Title of Proposal - North West Shelf Project Extension

Section 1 - Summary of your proposed action

Provide a summary of your proposed action, including any consultations undertaken.

1.1 Project Industry Type

Energy Generation and Supply (non-renewable)

1.2 Provide a detailed description of the proposed action, including all proposed activities.

The North West Shelf (NWS) Project is one of the world's largest liquefied natural gas (LNG) producers, supplying oil and gas to Australian and international markets from offshore gas, oil and condensate fields in the Carnarvon Basin off the north-west coast of Australia. For over 30 years, it has been Western Australia's largest producer of domestic gas.

Woodside Energy Ltd. (Woodside), as operator for and on behalf of the of the North West Shelf Joint Venture (NWSJV), is proposing to continue and extend the operating life of the NWS Project through the long-term processing of third party gas and fluids and NWSJV field resources through the NWS Project facilities.

The addition of third party gas and fluids to NWSJV field resources has the potential to allow for the ongoing operation of the NWS Project until around 2070 and will provide domestic gas and an ongoing supply of LNG, liquefied petroleum gas (LPG) and condensate to domestic and international markets.

1.2.1 Description of the Existing NWS Project

The Karratha Gas Plant (KGP) was originally commissioned in 1984 with feed gas and fluid sources from the North Rankin platform. The KGP has undergone a number of expansions and additional facilities have been installed since it was first commissioned. At present, the existing NWS Project processes natural gas and associated fluids from NWSJV field resources to produce up to 18.5 mtpa of LNG at the KGP. The onshore and State waters component of the existing NWS Project includes the following key processing, storage and offloading facilities (see Figure 1 attached):

• Five LNG processing trains;
• Two domestic gas trains;
• Six condensate stabilisation units;
• Three LPG fractionation units;
• LPG, LNG and condensate storage facilities;
• Two jetties for export of condensate, LPG and LNG;
• Power generation and supporting utilities;
• Emergency, operational and storage and loading flares;
• Two subsea pipelines, described as 1TL and 2TL, within State waters and crossing onshore to KGP;

• An offsite supply base, described as the King Bay Supply Facility (KBSF), used for activities such as diesel storage, refuelling, pilotage and logistics; and
• Associated infrastructure necessary and incidental to conducting existing NWS Project activities.

Current NWSJV field resources are extracted by offshore facilities in Commonwealth waters where produced water is separated, treated and discharged to the offshore Commonwealth marine environment. Gas and fluids are then transported onshore to the KGP through two trunklines (1TL and 2TL), that run broadly parallel to each other, and extend from the North Rankin Complex in Commonwealth waters, through State waters, and onshore to the KGP.

NWSJV field resources are processed at KGP for export to international and domestic markets. LNG, LPG and condensate are transported to the international market by marine vessels and natural gas is supplied to the domestic market via the Dampier to Bunbury Natural Gas Pipeline (DBNGP).

The continuation of the Existing NWS Project, including implementing any changes which are approved to support continued operations of the Existing NWS Project, are outside the scope of this referral.

The Existing NWS Project (and any approved changes) will continue to operate regardless of the NWS Project Extension Proposed Action (including during the assessment of the Proposed Action). It is not possible to define all of the existing NWS Project changes which may be approved during the consideration of and before implementation of the NWS Project Extension, as some changes are currently in development, and some may not even be anticipated yet. For completeness however, a summary of the key existing NWS Project changes (and any approved changes) which may be implemented regardless of the NWS Project Extension Proposed Action include:

• Inspection, maintenance, repair (IMR) and improvement programs on equipment, plant, machinery and subsea infrastructure identified above as key processing, storage and offloading facilities;

• Modifications to, or replacement upon reaching end of life of equipment, plant, machinery and subsea infrastructure identified above as key processing, storage and offloading facilities and power generation/utilities, such as the Karratha Life Extension Program; and

• Processing (and associated tie-ins) from approved onshore feed sources as necessary to maintain production levels.

1.2.2 NWS Project Extension Proposed Action Description

To enable the continued future operation of the NWS Project and the ongoing supply of gas and fluids to domestic and international markets, this NWS Project Extension Proposed Action has been developed to seek approval to continue to use the Existing NWS Project facilities for the:

i) Long-term processing of third party gas and fluids and NWSJV field resources through the NWS Project facilities, which includes:

• Potential changes to feed gas composition;

• Potential changes to composition of environmental discharge and emissions, although volumes of emissions and discharges are expected to be in line with current levels; and

• Potential construction of additional operational equipment to accommodate potential changes to feed gas composition or management of environmental discharge and emissions.

ii) Ongoing operation of the NWS Project to enable long term processing at the NWS Project facilities, currently expected to be until around 2070, which includes:

• Ongoing use of existing NWS Project facilities to process third party gas and fluids and NWSJV field resources;

• Continued inspection, maintenance, repair (IMR) and improvement programs;

• Continued maintenance dredging associated with jetties and berthing pockets;

• Replacement of equipment, plant and machinery as required (Woodside, as operator of the NWS Project, will look to adopt modern technology for any future plant modifications as reasonably practicable);

• Continued emissions and discharges to the environment (Woodside, as operator of the NWS Project, will continue to assess emission reduction opportunities (including NOx, CO2 and VOC's) that could result in a staged decrease in emissions over time during the formal assessment scoping phase); and

• Continued monitoring and management of environmental impacts.

1.2.3 Excluded from the Proposed Action

The NWS Project Extension Proposed Action does not include any of the following:

• Infrastructure to tie gas field sources into 1TL or 2TL (in Commonwealth or State waters). The tie-in infrastructure cannot be referred or assessed at this time because the commercial arrangements to identify and agree the relevant gas field sources are not complete. Separate approval will be obtained for the development and use of the tie-in infrastructure where required;

• Processing (and associated tie-ins) from approved onshore feed gas sources as necessary to maintain production levels. Separate approval will be obtained for the development and use of the tie–in infrastructure where required; and

• Development of gas fields. The development of the gas fields cannot be referred or assessed at this time because the commercial arrangements to identify and agree the relevant gas field sources are not complete. Separate approval will be obtained for the development of the fields

where required.

1.3 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action.

