted to the vessels if they are carried by currents to a distance within ~3.3 km of the vessel, however attraction will decrease in line with increasing light from moon, so will not be constant during the 23 days that the pipelay vessel is within the HCTS. Based on the propsoed trajectory of the pipelay vessel and predominant currents the scenario where hatchlings carried into proximity of the vessels is highly unlikely. During the day the pipelay vessel will not attract hatchlings consequently if by chance a hatchling were to become

trapped within the light spill from the vessel the effect would be limited to short term and would only affect isolated individuals.

RFI Issue: in concluding a low likelihood of hatchling turtles being trapped in the light spill from a vessel offshore, the EP describes the abilities of hatchlings to swim in ocean current speeds

RFI Issue: evaluates the extremes of management options to control impacts. For example, the EP evaluates and discounts the replacement of all light fittings on vessels as a control measure for light pollution, but does not appear to consider replacing globes only, the substitution of lighting for turtle friendly lights on the brightest and highest light sources or the application of 'house-keeping' type measures on the vessel (drawing blinds on cabin windows) to minimise light pollution.

RESPONSE: additional controls have been considered and the following controls adopted: - COMPLIES

- no vessel transfer activities at night within 10 km of nesting beaches during peak hatchling emergence.
- orientation and shielding of lights as determined necessary by a risk assessment prior to entering within 10 km of a nesting beach during peak hatchling emergence.
- sequencing pipelay activities to avoid peak periods
- housekeeping measures to be employed when within 10 km of a nesting beach

RFI Issue: Please provide a comprehensive evaluation of light impacts to inform a case for why these are considered acceptable, including by specifically explaining how the predicted impacts are not inconsistent with relevant statutory criteria and guidance materials. In the event that it is not possible to demonstrate the impacts are inherently acceptable for the activity as described, it may be necessary to further consider the application of additional, alternative and/or improved control measures, including temporal avoidance of important breeding periods.

* In addressing this item please give consideration to item 5.1

RESPONSE: COPA has provided a sound justification as to how the proposed activity is not inconsistent with the Recovery Plan for Marine Turtles and the National Light Pollution Guidelines. - COMPLIES

Findings:

The EP has used Popper et al. thresholds to evaluate the potential for impact to marine turtles from underwater noise. While these are not the most contemporary thresholds and Finneran et al. 2017 present numerical thresholds for impacts from both continuous and impulsive noise exposure, the outcomes of the evaluation are commensurate with what would be expected from using the Finneran thresholds. The potential for physiological impacts for continuous noise using the 180 dB SELcum 24 hr threshold from Finneran et al. would be limited to within ~ 100 m of the vessel, similar to that of behavioural disturbance. Given the potential for impact is based upon a cumulative sound exposure over 24 hrs, and it is extremely unlikely given the movement of the vessel and turtle behavioural response to continuous noise that a turtle would remain within 100 m of the vessel for that duration of time as is stated on p. 193 in the evaluation of potential impacts from impulsive noise. IN addition, the only habitat critical to survival overlapping the operational area is that of the flatback turtle. Based on tracking studies of flatback turtles, it is known that despite long distance alongshore movement within HCTS, suitable habitat for flatback turtle internesting behaviours has been defined as waters less than 16 m deep and within 10 km of coastline while unsuitable internesting habitat is waters > 25 m deep and > 27 km from the coastline (Whitlock et al. 2016). Based on this the likelihood of high numbers of marine turtles occurring within the operational area is low.

The EP has been revised to define the acceptable level of impact based on the EPBC significant impact guidelines and relevant species and marine park management plans. Impact and risk evaluations have been conducted systematically with each section concluding with a comparison with the relevant species and marine park management plan actions/objectives to demonstrate consistency of the activity with these legislative instruments. Based on the addition of content to the EP and substantial revision of section 5.2.4 (light emissions), it is demonstrated that the EP provides an evaluation of impacts and risks of light emissions and seabed disturbance from the activity that is both defensible and reproducible. With the inclusion of additional control measures to limit the temporal overlap of the pipelay activity with the peak nesting times of Olive Ridley and flatback turtles in the HCTS, controls to limit light emissions from vessels when operating within HCTS, and shielding of lights on the vessel to limit light spill, it is demonstrated that the actions to be taken are consistent with those described in the National Light Pollution Guidelines and the activity can be managed such that it is not inconsistent with the Recovery Plan for Marine Turtles in Australia. Additional content has been added to the description of the seabed and benthic habitats along the pipelay route to provide greater certainty around the prediction of impacts from the activity. Based on the information presented, impacts from the activity will be negligible in the context of available benthic habitats within the marine parks and KEF overlapping the operational area, and while some