Area	Point	Latitude	Longitude
Onshore Development Footprint	1	-20.604185326369	116.75774360943
Onshore Development Footprint	2	-20.604195368922	116.75774360943
Onshore Development Footprint	3	-20.601403513654	116.75828005123
Onshore Development Footprint	4	-20.600640263744	116.759996665
Onshore Development Footprint	5	-20.601724880894	116.76182056713
Onshore Development Footprint	6	-20.600439407869	116.76394487667
Onshore Development Footprint	7	-20.597526967945	116.76347280789
Onshore Development Footprint	8	-20.594514040508	116.76587606716
Onshore Development Footprint	9	-20.593549891153	116.76742101956
Onshore Development Footprint	10	-20.591501053534	116.76819349575
Onshore Development Footprint	11	-20.588488007031	116.77012468624
Onshore Development Footprint	12	-20.587925565091	116.77141214657
Onshore Development Footprint	13	-20.587644343344	116.7726996069
Onshore Development Footprint	14	-20.587985826827	116.77366520214
Onshore Development Footprint	15	-20.583787535636	116.77787090588
Onshore Development Footprint	16	-20.583024197552	116.78096081066
Onshore Development Footprint	17	-20.582843406393	116.7816259985
Onshore Development Footprint	18	-20.583365691377	116.78179765988
Onshore Development Footprint	19	-20.58352639409	116.78096081066
Onshore Development	20	-20.584530782206	116.78027416516

Area	Point	Latitude	Longitude
Onshore Development Footprint	21	-20.586830806083	116.78128267575
Onshore Development Footprint	22	-20.587272728096	116.78089643765
Onshore Development Footprint	23	-20.587855259703	116.78173328686
Onshore Development Footprint	24	-20.587794997916	116.78250576306
Onshore Development Footprint	25	-20.588518137791	116.7838575964
Onshore Development Footprint	26	-20.588799357927	116.78432966519
Onshore Development Footprint	27	-20.588698922224	116.78480173397
Onshore Development Footprint	28	-20.587935608715	116.78546692181
Onshore Development Footprint	29	-20.58871900937	116.78638960171
Onshore Development Footprint	30	-20.591611530774	116.78613210965
Onshore Development Footprint	31	-20.592515432462	116.7855527525
Onshore Development Footprint	32	-20.597798128494	116.78364301968
Onshore Development Footprint	33	-20.602337485318	116.78061748791
Onshore Development Footprint	34	-20.602317399966	116.7784717207
Onshore Development Footprint	35	-20.603803708857	116.77724863339
Onshore Development Footprint	36	-20.604928473519	116.7771628027
Onshore Development Footprint	37	-20.605892550907	116.77819277096
Onshore Development Footprint	38	-20.606113484449	116.77780653286
Onshore Development Footprint	39	-20.605169493437	116.77675510693
Onshore Development Footprint	40	-20.60934711146	116.7766263609
Onshore Development Footprint	41	-20.609166351512	116.76735664654
Onshore Development Footprint	42	-20.604185326369	116.75774360943
Offshore Development Envelope (Pipelines)	1	-20.587726841009	116.77390939421

Area	Point	Latitude	Longitude
Offshore Development Envelope (Pipelines)	2	-20.58772476595	116.7739117836
Offshore Development Envelope (Pipelines)	3	-20.536813569595	116.76024745967
Offshore Development Envelope (Pipelines)	4	-20.492836617825	116.77883346763
Offshore Development Envelope (Pipelines)	5	-20.446512224793	116.78098737753
Offshore Development Envelope (Pipelines)	6	-20.403579185681	116.76878897669
Offshore Development Envelope (Pipelines)	7	-20.34729136088	116.71084728002
Offshore Development Envelope (Pipelines)	8	-20.338914184349	116.7322620368
Offshore Development Envelope (Pipelines)	9	-20.383448086551	116.76861133337
Offshore Development Envelope (Pipelines)	10	-20.396770738513	116.77543222031
Offshore Development Envelope (Pipelines)	11	-20.443553664901	116.7865593644
Offshore Development Envelope (Pipelines)	12	-20.495975775201	116.7853892488
Offshore Development Envelope (Pipelines)	13	-20.531828788151	116.76866299338
Offshore Development Envelope (Pipelines)	14	-20.575829688322	116.7758405847
Offshore Development Envelope (Pipelines)	15	-20.583613915936	116.77858180232
Offshore Development Envelope (Pipelines)	16	-20.587726841009	116.77390939421
Offshore Development Footprint (Jetty Leases)	1	-20.587811425079	116.77142807126
Offshore Development Footprint (Jetty Leases)	2	-20.587791337814	116.77140661359
Offshore Development Footprint (Jetty Leases)	3	-20.591868998475	116.76823087812
Offshore Development Footprint (Jetty Leases)	4	-20.593817398818	116.76095672727
Offshore Development Footprint (Jetty Leases)	5	-20.590563355449	116.75666519284
Offshore Development Footprint (Jetty	6	-20.587028019764	116.7567724812

Area	Point	Latitude	Longitude
Leases)			
Offshore Development Footprint (Jetty Leases)	7	-20.583351987244	116.76741548658
Offshore Development Footprint (Jetty Leases)	8	-20.587811425079	116.77142807126

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland).

The NWS Project Extension Proposed Action is located both onshore and offshore in WA State waters. The onshore component is located on Burrup Road on the Burrup Peninsula in Western Australia. The Burrup Peninsula is on the North-West Pilbara Coast extending approximately 20 km into the Dampier Archipelago. The onshore component of the Proposed Action is located approximately 1,260 km north of Perth and 18 km north-west from Karratha. With the exception of 1TL, 2TL and KBSF, the property is bounded by Withnell Bay to the north, Mermaid Sound to the west, Murujuga National Park to the east, and industrial land to the south.

The property includes the existing KGP, the KGP plant buffer zone, the Southern Expansion Lease, KBSF and plant access roads. The remainder of the NWS Project Extension Proposed Action is located offshore in WA State waters.

The onshore development footprint is 466 ha, which includes 276ha of existing disturbance footprint. The offshore WA State Waters development footprint is 670 ha, which includes 589 ha of pipeline exclusion zone (1TL and 2TL) and 111 ha of seabed lease around the jetty berths.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

Total Development Envelope ~1166 ha [onshore ~ 466 ha] and [offshore ~700 ha]

1.7 Is the proposed action a street address or lot?

Lot

1.7.2 Describe the lot number and title. De Wit Location: Lot 199, 197, 379, 380, 655, 195, 151, 204

1.8 Primary Jurisdiction.

Western Australia

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

No

1.10 Is the proposed action subject to local government planning approval?

No

1.11 Provide an estimated start and estimated end date for the proposed action.

Start date 07/2020

End date 11/2068

1.12 Provide details of the context, planning framework and State and/or Local government requirements.

In addition to State and Commonwealth environment requirements the following two frameworks apply to the NWS Project Extension Proposed Action:

• City of Karratha Planning Scheme No. 8: The onshore NWS Project is located in the City of Karratha, where land is zoned as ‘strategic industry’ under Planning Scheme No. 8. Strategic industry areas are defined as “planned industrial sites of significant economic and strategic importance to the State which provide buffered industrial land in strategic locations for the development of resource and export-oriented industries, major utilities infrastructure and other strategic industries which may generate off-site impacts” (DoPLH, 2017).

• State Agreement: North West Gas Development (Woodside) Agreement Act 1979 is a State Agreement between the Western Australian Government and the NWSJV participants. This State Agreement approves the construction and operation of NWS Project. Four amendments have been made to the Agreement since ratification (in 1985, 1994, 1996 and 2015) to accommodate for further development and changes to the original NWS Project. The NWSJV will seek to extend the State Agreement which will align with this NWS Project Extension Proposed Action.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders.

Woodside’s objective is to build long-term and meaningful relationships with our host communities. Woodside has been part of the Australian community for over 60 years and has been operating on the Burrup Peninsula for more than 30 years. Woodside has well established relationships with the Pilbara community, regularly engaging with stakeholders through various forums on a broad range of issues, including potential environmental and social impacts associated with our operations. Key to understanding local issues are mechanisms such as the Karratha Liaison Group, which holds quarterly meetings with a range of Local Government,

State Government and industry representatives. Woodside also has an established office in Karratha and presence in Roebourne which provides an avenue for locals to talk to any issues via one-on-one engagement.

Woodside, as operator of the NWS Project, has commenced a phased stakeholder engagement program on this NWS Project Extension Proposed Action, which will continue throughout the environmental impact assessment process. The program is based on leveraging existing relationships and forging new connections with parties likely to have an interest in the NWS Project Extension Proposed Action from the following groups: Local, State and Commonwealth Government, community, environmental non-government organisations and various commercial entities.

Stakeholder activities will include:

• Independent social impact assessment;

• Social impact management planning;

• Economic impact assessment;

• One-on-one engagement;

• Broad stakeholder forums;

• Targeted correspondence;

• Hard-copy and electronic communication materials; and

• Media and social media.

Feedback received from relevant stakeholders will be used to inform the referral process. Woodside will continue its usual stakeholder engagement processes such as regular participation in community forums, distribution of communication material and business updates posted to www.woodside.com.au. Specific information about the NWS Project Extension Proposed Action is available on Woodside’s Burrup Hub page.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project.

The existing NWS Project has been subject to several environmental impact assessments under Commonwealth and State legislation as described below:

1. Description of Assessment: Development of at least three North West Shelf gas and condensate fields (North Rankin, Goodwyn and Angel). The scope included an offshore pipeline (1TL), onshore treatment and distribution, shipping and port facilities and infrastructure.

Date: 1979**,** Regulators: WA Environment Protection Authority (WA EPA) and Commonwealth Department of Science and the Environment (now DoEE)

2. Description of Assessment: Consultative Environmental Review of the installation of two LPG storage tanks, a chiller unit, fire protection equipment, an auxiliary substation and associated infrastructure within the existing process area at the KGP and a new ship jetty parallel with, and to the north of the existing jetty. No extension to the plant boundary required.

Date: 1993, Regulator: WA EPA

3. Description of Assessment: Public notification for the change in location for disposal of dredge spoil from land disposal in No Name Creek (as approved under Ministerial Statement 320) to marine disposal in a previously used offshore disposal ground.

Date: 1994, Regulator: WA EPA

4. Description of Assessment: Joint Commonwealth / State Public Environment Report for the Domestic Gas (Domgas) debottlenecking and second trunkline (2TL) installation project.

Date: 1998, Regulators: WA EPA and Commonwealth Department of the Environment, Sport and Territories (now DoEE)

5. Description of Assessment: State Public Environmental Review and Commonwealth Public Environmental Report for the Additional NWSJV LNG Facilities Project. This included two additional LNG processing trains to increase LNG production from 7.5 mtpa to 15.5 mtpa, one additional fractionation unit, two additional power generation units, one additional jetty berth, additional LNG ships, dredging and blasting works and spoil disposal, one additional LNG storage tank, and utilities upgrade.

Date: 2000, Regulators: WA EPA and Commonwealth Department of the Environment (now DoEE)

6. Description of Assessment: Section 45C assessment of an increase in capacity from 15.5 mtpa to 18.5 mtpa and increase in duration of operations.

Date: 2006, Regulator: WA EPA

7. Description of Assessment: Commonwealth referral for the increase of capacity and duration of operations.

Date: 2006, Regulator: Commonwealth DoEE

8. Description of Assessment: Approval of offshore petroleum activities undertaken in accordance with the Program Report – Strategic Assessment of the environmental management authorisation process for petroleum and greenhouse gas storage activities by the NOPSEMA under the Offshore Petroleum and Greenhouse Gas Storage Act 2006
(OPGGS Act).

Date: 2014, Regulator: Commonwealth DoEE and NOPSEMA

9. Description of Assessment: Referral under Section 38 of the EP Act and Part 7 of the EPBC Act for the long-term processing of third party gas and fluids and NWSJV field resources through the NWS Project until around 2070.

Date: Current, Regulators: WA EPA and Commonwealth DoEE

As illustrated in the table above, the existing NWS Project (with the exception of the 2006 Expansion from 15.5 mtpa to 18.5 mtpa and strategic assessment of offshore petroleum activities) was assessed under the Western Australian Environmental Protection Act 1986 (EP Act) and/or the Commonwealth Environment Protection (Impact of Proposals) Act 1974, the predecessor prior to the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) coming into force on 1 July 2000. The existing NWS Project action up to 15.5 mtpa is therefore currently exempt from the EPBC Act, and the expansion up to 18.5 mtpa in 2006 was determined to be not to be a controlled action.

The NWS Project Extension Proposed Action is expected to undergo environmental impact assessment through the referral under Section 38 of the EP Act and Part 7 of the EPBC Act (being this referral) for the long-term processing of third party gas and fluids and NWSJV field resources through the NWS Project until around 2070.

1.15 Is this action part of a staged development (or a component of a larger project)?

No

1.16 Is the proposed action related to other actions or proposals in the region?

Yes

1.16.1 Identify the nature/scope and location of the related action (Including under the

relevant legislation).