			seabed will be permanently disturbed from the laying of the pipeline, this will not constitute a significant impact to the ecological integrity and function of the region.
4	Environment Plan provides for appropriate performance outcomes, standards and measurement criteria	General	<p>IMS</p> <p>COA have updated the implementation section of the EP with additional ballast water and biofouling management detail. Section 7.2.5 provides a summary of the Australian ballast water requirements (including timeframes, distances vessel checks and record keeping), and the international pre arrival requirements for vessels. In addition Section 7.2.6 describes the process COA will use when risk assessing vessels for biofouling risks. Description of the process includes: a high level overview of the factors that vessel risk assessments considered including: vessel history, vessel operation profile (e.g. vessel speed & time alongside facility), receiving environment including the presence of shallow water sensitivities within proximity to the activity etc Vessel risk assessment categorises and definitions (s7.2.6.2) Additional control measures (Table 7-1) pending the vessel risk assessment category (IMS Inspection, In water cleaning, dry docking, temporal or spatial controls, additional anti-fouling, treatment of internal seawater systems). Biofouling risk assessment process is also presented in a simple flow chart in Figure 7-5 and states risk assessment is to occur &apos;Prior to movement, selection and contracting of vessel/equipment&apos; adequately demonstrating the risk assessment process will occur prior to vessels being engaged for the EP/petroleum activity. Section 7.2.6.1 confirms the vessel risk assessment is applicable to both internationally and domestically sourced vessels. The effectiveness of controls in the demonstration of ALARP has been updated along with the environmental performance standards (EPS9.1.1 & EPS9.3.2). EPS&apos;s have been expanded to include vessels sourced from both international and domestic regions. Vessel risk assessment in the implementation (s7.2.6) have been linked to the control measures listed in section 5.3.2. Inclusion of the additional biofouling context and controls, including the vessel risk assessment process, adequately addresses the IMS risk profile identified in the EP impact assessment (noting shallow waters) - [C] - Letter point addressed</p> <p>Seabed Disturbance EPO</p> <p>Risk assessment for seabed disturbance has been split out to mass flow excavation, other rectification and PLET & pipeline activities and risks (pg179). Risk rating for all three risks are the same (Inherent Medium and Residual Low). The acceptable levels of impact for seabed disturbance (pg170) have been revised and are appropriate - please refer to assessment findings under General - &quot;3 Environment Plan demonstrates that impacts and risks will be of an acceptable level&quot; Section 5.2.2 has been updated with new sediment plume modelling, additional context regarding benthic communities and seabed disturbance impacts and risks. Section 5.2.2 clearly assesses and adequately defines both direct and indirect impacts from sea bed disturbance activities (please refer to &apos;2 - General - Environment Plan demonstrates that the impacts and risks will be reduced to ALARP&apos;. EPO for seabed disturbance has been amended to incorporate direct and indirect impacts. - [C] - Letter point addressed The EP as demonstrated that acceptable levels has been considered independently, methods are systematic, followed and applied thoroughly and outcomes are reproducible and defensible</p>