The operation of offshore NWS Project assets in Commonwealth waters is related to this NWS Project Extension Proposed Action, in that these assets will continue to feed gas and fluids to the KGP following approval of the Proposed Action. The following five most recent NWSJV referred actions under the Environment Protection and Biodiversity Conservation Act 1999 are listed below:

• Greater Western Flank Phase 1 Gas Development, offshore WA (EPBC 2011/5980);

• North Rankin B Gas Compression Facility, North West Shelf WA (EPBC 2005/2500);

• Western Flank Development, North West Shelf WA (EPBC 2005/2464);

• Echo A Development in the Echo/Yodel area, North West Shelf WA (EPBC 2005/2042); and

• Development of Angel Gas and Condensate Field (EPBC 2004/1805).

The NWSJV understands the Browse Joint Venture (BJV) has referred the Browse to NWS Development, which includes long term processing of BJV gas at KGP, subject to all necessary joint venture and regulatory approvals being obtained and appropriate commercial arrangements being finalised. The potential impacts associated with the proposed BJV action will be described in that referral.

Section 2 - Matters of National Environmental Significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest. Consideration of likely impacts should include both direct and indirect impacts.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The following resources can assist you in your assessment of likely impacts:

• Profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;

• Significant Impact Guidelines 1.1 – Matters of National Environmental Significance;

• Significant Impact Guideline 1.2 – Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies.

2.1 Is the proposed action likely to have ANY direct or indirect impact on the values of any World Heritage properties?

No

2.2 Is the proposed action likely to have ANY direct or indirect impact on the values of any National Heritage places?

Yes

2.2.1 Impact table

Place	Impact
Dampier Archipelago (including the Burrup Peninsula) (Place ID 105727)	The National Heritage Place, Murujuga National Park (Figure 2), is located to the east of the onshore NWS Project. For approximately 600m along the northern most section of the KGP, the National Heritage Place borders the lease boundary. The National Heritage Place boundary overlaps the onshore NWS Project lease area in the North East at Withnell Bay, at Mount Wongama Road and over a section of the Mount Wongama telecommunications lease. Further south the National Heritage Place is 150 m or more from the edge of the KGP lease boundary. The National Heritage

Place	Impact
	Place may contain up to a million rock art images known as petroglyphs, which is one of the densest concentrations in Australia (DoEC, 2013). The petroglyphs feature a range of motif types including anthropomorphic and zoomorphic figures and geometric and amorphous designs. At a national level the range of anthropomorphic figures are diverse and the petroglyphs range considerably in their motif subject content, technique, antiquity and distribution across the landscape. A range of other sites are also represented including ethnographic sites, standing stones, shell middens, artefact scatters and quarries and grinding patches. State records and the NWSJV's own surveys during the operation of the NWS Project have identified a range of Aboriginal heritage site types, inside and adjacent the NWS Project facilities. An audit of Aboriginal heritage sites within the NWS Project development footprint confirmed the presence of 134 Aboriginal heritage sites preserved in situ (Mott et al, 2007). Aboriginal heritage sites within the proposed development footprint is shown in Figure 2 attached. The following activities have the potential to impact the National Heritage Place: • Air emissions from the operation of onshore NWS Project facilities that cause deposits on petroglyphs; and • Unauthorised access by project personnel to areas outside the development footprint that may disturb petroglyphs. The following measures will continue to be in place to manage and mitigate the potential environmental impacts of the NWS Project Extension Proposed Action: • Access by project personnel to areas outside the development footprint will continue to be strictly controlled; • Project personnel will continue to be educated on the sensitivity of the Burrup Peninsula through mechanisms such as site inductions; • Atmospheric emissions are expected to be in line with current permitted levels and Woodside, as operator of the NWS Project will continue to assess emission reduction opportunities that could result in a staged decrease in emissions over time; and • Annual Aboriginal heritage sites audits conducted with traditional owners

Place	Impact
	and a qualified archaeologist, to inspect and monitor and report on the conditions of the sites within the development footprint. A CSIRO study assessing air pollution on the Burrup Peninsula in 2006 (22 years since the NWS Project facilities commenced operation) stated that while acid deposition fluxes were observed they were not considered to exceed a threshold that would be likely to adversely affect rock art (CSIRO, 2006). Subsequently, the Senate Environment and Communications References Committee's Report into the Protection of Aboriginal rock art of the Burrup Peninsula has highlighted that a suitable threshold is yet to be determined (Commonwealth of Australia, 2018). Woodside has also voluntarily run a Burrup Ambient Air Quality Monitoring Program from 2008 to 2011, which showed negligible effects on air quality arising from emissions from the NWS Project facilities. This monitoring indicated no emissions were occurring at levels which may cause harm to rock art. The 2017 CSIRO report assessed potential colour change across various petroglyph sites on the Burrup Peninsula using a standardised technique for recording colour. Analysis of the results has shown that while there has been some change, it is not occurring uniformly as would be expected if actual colour change associated with the petroglyphs was occurring (Duffy et al, 2017). The report indicates that there are no sites where the lightness of the engraving or background of the petroglyph has consistently increased or decreased; rather the lightness has done both over time at least twice, and not consistently across sites. The report also notes that there were no significant trends associated with a rate of colour change between control sites and sites closer to industrial activity (Duffy et al, 2017). Woodside is committed to managing and protecting Aboriginal cultural heritage. Woodside supports the ongoing protection, conservation and management of the National Heritage Listed values of Murujuga and the wider Dampier Archipelago, as reaffirmed in the 2017 Deep Gorge Joint Statement. In response to concerns that industrial emissions may be having an impact

Place	Impact
	on rock art, a range of monitoring programs and scientific studies have been undertaken over the last 15 years. Woodside acknowledges that the conclusions of some of these studies have been contested and that in response the State Government is currently progressing the Murujuga Rock Art Strategy. Woodside understands that the intention of the Strategy is to build on previous work to deliver a monitoring and management approach to ensure the continued protection of rock art on the Burrup Peninsula. As part of developing this Strategy, Woodside is a participant in the Murujuga Rock Art Stakeholder Reference Group.

2.2.2 Do you consider this impact to be significant?

No

2.3 Is the proposed action likely to have ANY direct or indirect impact on the ecological character of a Ramsar wetland?

No

2.4 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

Yes

2.4.1 Impact table

Species	Impact
BIRDS: Calidris ferruginea (Curlew Sandpiper) Limosa lapponica menzbieri (Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit) Numenius madagascariensis (Eastern Curlew, Far Eastern Curlew) Macronectes giganteus (Southern Giant-Petrel, Southern Giant Petrel) Calidris canutus (Red Knot, Knot) Rostratula australis (Australian Painted-snipe, Australian Painted Snipe) Limosa lapponica baueri (Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit) Sternula nereis nereis (Australian Fairy Tern)	The following proposed activities have the potential to affect avifauna within the development footprint: • Continued light emissions/spill from existing vessel movements (tankers, support vessels or inspection, maintenance and repair (IMR) vessels) and existing onshore facilities; • Potential for unplanned discharges to the terrestrial environment or the marine environment within State waters due to a pipeline rupture or leak; and • Potential for unplanned discharges to the marine environment within State waters from onshore activities within the KGP. As a result of

Species	Impact
	the proposed activities, the following impacts on avifauna may occur due to ongoing implementation of the NWS Project Extension Proposed Action: • Attraction and/or disorientation of avifauna to light sources; and • Potential surface, entrained and dissolved aromatic hydrocarbons exceeding threshold concentrations may impact shorebird and marine avifauna in the highly unlikely event of an unplanned discharge to the marine environment.
REPTILES: Aipysurus apraefrontalis (Short-nosed Seasnake) Caretta caretta (Loggerhead Turtle) Dermochelys coriacea (Leatherback Turtle, Leathery Turtle, Luth) Chelonia mydas (Green Turtle) Eretmochelys imbricata (Hawksbill Turtle) Liasis olivaceus barroni (Olive Python) Natator depressus (Flatback Turtle) Ctenotus angusticeps (Northwestern Coastal Ctenotus, Airlie Island Ctenotus)	The following proposed activities have the potential to affect reptile fauna within the development footprint: • Continued light emissions/spill from existing vessel movements (tankers, support vessels or IMR vessels) and existing onshore facilities; • Vessel, vehicle and personnel movements; • Potential for unplanned discharges to the terrestrial environment or the marine environment within State waters due to a pipeline rupture or leak; and • Potential for unplanned discharges to the terrestrial environment or the marine environment within State waters from onshore activities within the KGP. As a result of the proposed activities, the following impacts on reptile fauna may occur due to implementation of the NWS Project Extension Proposed Action: • Attraction and/or disorientation of marine fauna to light sources within the marine environment or surrounding beaches. This is a particular risk to turtle hatchlings however the beaches associated with the NWS Project are not considered to be suitable habitat for turtle nesting; • Vessel collisions with marine reptiles; • Vehicle collisions with terrestrial reptiles; • Potential surface, entrained and dissolved aromatic hydrocarbons exceeding threshold concentrations may impact marine reptile fauna in the highly unlikely event of an unplanned discharge to the marine environment.
MAMMALS: Balaenoptera musculus (Blue Whale) Dasyurus hallucatus (Northern Quoll) Rhinonicteris aurantia (Pilbara Leaf-nosed Bat) Megaptera novaeangliae (Humpback Whale)	The following proposed activities have the potential to affect terrestrial mammals within the development footprint: • Continued light emissions/spill from existing vessel movements (tankers, support vessels or IMR vessels) and existing onshore facilities (particularly bat species and the Northern quoll); The following

Species	Impact
	proposed activities have the potential to affect marine mammals within the development footprint: • Noise emissions from vessels; • Vessel movements; • Potential for unplanned discharges to the marine environment within State waters due to a pipeline rupture or leak; and • Potential for unplanned discharges to the marine environment within State waters from onshore activities within the gas plant. As a result of the proposed activities, the following impacts on mammals may occur due to implementation of the NWS Project Extension Proposed Action: • Attraction and/or disorientation of bat species and Northern quoll to light sources within the onshore development footprint; • Non-physiological effects on whales due to noise emissions; • Vessel or vehicle collisions; and • Potential surface, entrained and dissolved aromatic hydrocarbons exceeding threshold concentrations may impact marine mammals in the highly unlikely event of an unplanned discharge to the marine environment.
SHARKS: Carcharodon carcharias (White Shark, Great White Shark) Pristis clavata (Dwarf Sawfish, Queensland Sawfish) Pristis zijsron (Green Sawfish, Dindagubba, Narrowsnout Sawfish) Rhincodon typus (Whale Shark)	The following proposed activities have the potential to affect sharks within the development footprint: • Continued light emissions/spill from existing vessel movements (tankers, support vessels or IMR vessels) and existing onshore facilities; • Noise emissions from vessels; • Potential for unplanned discharges to the marine environment within State waters due to a pipeline rupture or leak; and • Potential for unplanned discharges to the marine environment within State waters from onshore activities within the gas plant. As a result of the proposed activities, the following impacts on sharks may occur due to implementation of the NWS Project Extension Proposed Action: • Behaviour effects due to noise emissions; and • Potential surface, entrained and dissolved aromatic hydrocarbons exceeding threshold concentrations may impact marine mammal fauna in the highly unlikely event of an unplanned discharge to the marine environment.
THREATENED ECOLOGICAL COMMUNITIES	No Threatened Ecological Communities are present within the study area

2.4.2 Do you consider this impact to be significant?

No

2.5 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed migratory species, or their habitat?

Yes

2.5.1 Impact table

Species	Impact
MIGRATORY MARINE BIRDS: Anous stolidus (Common Noddy) Apus pacificus (Fork-tailed Swift) Ardenna pacifica (Wedge-tailed Shearwater) Calonectris leucomelas (Streaked Shearwater) Fregata ariel (Lesser Frigatebird, Least Frigatebird) Hydroprogne caspia (Caspian Tern) Macronectes giganteus (Southern Giant-Petrel, Southern Giant Petrel) Sterna dougallii (Roseate Tern)	The following proposed activities have the potential to affect migratory avifauna within the development footprint: • Continued light emissions/spill from existing vessel movements (tankers, support vessels or IMR vessels) and existing onshore facilities; • Potential for unplanned discharges to the marine environment within State waters due to a pipeline rupture or leak; and • Potential for unplanned discharges to the marine environment within State waters from onshore activities within the gas plant. As a result of the proposed activities, the following impacts on migratory avifauna may occur due to implementation of the NWS Project Extension Proposed Action: • Attraction and/or disorientation of avifauna to light sources; and • Potential surface, entrained and dissolved aromatic hydrocarbons exceeding threshold concentrations may impact migratory avifauna in the highly unlikely event of an unplanned discharge to the marine environment. Note: there will be no impact to habitat as there is no proposed disturbance outside of existing development footprint or activities at levels materially greater than currently experienced e.g. vessel movements.
MIGRATORY MARINE SPECIES: Anoxypristis cuspidata (Narrow Sawfish, Knifetooth Sawfish) Balaenoptera edeni (Bryde's Whale) Balaenoptera musculus (Blue Whale) Carcharodon carcharias (White Shark, Great White Shark) Caretta caretta (Loggerhead Turtle) Chelonia mydas (Green Turtle) Dermochelys coriacea (Leatherback Turtle,	The following proposed activities have the potential to affect migratory marine species within the development footprint: • Continued light emissions/spill from existing vessel movements (tankers, support vessels or IMR vessels) and existing onshore facilities; • Noise emissions from vessels; • Vessel movements; • Potential for unplanned discharges to the