4	Environment Plan provides for appropriate performance outcomes, standards and measurement criteria	General	<p>IMS (Letter 2.1): Pipeline is located in water depths ranging from 33m to 250m. Potential impacts from IMS for large portions of the pipeline have been ruled out based on water depths and areas of bare sediment. Closest banks/shoals are between 1 and 3 km from the Operational Area, with their shallowest points ranging in depth from 9 to 13 m. EP (pg195) notes &quot;an increased risk of IMS colonising areas within the shallow water area of the southern section of the gas export pipeline route, where there is suitable light and habitat available (particularly in the vicinity of the shoals/banks)&quot;. Ballast water controls are appropriate and align with industry standard practice. Anti fouling controls include adhering/aligning with international standards and guidelines (e.g. MO 98, IMO Guidelines for the Control and Management of Ships&apos; Biofouling to Minimize the Transfer of Invasive Aquatic Species). The valid International antifouling certificate focus on the prevention of adverse impacts from the use of anti-fouling systems and the biocidal properties they may contain, rather than preventing the transfer of marine pests. The AFS certificate does not provide assurance of reduced biofouling risk as it does not indicate the effectiveness and condition of the anti-foul coating. In addition the EPS 9.3.1 and 9.3.2 still refer to implementing management plans, risk assessments and implementing mitigation measures commensurate with the level of risk and provides no details regarding what these controls entail. Subsequently the resubmitted EP does not contain sufficient management arrangements to provide confidence that the EPO (acceptable level of risk) will be met for biosecurity/IMS risk. In addition the EP does not consider the IMS risks from the sourcing/movement of vessels domestically to the activity area.</p> <p>RFFWI#: The risk evaluation and proposed control measures to manage the risk of IMS are currently considered insufficient. Specifically:Key controls include implementing management plans, risk assessments and implementing mitigation measures commensurate with the level of risk, however details are not provided regarding the nature of these controls to demonstrate they are appropriate. For example: No information has been provided on how this risk assessment will be effective in determining risk and informing selection of appropriate management measures. In particular, no information has been provided on:The timing of IMS risk assessment relative to vessel/rig selection and movementThe training and competency of personnel conducting and reviewing the risk assessmentThe factors/information that will inform the risk assessmentMeasures that will be applied to address uncertainties/information gapsThe range of management measures to be considered and decision guidance on implementation.Anti fouling controls include adhering to Marine Order 98 (Marine Pollution – Anti-fouling Systems) and vessels requiring a valid International Antifouling System Certificate. Valid International antifouling certificate focus on the prevention of adverse impacts from the use of anti-fouling systems and the biocidal properties they may contain, rather than preventing the transfer of marine pests. The anti fouling certificate does not provide assurance of reduced biofouling risk as it does not indicate the effectiveness and condition of the anti-foul coating. ??The EP must summarise the relevant control measures that will be implemented and the expected level of performance of those control measures. ?EP to include the consideration (and management) of domestic IMS risks from domestically sourced vessels. Seabed disturbance (Letter 3.4/4.1) - Further description and detail on the seabed characteristics from previous surveys has been included in section 4.4. Potential impacts to sea bed (s5.2.2), in particular Bathymetry and Seabed Features, KEFs & benthic communities have been expanded. aTble 5-6 does provide a comparative assessment and sub criteria for span rectification activities and details the benthic habitat, water quality and materials fate impacts. The inclusion of this information and further impact analysis has not resulted in a change to the corresponding EPO (2) which states &quot;No permanent disturbance to benthic habitats beyond the physical footprint of the gas export pipeline route, as relevant to both direct and indirect sources of disturbance to the seabed and associated benthic habitats&quot;. RFFWI# - The EPO in conjunction with the specified levels of acceptable impact (e.g. acceptable if Modification or loss of seabed habitat that is widely represented in the region) may allow for permanent/long term impacts (both direct and indirect) from seabed disturbance activities. The EPO does not adequately define impacts of a non permanent nature (e.g. medium to long term impacts) beyond the physical footprint of the gas export pipeline route. The EP/EPO needs to further define the full extend of the impact and the severity of the acceptable impact. This RFFWI can be tied in with the finding in the EPBC protected matters.</p>
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4	Environment Plan provides for appropriate performance outcomes, standards and measurement criteria	General	<p>Physical presence - impacts to other users (s5.2.1) - EPO in EP aligns with outcome in OPP. EPS include Standard maritime industry controls and practices are proposed (e.g. MARPOL, Marine Order 21, 27, 30, 71). Additional engineering controls have been considered and included as EPS&apos;s (e.g. anti-sag protection on mechanical support structures). EP adequately demonstrates impacts and risks are low and managed to ALARP.</p> <p>Seabed disturbance (s5.2.2) - Pg130 refers to undertaking additional impact assessments as part of the control measures for pre-lay activities and doesn't specify what these impact assessment will entail or consider. e.g. Assessment of additional controls:</p> <p>The pre-lay survey information will inform an impact assessment Each span is expected to have unique technical requirements. By undertaking span-specific assessments, the most effective rectification method can be selected. This assessment will include consideration of the environmental impacts and risks, which will assist in managing the environmental impacts and risks In addition the acceptability statements for seabed disturbance state "ConocoPhillips has facilitated extensive environmental studies to inform the environmental impact assessment, including habitat mapping and modelling of the proposed gas export pipeline route and broader region. Both the gas export pipeline installation activities and the receiving environment are well understood, which provides a high degree of confidence in the impact assessment". Undertaking of additional risk assessments as a control contradicts this acceptability statement and implies a high level of uncertainty.</p> <p>ISSUE: Seabed disturbance - Please provide further details on the pre-lay survey impact assessment controls and provide further evidence to demonstrate impacts from these activities are of an acceptable level.</p> <p>IMS EPS 9.3.1- A Quarantine Management Plan will be developed and implemented, which will include as a minimum:</p> <ul style="list-style-type: none"> • compliance with all relevant Australian legislation and current regulatory guidance • outline of when an IMS risk assessment is required as the associated inspection, cleaning and certification requirements • implementation of management measures commensurate with the level of risk (based on the outcomes of the IMS risk assessment), such as inspections and movement restrictions, and • anti-fouling prevention measures including details on maintenance and inspection <p>ISSUE - IMS - Control measures and standards from the approved OPP have not been further developed for the EP activity. The EPS for IMS in section 5.3.2 of the EP does not contain any additional detail or information on the specific controls that will be implemented for the EP activity and subsequently the risk evaluation and proposed control measures to manage the risk of IMS introduction for this activity is insufficient. E.g. IMS standards include "management measures" that do not clearly specify or detail the controls or control measure considerations. A environmental performance standard EPS9.3.1 is included in section 5.3.2 which states a quarantine management plan will be developed and implemented which will include as a minimum compliance with all relevant Australian legislation, outline when an IMS risk assessment is required, implement management measures commensurate with the level of risk, and anti-fouling prevention measures. The standard does not provide adequate detail regarding performance standards and control measures that will be implemented (e.g. it lacks detail on the content, considerations, timing, scope or management measures that may be implemented). Please note that [REDACTED] (pg 373 of Appendix E) that do not appear to have been included in the EP controls.</p>
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4	Environment Plan provides for appropriate performance outcomes, standards and measurement criteria	Matters protected under Part 3 of the EPBC Act	<p>SEABED DISTURBANCE The relevant EPO for seabed disturbance (p149) has not been modified - No permanent disturbance to benthic habitats beyond the physical footprint of the gas export pipeline route, as relevant to both direct and indirect sources of disturbance to the seabed and associated benthic habitats. ISSUE - Meeting this EPO would still allow for medium to long term impacts beyond the footprint and there is no limit placed on the extent of these potential impacts. The EPO (and acceptable levels) require further definition in terms of extent and severity of impacts.</p> <p>LIGHT EMISSIONS EPO unchanged from previous revision - EPO4 - No significant impacts to marine fauna from the gas export pipeline installation campaign. ISSUE - Further to last assessment, the EPO for light emissions needs better connection to describe how the management of lighting will perform to meet the acceptable level. See above regarding requirements for improved definition of the acceptable level and connections to EIA.</p> <p>NOISE EMISSIONS EPO unchanged from previous revision - EPO3 - No significant impacts to marine fauna from noise generated during the gas export pipeline installation campaign. ISSUE - Further to last assessment, the EPO for noise emissions needs better connection to describe how the management of lighting will perform to meet the acceptable level. See above regarding requirements for improved definition of the acceptable level and connections to EIA.</p> <hr/> <p>Findings: EPOs have been revised in the EP to reflect the acceptable level of impact for marine turtles, and seabed disturbance. This includes the EPO "No displacement of marine turtles from habitat critical to the survival of marine turtles during the pipeline installation activities and biologically important behaviour to continue in BIAs" for both light and noise impacts. EPOs are presented in Table 6-1 (p.307) along with supporting EPS, MC and control measures. The EPO for seabed disturbance is now "Direct impacts to benthic habitats will be restricted to the footprint of the pipeline and supporting structures. Beyond the footprint of the pipeline and supporting structures, impact will be limited to localised, short term disturbance associated with suspension and deposition of surface sediment." A number of additional controls (C 5.10,C 2.10,C 5.11, C 5.12, and C 5.13) have been implemented to prevent unacceptable impacts to turtles from light. Appropriate EPS and MC are proposed for these EPOs. The revised EP includes appropriate EPOs, EPS and MC that reflect the defined acceptable level of impact and provide confidence that the activity will be managed consistent with the EP.</p>
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4	Environment Plan provides for appropriate performance outcomes, standards and measurement criteria	Matters protected under Part 3 of the EPBC Act	<p>SEABED DISTURBANCE</p> <p>Environmental performance outcomes: EPO2 is set out on pg 132 and states: &quot;No permanent disturbance to benthic habitats beyond the physical footprint of the gas export pipeline route, as relevant to both direct and indirect sources of disturbance to the seabed and associated benthic habitats&quot;. In general the intent of this EPO appears appropriate. Though it requires further support and definition through defining the acceptable level and providing EIA content to demonstrate that level of impact will be met (not exceeded). For example, the intent of the EPO is not clear with respect to how direct and indirect sources of disturbance at to be taken into account. Also the physical the physical footprint oof the GEP is not adequately defined to ensure the titleholder is able to measure compliance. For example is the footprint of the route that area over-topped by the pipeline itself or does this include span rectification and other associated works? ISSUE - the EPO for seabed disturbance requires clarification to ensure performance is measurable Environmental performance standards: EPS 2.2.1 - Proposed gas export pipeline route to be surveyed and confirmed prior to installation. This EPS is not appropriate because it is not clearly connected to the performance required by the relevant control measure to reduced impacts to ALARP. EPS 2.6.1 - Initiation anchoring plan developed based on pre-lay survey information and include: Requirement for trained and experienced vessel crews • Continuous monitoring of anchor wire tensions to prevent anchor drag on seabed during pipelay • Review of initiation anchor plan to verify anchor location avoids sensitive habitat. Is not an appropriate EPS because it does not set a standard of performance connected with the intent of the control to avoid sensitive habitats. Further the language uses means the EPS is not easily monitored for compliance (e.g. sensitive habitat is not defined).</p> <p>LIGHT EMISSIONS</p> <p>EPO4 - No significant impacts to marine fauna from the gas export pipeline installation campaign. Further information is needed to form a judgement on whether this EPO is appropriate.</p> <p>NOISE EMISSIONS</p> <p>EPO3 - No significant impacts to marine fauna from noise generated during the gas export pipeline installation campaign. Further information is needed to form a judgement on whether this EPO is appropriate.</p>
5	Environment Plan includes appropriate implementation strategy and monitoring, recording and reporting arrangements	General	<p>OPEP (Letter 5.1) - Section 4.1.1 has been updated to include the definition of a facility that aligns with the requirements of Schedule 3 Clause 4 of the Act (e.g. COPA is control agency for any oil spills arising from any vessel undertaking or being prepared for pipelay activities). OPP includes spill notifications to AMP and response priorities consider AMP values (s7.3 OPP)</p>