Species	Impact
Leathery Turtle, Luth) Dugong dugong (Dugong) Eretmochelys imbricata (Hawksbill Turtle) Manta alfredi (Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray) Manta birostris (Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray) Megaptera novaeangliae (Humpback Whale) Natator depressus (Flatback Turtle) Orcinus orca (Killer Whale, Orca) Pristis clavata (Dwarf Sawfish, Queensland Sawfish) Pristis zijsron (Green Sawfish, Dindagubba, Narrowsnout Sawfish) Rhincodon typus (Whale Shark) Sousa sahulensis (Australian Humpback Dolphin) Tursiops aduncus (Spotted Bottlenose Dolphin (Arafura/Timor Sea populations))	marine environment within State waters due to a pipeline rupture or leak; and • Potential for unplanned discharges to the marine environment within State waters from onshore activities within the gas plant. As a result of the proposed activities, the following impacts on marine fauna may occur due to implementation of the NWS Project Extension Proposed Action: • Attraction and/or disorientation of migratory marine fauna to light sources within the marine environment or surrounding beaches. This is a particular risk to nesting turtles and turtle hatchlings, however the beaches associated with the NWS Project do not have records of turtle nesting and are not used by turtles for nesting • Non-physiological effects on marine fauna due to noise emissions; • Vessel collisions with marine fauna; and • Potential surface, entrained and dissolved aromatic hydrocarbons exceeding threshold concentrations may impact marine fauna in the highly unlikely event of an unplanned discharge to the marine environment. Note: there will be no impact to habitat as there is no proposed disturbance outside of existing development footprint or activities at levels greater than currently experienced e.g. vessel movements
MIGRATORY TERRESTRIAL SPECIES: Hirundo rustica (Barn Swallow) Motacilla cinerea (Grey Wagtail) Motacilla flava (Yellow Wagtail)	The following proposed activities have the potential to migratory terrestrial avifauna within the development footprint: • Light emissions/spill from vessels parked at the jetties and onshore facilities. As a result of the proposed activities, the following impacts on avifauna may occur due to implementation of the NWS Project Extension Proposed Action: • Attraction and/or disorientation of avifauna to light sources. Note: there will be no impact to habitat as there is no proposed disturbance outside of existing development footprint or activities at levels materially greater than currently experienced.
MIGRATORY WETLANDS SPECIES: Actitis hypoleucos (Common Sandpiper) Calidris acuminata (Sharp-tailed Sandpiper) Calidris canutus (Red Knot, Knot) Calidris ferruginea (Curlew Sandpiper) Calidris melanotos (Pectoral Sandpiper) Charadrius veredus (Oriental Plover, Oriental Dotterel) Glareola	The following proposed activities have the potential to affect migratory wetland avifauna within the development footprint: • Continued light emissions/spill from existing vessel movements (tankers, support vessels or IMR vessels) and existing onshore facilities; • Potential for unplanned discharges to the

Species	Impact
maldivarum (Oriental Pratincole) Limosa lapponica (Bar-tailed Godwit) Numenius madagascariensis (Eastern Curlew, Far Eastern Curlew) Pandion haliaetus (Osprey) Tringa nebularia (Common Greeshank, Greenshank).	marine environment within State waters due to a pipeline rupture or leak; and • Potential for unplanned discharges to the marine environment within State waters from onshore activities within the gas plant. As a result of the proposed activities, the following impacts on affect migratory wetland avifauna may occur due to implementation of the NWS Project Extension Proposed Action: • Attraction and/or disorientation of avifauna to light sources; and • Potential surface, entrained and dissolved aromatic hydrocarbons exceeding threshold concentrations may impact avifauna in the highly unlikely event of an unplanned discharge to the marine environment. Note: there will be no impact to habitat as there is no proposed disturbance outside of the existing development footprint or activities at levels materially greater than currently experienced.

2.5.2 Do you consider this impact to be significant?

No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

Yes

2.6.1 Is the proposed action likely to have ANY direct or indirect impact on the Commonwealth marine environment?

Yes

2.6.2 Describe the nature and extent of the likely impact on the whole of the environment.

Activities associated with the NWS Project Extension Proposed Action that are located in the Commonwealth Marine Area are either covered by existing environmental approval decisions (as further described in Section 1.15 of this referral) or will be the subject of a separate referral under the EPBC Act or as an Offshore Project Proposal under the OPGGS Act, as appropriate.

The NWS Project Extension Proposed Action has the potential to affect environmental values within the Commonwealth Marine environment through activities which take place in State waters, for example:

• Light emissions/spill from vessels (tankers, support vessels or IMR vessels);

• Noise emissions from vessels;

• Unplanned discharges to the marine environment from vessels;

• Unplanned discharges to the marine environment due to vessel collisions; and

• Potential for unplanned discharges to the marine environment due to a pipeline rupture or leak.

Light and noise emissions as well as routine discharges are only likely to affect the area immediately adjacent to the State waters limit. In the highly unlikely event of an unplanned discharge associated with vessel collisions or ruptures/leaks, there is potential for impact to extend into the Commonwealth Marine environment. Vessels used to transport LNG, LPG and condensate for export as well as IMR vessels could introduce invasive marine species to the Commonwealth Marine environment. Current management and inspection measures are considered appropriate to minimise this risk to as low as reasonably practicable.

2.6.3 Do you consider this impact to be significant?

No

2.7 Is the proposed action to be taken on or near Commonwealth land?

No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

2.10 Is the proposed action a nuclear action?

No

2.11 Is the proposed action to be taken by the Commonwealth agency?

No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No

2.13 Is the proposed action likely to have ANY direct or indirect impact on any part of the environment in the Commonwealth marine area?

Yes

2.13.1 Describe the nature and extent of the likely impact on the whole of the environment.

Any impacts that the Proposed Action may have on the Commonwealth Marine Area are expected to be limited to those discussed in Section 2.6.1 of this referral.