5	Environment Plan includes appropriate implementation strategy and monitoring, recording and reporting arrangements	General	<p>The Implementation Strategy is provided in Section 7. A description of the corporate HSE management system is outlined which provides a high level overview of all aspects of the management system and claims to be consistent with ISO14001. The HSE management system and elements appear to be suitable for implementation of the EP. Whilst the HSE management system details are corporate and high level, activity specific components have been included for vessel and contractor management (s7.2.2 & s7.2.3), pre-mobilisation, pipeline Installation and installation aspects of the activity (s7.4-7.5). Roles and responsibilities are outlined for office and offshore roles (table 7-1) and include implementation, monitoring, review and reporting responsibilities and appear appropriate. In addition table 6-1 assigns a responsible person (role) for each individual EPO/EPs/MC under section 6 of the EP.</p> <p>Monitoring, auditing and non conformance system is detailed in section 7.6. Table 7-2 details the audit types, a description of the audit, scope and frequency. Audit program includes a monthly internal environmental compliance audit against EPO's, EPS, and MC. Auditing system is appropriate for the purpose of the activity and includes a suitable schedule.</p> <p>S7.7.2.2 details the reporting of performance to regulator and the time frames and commitments are inline with reg14(2).</p> <p>Section 7.6.5 details the MOC and revision of EP processes and the processes appear appropriate and align with regulatory requirements</p> <p>Recordable and reportable incident reporting system is defined, with relevant agencies correctly identified (s7.8/table 7-4).</p> <p>OPEP</p> <p>Section 7.10 details the OPEP component of the implementation strategy and provides for updating of the plan in accordance with Reg14 (8). OPEP includes the IMT structure (s7.10.5/7.10.6), CMT (s7.10.6.1), roles and responsibilities (Table 7-5). OPEP provides clear link to EP. OPEP clearly states that ConocoPhillips is the controlling agency for spills arising from pipelay vessels however states when the pipelay vessel is not considered to be a facility when not laying the pipeline; it is considered to be a vessel.</p> <p>ISSUE</p> <p>OPEP/Spill response: Pg 17 of OPEP states "The pipelay vessel is not considered to be a facility when not laying the pipeline; it is considered to be a vessel and subsequently AMSA is the Control Agency for any spill within the Operational Area from the pipelay vessel whilst not laying the pipeline". Schedule 3 Clause 4 of the Offshore Petroleum and Greenhouse Gas Storage Act 2006 states A vessel or structure is taken to be a facility for the purposes of this Schedule while that vessel or structure: (a) is located at a site in Commonwealth waters; and (b) is being used, or prepared for use, at that site. Please revise the OPEP and expand the spill management arrangements to include pipelay vessel preparation activities, in accordance with the requirements of the Act. Please refer to the NOPSEMA Guidance Note - Vessels subject to the Australian Offshore Petroleum Safety Legislation (https://www.nopsema.gov.au/assets/Guidance-notes/A474095.pdf). Please consider the spatial extent of the environment that may be affected finding comment in relation to the OPEP to ensure the OPEP captures any changes to the EMBA and worst case spill scenario. OPEP (pg 18) includes territory control agency requirements (e.g. For Tier 2/3 spills that contact NT shorelines the NT IC will assume the role of Control Agency). First strike response actions and responsibilities are detailed in table 2-1 of OPEP. EPO, EPS's and MC are provided for IMT (table 5-3), emergency response options that result in net environmental benefit (Table 7-3), monitoring and evaluating spills (table 8-3), wildlife response (table 8-6) , OSMP activities (table 9-2) and waste management (table 10-3). OPEP appears to account for the duration of the activity, and will allow for timely implementation and monitoring of the control measures,</p>
No material changes since last revision			
6	Environment Plan does not involve the activity or part of the activity being undertaken in any part of a declared World Heritage property	General	<p>No material changes since last revision</p> <p>No material changes since last revision</p> <p>No World Heritage Properties fall within the boundaries of either the Operational Area and EMBA. The closest World Heritage Property is the Kakadu World Heritage place, approximately 280 km south-east of the Operational Area and outside the EMBA (section 4.5.1)</p>
7	Environment Plan demonstrates appropriate level of consultation	General	<p>No material changes since last revision</p> <p>Please refer to consultation/socio-economic topic scope</p> <p>No material changes since last revision</p>
		Socio-economic	Note: External Correspondence for Environment Matters 2019 Register (A654857) checked

- 1 email has been recorded related to the submission - from WAFIC. The concern raised has been addressed by the TH below - see WAFIC heading.

note p188: 6km from Bathurst island

The Operational Area for this EP (Figure 3-1) has been defined as 2,000 m either side of the gas export pipeline route, except in the following locations:

- where the width of Operational Area has been reduced to the east and west of the pipeline centreline to remain within the pipeline installation corridor presented in the accepted OPP; - has consultation occurred with state govt

Stakeholder consultation report: Section 8 of the EP (p285 -). RFFWI: This section describes consultation undertaken, and defines relevant persons. However it is stated on p286 that this was with those who 'may be affected by the production cessation activities'. Please correct this, and provide assurance that this section of the EP is relevant for the described activity.

Sufficient time: emails within App E indicate that the fact sheet was emailed to stakeholders on the 16th Jan 2019, and requested feedback provided by the 19th Feb. Page 290 of the EP provides additional information regarding a period of 8 weeks for followup and additional time for final comment - 7 weeks to 30 April 2019. This is a reasonable timeframe for obtaining feedback and conducting consultation. It is evident from App E and the full text provided that Conoco have provided stakeholders with a number of opportunities for feedback, including a number of reminders and followups - for example p219 as followup to WAFIC.

Sufficient information/ Fact sheet key details:

RFFWI: A fact sheet has been provided to stakeholders (p9 -13 of App E), which states that timing of activity will be between Q3 2021 to Q2 2023 (also subsequent emails or info to stakeholders give same date range - ie p243, p309,321, App E). However, the EP p20 states the activity could take place between Q4 2020 and Q1 2024 (both fact sheet and EP state that pre-lay survey could commence up to 9 months earlier than pipeline installation). Stakeholders have therefore not been correctly informed as to the timing of the activity that is, they have been told it could start as early as Aug 2021 and be complete by July 2023, whereas EP allows for start as early as Oct 2020, and completion by March 2024. Table 8-3 contains repeated reference to a 16 April email advising that the potential end date is Q1 2024, and the email is presented in App E. (e.g. p 439). However, the start date has not been clarified. Please provide an updated EP that reflects the timing as communicated to stakeholders, or alternatively, demonstrate that appropriate consultation has taken place.

EP p21: 2000 m buffer either side of gas export pipeline route - consistent as presented in APP E p11 (factsheet sent to stakeholders)the figure provided in the fact sheet for the activity is consistent with the figure provided in the accepted OPP (for pipeline corridor). The submission provides details of a list of stakeholders that have been consulted, including those deemed relevant. The below assessment focusses on key relevant stakeholders and the appropriateness of consultation.

Cultural values/Traditional Fishing

A number of statements are made in the submission regarding aspects of the environment as they relate to Aboriginal heritage, and traditional fishing. In the case of Aboriginal heritage, the statement is made that 'Stakeholder consultation with Tiwi Islanders identified Aboriginal heritage sites along the northern, western and southern coastlines of the Tiwi Islands, including areas used for food collection, sacred sites, camping sites and a dreaming site' (page 88 of EP). Please provide further information that demonstrates what consultation was undertaken to support this statement.