2.13.2 Do you consider this impact to be significant?

No

Section 3 - Description of the project area

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed in Section 2).

3.1 Describe the flora and fauna relevant to the project area.

Nearshore benthic marine environment

The 12 major islands and 30 smaller islands of the Dampier Archipelago are fringed by areas of subtidal limestone and granite reefs and reef platforms, and shoals that support coral systems (CALM, 2005). The shorelines are predominantly rocky shore with sandy beaches occurring in some bays and expanses of mudflat occurring in the inner waters of the archipelago (Woodside, 2006). Benthic primary producer habitats fringe the coast at locations across the Dampier Archipelago, and include scleractinian (reef building) corals, mangroves, seagrass and macroalgae.

Marine Fauna

The marine waters within the development footprint are part of Dampier Archipelago’s coastal open water foraging habitat for numerous seabirds, with the coastal fringes of the Burrup Peninsula and Dampier Archipelago containing a range of intertidal habitats suitable for numerous migratory shorebirds and resident wetland birds. Similarly, the marine waters within Mermaid Sound host a number of migratory and resident marine fauna including cetaceans, dugongs, marine turtles, sea snakes and fish.

A search of the EPBC Act Protected Matters National database identified 12 cetacean species that are likely to occur within the State waters component of the development footprint, including two threatened and six migratory species. The endangered pygmy blue whale and the vulnerable humpback whale are two whale species that seasonally migrate through the broader NWS province as they travel between northern breeding grounds and southern feeding grounds.

The west coast humpback whale population seasonally migrate north from Antarctica to the north west of Western Australia. The southern migration route traverses through the Dampier Archipelago. A female and calf humpback resting area is located in the Dampier Archipelago, which is traversed by 1TL and 2TL.

The humpback whale migration occurs seasonally through the Dampier Archipelago using inshore waters as resting stops. During their southern migration, they keep close to the mainland and rest in Dampier Archipelago before migration to Antarctica.

Dugong sightings / feeding grounds occur around Angel and Gidley Islands. 1TL and 2TL

traverse the seabed adjacent to this area. Additional sightings/feeding grounds are located around Malus, East Lewis and West Lewis Islands, though the Proposed Action will not interact with these areas.

The State waters component of the development footprint is located within a migratory Biologically Important Area (BIA) for humpback whales, with other cetacean species likely to occur at low densities throughout the year. However, the State waters component of the development footprint does not represent critical habitat for any cetacean species.

The distribution of the dugong in the Pilbara region is widespread including the Dampier Archipelago, Barrow Island, the Montebello Islands, Lowendal Island and Exmouth Gulf. In the Pilbara region, some dugongs may be resident year-round, with some seasonal variations in density (Chevron, 2010). Within the Dampier Archipelago, dugongs have been recorded near various islands including Rosemary Island, East Lewis Island, West Lewis Island, Keast Island, Legendre Island and Little Rocky Island (Woodside, 2006). Dugongs have also been sighted in shallow sheltered bays of the Burrup Peninsula and mainland coast such as Regnard Bay and Nickol Bay, and the seaward side of the Hamersley Shoal at the entrance of the Mermaid Sound (Woodside, 2006). While the nearshore development footprint contains seagrass habitats that may represent habitat for dugongs, the area does not constitute critical habitat, with the closest dugong BIA being Exmouth Gulf over 235 km away.

A Protected Matters Search identified five marine turtle species that are likely to occur within the development footprint. The marine turtles identified were: the green turtle (*Chelonia mydas*), leatherback turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*), hawksbill turtle (*Eretmochelys imbricata),* and the flatback turtle (*Natator depressus*). Four of these species (green, loggerhead, flatback and hawksbill) have significant nesting beaches along the mainland coast and islands in the region including the Dampier Archipelago (DoEC, 2012; DoEE, 2017). Within the Dampier Archipelago, waters surrounding islands such as Rosemary Island, Huay Island, Legendre Island and Delembre Island are reported to be important sea turtle aggregation areas, with nesting BIAs within the development footprint for flatback, green and hawksbill turtles. Green turtles are known to have minor nesting sites on Rosemary Island, Legendre Island and Delambre islands, flatback turtles are known to have major nesting at Delambre Island and minor nesting areas in the Dampier Archipelago, and hawksbill turtles are known to have major nesting areas on Rosemary Island and Delambre Island with the largest nesting aggregation recorded at Rosemary Island (Woodside, 2006; DSEWPaC, 2012; DoEE, 2017).

A total of 26 teleost fish species listed under the EPBC Act were identified as potentially occurring within the State waters component of the development footprint, including 22 species of pipefish and four species of seahorses (Syngnathids). Syngnathids are commonly found in seagrass and sandy habitats around coastal islands and shallow reef areas along the NWS and therefore have the potential to occur within the development footprint. Shark species identified as possibly occurring within the State waters component of the development footprint include the migratory/threatened whale shark and the threatened dwarf sawfish, though no BIAs for these species are present within the development footprint.

Flora

No threatened flora species have been identified in the development footprint of the Proposed Action.

The Australian State and Territory Governments have classified thirty-two flora species as Weeds of National Significance (WoNS). A search of the EPBC Act Protected Matters National database identified four species that may occur within or near the development footprint of the Proposed Action, these include; **Cenchrus ciliaris, *Jatropha gossypifolia, *Parkinsonia aculeata* and **Prosopis spp*. These species are listed on the Western Australian Organism List with **Jatropha gossypifolia, *Parkinsonia aculeate*, and **Prosopis spp.* considered Declared Pests under Section 12 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act) and Weeds of National Significance, and **Cenchrus ciliaris* is listed as permitted under Section 11 of the BAM Act.

Seven weed species are known to occur within the development footprint:

*Aerva javanica (kapok bush);

*Cenchrus ciliaris (buffel grass);

*Conyza bonariensis (flaxleaf fleabane);

*Passiflora foetida var. hispida (stinking passion flower);

*Rumex vesicarius (ruby dock);

*Sonchus oleraceus (common sowthistle); and

*Tridax procumbens (tridax).

Of these species, none are listed as WoNS, all are listed as permitted weeds under Section 11 of the BAM Act. The following are **Aerva javanica, *Cenchrus ciliaris, *Passiflora foetida var. hispida* and **Rumex vesicarius* are rated as highly invasive with high ecological impact.

Terrestrial Fauna

The terrestrial environment within the development footprint is part of the buffer zone that surrounds the onshore NWS Project and is located adjacent to the Murujuga National Park in the Burrup Peninsula. The Burrup Peninsula is known to contain a number of conservation significant fauna species and habitats and the fauna is demonstrative of species typical of the western Pilbara coast and hinterland (DoEC, 2013).