In terms of traditional fishing, while some details are provided on page 93 of the EP, and further detail in sections such as those dealing with physical presence (page 110), the statements made and conclusions reached do not seem to be supported by a suitable level of stakeholder consultation. Please demonstrate that appropriate consultation has taken place to support the claims made.

p110 of EP (physical presence ERA): Non-shore-based Indigenous and recreational fishing practices, including fishing tours, are typically observed near/around shoals and reefs in the NMR region and are consequently not expected to occur within the Operational Area (see Sections 4.5.6 and 4.5.9). However recreational and traditional fishing may occur near a small number of shoals located near the Operational Area (e.g. Goodrich Bank, Marie Shoal, Moss Shoal,

Mesquite Shoal and Shepparton Shoal – see Section 4.4.4.3). Any interactions with recreational fishing, fishing tours or traditional fishers are expected to be restricted to temporary avoidance of activity vessels while transiting through the area.

Tiwi Land Council - p365 of App E and EP consultation table - details are provided regarding items raised by the Tiwi land council and the responses provided by Conoco appear appropriate - however note RFFWI as to traditional fishing and heritage values

Fisheries:

p88 of EP: • Commonwealth managed fisheries: - Northern Prawn Fishery. NT managed fisheries: Demersal Fishery, Coastal Line Fishery, Offshore Net and Line Fishery, Spanish Mackerel Fishery, Timor Reef Fishery. The following three Commonwealth fisheries were excluded from assessment given the fishery is either inactive or does not operate within or in close proximity to the Operational Area and EMBA: the Western tuna and billfish fishery,

the Western skipjack fishery and the Southern bluefin tuna fishery.

This is based on: 'Consultation with the Australian Fisheries Management Association (AFMA), NT Department of Primary Industry and Resource (Fisheries) and appropriate fisheries associations and license holders are discussed in Section 8'. Check for details of such consultation

NTSC and WAFIC both expressed dissatisfaction with the fact sheet provided in that it was not bespoke to the commercial fishing sector (p46 App E). Conoco provided updated information tailored to the commercial fishing stakeholders and have sent this out on the 6 March (see page 291 of AppE), and specifically to NTSC on 27 Feb (p249).

NT Spanish Mackerel Fishery: (p362 App E) - RFFWI: The NT Spanish Mackerel Fishery has raised concerns in relation to the timing of the activity, querying the length and timing of the installation period and interruption to fishing activity. In the response it is not clear that Conoco has given appropriate attention to potential controls so avoid periods of sensitivity for this fishery. Please demonstrate that controls to mitigate the impact of the activity on this stakeholder have been appropriately considered.

Northern Prawn Fishery Industry: (p488 App E). NPF have a concern over impacts to their fishery from installation activities. RFFWI: The Northern Prawn Fishery Industry specifically requested that all pipeline activity is undertaken outside of their fishing season (page 346). Conoco's response refers to the fact that at this early planning stage the exact timing and duration of pipeline installation activities subject to vessel activity, sea state, weather conditions and operational efficiencies. To defer consideration of timing to reduce impacts to sensitivities is not appropriate, particularly given that the NPF has been informed that the pipeline will take around 3 months (page 348). Please provide additional details of the Northern Prawn Fishery Industry and an evaluation of how impacts to the fishery can be avoided through adjustments to timing of the activity. (note - other point regarding 3 month duration vs 9 month, and timing vs turtle sensitivities)

Demersal Fishery (NT): appears to have been appropriately consulted, with no issues or concerns raised (p328 EP).

Small Pelagic Fishery (NT): appears to have been appropriately consulted, with no issues or concerns raised (p328 EP).

Timor Reef Fishery: have been consulted, with no issues raised, most of the concern is more related to the offshore development area (FPSP/well location).

Austral Fisheries: had a number of questions raised in a meeting that Conoco confirmed via email and then answered appropriately via email (see page xx App E, p312 EP).

RFFWI: The information provided to a number of stakeholders creates the impression the pipeline route has already been selected, and that it is not an item for consideration and refinement if necessary in the EP assessment process. For example, information provided to Austral Fisheries, Clearwater Island Lodge, Spanish Mackerel Fishery Licence-Holders states that the 'pipeline route has been refined' etc, and excludes this aspect from the list of items to be 'further examined' via the EP (page 305, 317, 333 of App E, respectively). Please provide clarification to stakeholders that the pipeline route selection is a matter for consideration within the EP, and also demonstrate that stakeholders are aware of the opportunity to engage with the proposed pipeline route.

Also note that as per item XX carry out an appropriate evaluation within the EP to demonstrate that impacts and risks are appropriately mitigated and reduced to ALARP in selection of pipeline route, taking into account the context of this consultation.

NT govt - Dept of Prim Industry and Resources: the department identified 2 single licence holders for small pelagic and demersal trap fishery's, which Conoco have confirmed they have now consulted with.

Dept of Ag - IMS: commitments are made to the Dept of Ag (p373 of App E) that are not carried over or addressed as controls in EP. For example - commitments in relation to pipeline stinger, and IMS risk assessment. Further, the Dept of Ag specifically refers to the need for a Biofouling Management Plan and Biofouling record book to be used and the EP does not reflect this commitment - refers to a Quarantine Management plan which will be developed. Such deferral of the controls or details of the Plan is not appropriate given the nature and scale of the activity (this point to be raised in general assessment - check).

DNP: Emails provided in App E (p483) as well as summary provided in the consultation report on p331 of the EP demonstrate that appropriate consultation has taken place with DNP. The DNP had specific notification requirements - these have been checked in the EP (p267) and the OPEP (p31). RFFWI: The DNP had a specific requirement (p482 of App E) that 'any vessels used for or in connection with the pipeline installation must not anchor in the Habitat Protection Zone {IUCN IV} - Zone 2 unless it is required in an emergency. notification requirements', which has not been addressed as a control/EP. Please include this as a control and EP for the submission.

Environmental Interest Groups: Australian Marine Conservation Society/ Environment Centre NT: shared a number of similar concerns regarding seabed impacts and effects upon turtles (p294 of EP). On p 357- of App Conoco has responded to a number of the concerns raised in detail. The consultation report summary in the EP is consistent with the information provided in APP E. (see page 314-318, 340-341 for these stakeholders).

Recreational fishing: email p 405 of AppE - requests notification of activity work schedule and vessel presence. This is considered appropriately dealt with by the commitments for ongoing consultation. P151 of App E - bathurst island lodge concern re intention to fish in

area of trench west of BI. AFANT had a number of questions raised in a meeting that Conoco confirmed via email and then answered appropriately via email (see page 407 App E, p300 EP). 3 key fishing operators/tours that have been consulted with:

Clearwater Island Lodge - raised concerns in relation to IMS, possible impacts of vessel activities upon jewfish fishing grounds in the Apsley Strait, potential for their accommodation to be utilised by project personnel, and general impacts of pipeline installation in relation to fishing activities. Note the RFFWI point above with respect to pipeline route being in scope for the assessment. The question about vessel movements has been addressed, however note the RFFWI point in the general regarding other vessel movements being out of scope. Fishing activities are claimed to operate as far as 40km away, so this was raised as a concern. RFFWI: In responding to the Clearwater Lodge concerns, Conoco stated that 'Pipeline installation activities (i.e. involving the pipelay vessel) are expected to occur over approximately three months' (p317 of App E). This appears contradictory to the EP which states it will be up to 9 months. Please either clarify the timing in the EP or the timing as described to such stakeholders. In doing so, note item.... xxxxx (pt re timing to avoid sensitivities)

Bathurst Island Lodge (p343 of App E) - raised concerns in relation to impacts on Manta Rays and whales which have been addressed. RFFWI: The response by Conoco includes this statement: 'During the installation, hook-up and commissioning phases an accommodation support vessel may be located in the offshore development area supporting several hundred personnel' (page 343 of App E). However, as there is no mention of such a vessel in the EP activity description, please confirm that this is not within activity scope.

Tiwi Island Adventures/Tiwi Land Council: p365 of App E/p320 EP. raised some concerns on behalf of Bathurst Island lodge and where the new owners may wish to conduct fishing charters. This concern was not raised by Bathurst Island Lodge itself. A concern was raised in relation to flooding/cleaning/testing discharge. Note that an item has been raised in the general assessment relating to the location of the discharge given the OPP only considered discharge at FPSO 'end'. NTGFIA: RFFWI: The Northern Territory Guided Fishing Industry Association: (p351 EP, p429 App E) - raised concerns in relation to timing of the activity, saying that fishing charters will be more active in earlier and later months of each year (page 393 of App E). In the response Conoco focused on commercial fishing operations, and stated that 'Only limited recreational fishing activity occurs in or near the operational area due to the distance from the NT mainland.' (p354 of App E). Given the stakeholder referred to fishing charters from the Tiwi Islands as well, please provide further information to demonstrate that this concern has been appropriately addressed. (with NPMI point).

Ongoing consultation: Page 296 of the EP outlines a process of ongoing engagement with stakeholders in the lead up to the activity, as well as during the activity period and post activity. Quarterly updates are planned, commencing Q1 2020

Consideration of items raised in OMR letter:

Timing of the activity (letter item 1.2 from RFFWI, letter item 5.1 from OMR): The resubmission contains additional information in section 5.2.1 for the ALARP evaluation for changed timing of the activity. While the level of rigour for the evaluation is not at the level that would be considered ideal it is clear that relevant controls have now been considered, and that these have also been considered in light of the claims of the Northern Prawn Fishery.

Consultation - cultural values/traditional fishing (letter item 6.2 from RFFWI, letter item 5.2): Previous letter point 6.2 requested further information that demonstrates what consultation was undertaken to support conclusions reached in relation to cultural values and traditional fishing. The response provided was limited to reference to a mapping exercise, for which a very limited description had already been provided on page. Additional information on the mapping exercise has been included in section 4.6.6 (page 131) which describes what was carried out for this process, including the desktop develop

Consideration of items raised in OMR letter:

Timing of the activity (RFFWI letter item 1.2, OMR letter item 5.1): It was identified in the OMR letter that given the Northern Prawn Fishery also had concerns regarding timing of the activity, that CoP should review and update the ALARP evaluation for changed timing to appropriately reflect the potential environmental benefit gained for all timing sensitive environmental receptors. In response the ALARP evaluation for timing has been updated (section 5.2.1 - see page 156) to include consideration of the Northern Prawn Fishery. While this consideration could be more robust, when considering the general far greater robust nature of the ALARP evaluation for timing/physical presence/ light/noise risks the item is appropriately addressed.

Consultation - cultural values/traditional fishing (RFFWI letter item 6.2, OMR letter item 5.2): In relation to the RFFWI letter point 6.2, the response is limited to reference to a mapping exercise, for which a very limited description had already been provided on page 50. Cop were requested to describe the mapping exercise or include the full report sufficient to demonstrate that appropriate consultation has been carried out to support the conclusions reached in relation to cultural values and traditional fishing. In response,

additional information has been provided for section 4.6.6 regarding 'Aboriginal Heritage' on page 131 that better defines how the mapping of those values was undertaken. That is, an initial desktop mapping exercise was undertaken, the results of which were used as the basis for consultation with stakeholder engagement with Tiwi Islanders. 2 workshops were held with the final maps presented to the Tiwi Island Land Council. This is a reasonable basis for the mapping.

Consideration of items raised in Request for Further Written Information:

Pipeline Route (letter item 1.1): In the first submission a range of material was presented that created the impression that stakeholders were informed of a pipeline route, with the implication given that the consultation process did not include consideration of changes to the pipeline route. In the response, Conoco have provided clarification that demonstrates that there were communications with those titleholders that included the words 'proposed' in relation to the pipeline route (see Table 1 of response table). Given in particular the fact that Conoco provided updated information tailored to the commercial fishing stakeholders and have sent this out on the 6 March (see page 291 of AppE), and 27 Feb (p249), which referred to the fact that the pipeline route was proposed only, making clear that there was opportunity for review of the selected route.

Timing of the activity (letter item 1.2): Issues were raised in the RFFWI for 4 stakeholders - addressed as follows:

Clearwater Lodge: Clarification that the concerns were not regarding timing of the activity per se, which on second reading is a reasonable interpretation of statements made are more a concern of vessel activity at all and not in relation to timing specifically. Northern Prawn Fishery Industry: The material provided in response claims that COPA has sought information to address the issues - for example via letter on 21 May 2019, and email response on 12 June. It appears that reasonable attempts have been made to clarify the timing requirements, and also to explain the actual period of pipelay vessel activity - 3 months at a rate of 3-5km per day with 500m exclusion zone. Additional information has been included on page 131 of the EP as it relates to timing of the Northern Prawn fishery, including an ALARP evaluation. RFFWI: NPFI has responded with a very specific request, that the pipelay activities take place outside of the fishing season (closed 16 June to 31 July, 1 Dec to 1 April). This additional control has been evaluated on page 128 of the EP. Given the rate of movement of the pipelay vessel, the relative size of the fishery, the costs that would be incurred to limit the timing and the potential for runover into unfavourable cyclone season, in isolation it appears reasonable to not introduce such a control - (note that these costs are not well defined in the submission). However, peak turtle period (as shown on page 137) includes the months of April through Sept, and an ALARP evaluation has considered the additional environment benefit in avoiding these periods, noting that mid June through to end of August in particular is a 'peak period' for both NPFI and turtles. Spanish Mackerel Fishery: as with NPFI, information provided does demonstrate an attempt to determine what issues are at play for the fishery, however the response from mackerel fishery is not as explicit as the NPFI in relation to a clear claim made for change to timing of the activity, it is more of a general concern over being exclusion from fishing areas, so it is reasonably handled as per the additional information provided on page 131 of the EP. Northern Territory Guided Fishing Industry Association: the response provides clarification that the concerns were regarding timing of the activity more generally, noting the time at which operators might be more likely to be busy, and that CoP committed to providing notifications to mitigate associated risks. There is no further correspondence indicating that this is insufficient. Nature of consultation (letter item 6.1): The previous submission was stated on p286 that consultation was with those who 'may be affected by the production cessation activities'. This has been corrected to refer to those 'affected by the pipelay installation activities' on page 316 of the EP.

Consultation - cultural values/traditional fishing (letter item 6.2): The response to this item is limited to inclusion of reference to 'sensitivity mapping carried out with the Tiwi Islanders (ConocoPhillips, 2019), a study which is not described in sufficient detail (noting summary on page 50), and is referred to as an unpublished report. The response is insufficient. RFFWI: In relation to previous letter point 6.2, the response is limited to reference to a mapping exercise, for which a very limited description had already been provided on page 50. Please describe the mapping exercise or include the full report sufficient to demonstrate that appropriate consultation has been carried out to support the conclusions reached in relation to cultural values and traditional fishing.

Director of National Parks - anchoring (letter item 6.3): The requirement of the DNP that there be no anchoring in the habitat protection zone has been included as a control with an associated EPS.

Clarification re accommodation vessel (letter item 6.4): A response has been provided that clarifies that the accommodation is not included in activity scope.

Duration of the activity (letter item): the timing of the activity was defined differently in fact sheets to stakeholders compared to that info provided in the EP. The EP has been corrected in section 3.1 (page 21) to state that 'Installation of the pipeline is expected to be undertaken sometime between Q3 2021 and Q2 2023 and take up to nine months to complete. However, pre-lay survey could commence up to nine months earlier than pipeline installation (amending the above Q3 2021 (start date) to Q4 2020)'. This now

			appropriately reflects the EP.
8	Environment Plan complies with the Act and regulations	General	<p>No material changes since last revision</p> <p>Only commentary regarding decommissioning is in Table 5-6 which details the proposed "fate" of material used in construction of the pipeline. Table 5-6 states material is not typically recovered during decommissioning regarding rock dump material. Grout bags and mattresses are assumed to decompose over several decades. Shoulder modification material and mass flow excavation are stated as having no requirement to remove material for decommissioning.</p> <p>ISSUE: Legislative Requirements - EP does not identify decommissioning obligations applicable under the OPGGS Act (section 572) or demonstrate how these obligations will be met.</p> <p>EP has been updated and includes a generic statement that the pipeline and associated structures shall be designed to meet the base case for removal (S2.1.1)</p>