A Protected Matters Search identified 15 threatened terrestrial species and 14 migratory species. Of these, three are listed as critically endangered (curlew sandpiper (*Calidris* ferruginea)*,* northern siberian bar-tailed godwit (*Limosa lapponica menzbieri) and* eastern curlew (*Numenius madagascariensis*)), five are listed as endangered (red knot (*Calidris canutus),* southern giant-petrel (*Macronectes giganteus),* Australian painted-snipe (*Rostratula australis*)*,* northern quoll (*Dasyurus hallucatus))* and 13 listed as vulnerable. No

habitat was listed in the Protected Matters Search.

Twelve invasive fauna species were identified in the Protected Matters Search. The following feral animals have been recorded in the Burrup Peninsula area and may occur near the NWS onshore facilities; domestic dog (*Canis lupus familiaris*), horse (*Equus caballus*), domestic cat (*Felis catus*), house mouse (*Mus musculus*), European rabbit (*Oryctolagus cuniculus*), black rat (*Rattus rattus*), and red fox (*Vulpes Vulpes).*

A large proportion of the terrestrial fauna species on the Burrup Peninsula consists of reptiles including species of Agamidae (dragon lizards), Gekkonidae (geckoes), Scinidae (skinks) and Elapidae (elapid snakes) (Woodside, 2006).

A search of the Department of Biodiversity, Conservation and Attractions (DBCA) *NatureMap* database identified two threatened species (rare or likely to become extinct) under the Western Australian *Wildlife Conservation Act 1950* (WC Act); the Pilbara olive python *(Liasis oliviaceus* subsp. *barroni)* and the northern quoll *(Dasyurus hallucatus).* The Pilbara olive python is frequently recorded within the development footprint and is also observed throughout the Pilbara region. The habitat of these species is not expected to be impacted by the NWS Project Extension Proposed Action as the development footprint is not expected to increase beyond what is already approved.

3.2 Describe the hydrology relevant to the project area (including water flows).

As with much of the wider Pilbara region, the Burrup Peninsula has limited surface freshwater supplies and relies upon inputs during the wet season. Consequently, freshwater flows in the region are variable and are often experienced as high flow, short period events. The general topography of the Burrup Peninsula is such that surface water flows are channelled off steep slopes into drainage lines and numerous gullies. These high rainfall and short duration events are followed by dry periods that stop stream flow and the recharge of deeper waterholes and gorges.

Groundwater aquifers on the Burrup Peninsula occur as isolated pockets, located in rock fractures, joints, bedding planes and cavities of the rock mass. Fractured rock aquifers occur as localised systems with regional flow (Woodside, 2006).

The soils and underlying weathered bedrock on the Burrup Peninsula are highly permeable and allow the recharge of groundwater during rainfall events; however, the presence of granophyre at shallow depths prevents the potential for long-term subsurface water storage.

The granophyre at depth is expected to be a generally tight, solid rock mass with limited open fractures/joints. The orientation, interconnectivity and permeability of these limited open pathways will therefore govern the rate and nature of groundwater movement.

Little groundwater flow is expected to occur from the perched water tables. Instead, this water is known to be ephemeral and subject to gradual drainage and evaporation.

The creek lines and other surface water features relevant to the Proposed Action include North East Creek and No Name Creek (Figure 3). No earthworks with the potential to alter existing

watercourses are proposed and as such, no alteration to the existing hydrology will occur. Similarly, no new areas of hardstand are proposed and no additional alteration to surface water flows or groundwater recharge are expected to occur.

The NWS Project Extension Proposed Action does not include any changes to processing infrastructure that would result in changed or additional impacts to surface water quality. Potentially contaminated water, from areas of hardstand, is collected by the OCW drainage network for treatment through the waste water treatment system prior to discharge via the jetty outfall into Mermaid Sound. The waste water system is managed in accordance with the DWER operating licence.

The natural topography of the development footprint has been heavily modified through the original construction of level, sealed areas of hard standing for roads, storage tanks, processing equipment etc, as well as drainage features to contain and direct surface water flows in the event of seasonal heavy rainfall. Nevertheless, a number of remnant creeks and gullies occur across the site, some of which have been truncated or modified and which may contain water and/or flow on a seasonal basis. No permanent natural bodies of fresh surface water exist on site.

3.3 Describe the soil and vegetation characteristics relevant to the project area.

Soils

The Burrup Peninsula is part of a spine of Archaean igneous rocks that includes granophyres, gabbros and small granite exposures (Woodside, 2006). The development footprint occupies a granitic land system with heavily weathered, shallow red sandy soils, comprising a mixture of boulders, cobbles, gravels and silty sand. Soils reach a depth of up to 2 m in lower alluvial slopes and which may also contain stony clay colluvial infills.

The surface soils within the development footprint have been heavily modified through the original cutting, filling and levelling to enable construction of level, sealed areas of hard standing for roads, storage tanks, processing equipment etc, as well as drainage features to contain and direct surface water flows (and consequently reducing rainwater infiltration) in the event of seasonal heavy rainfall.

Woodside’s Pluto LNG Development Public Environmental Review document (2006) states “The Karratha Gas Plant has been built on a raised fill platform which comprised the excavation of all topsoil, erosional deposits and the in-situ weathering profiles from the site to expose ‘fresh’ bedrock. The bedrock surface was subsequently used as the base on which the fill platform was constructed. The excavated material, together with material from local sources was used as fill. Typically, this material consisted of coarse angular gravel, cobbles and boulders of granophyre debris. Whilst the depth of fill is variable, boreholes drilled within the platform by URS suggest that it ranges from 4 m–11.5 m depth.”

Vegetation

A desktop assessment identified no threatened ecological communities within the development footprint. The vegetation condition is unknown but assumed to range from completely degraded where clearing activities have occurred to very good or excellent where native vegetation has been retained.

Vegetation in the Burrup Peninsula in the Roebourne subregion is characterised by quaternary alluvial, colluvial coastal and subcoastal plains that support grass savannah, hummock grasses and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera* (Astron, 2018). The uplands are dominated by Triodia hummock grasslands and *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands that are supported by ephemeral drainage lines (Astron, 2018).

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area.

The Proposed Action is located on the Burrup Peninsula and adjacent to the Murujuga National Park. The Burrup Peninsula is widely known for its rock art and contains the largest collection of petroglyphs in Australia (Commonwealth of Australia, 2018). The Burrup Peninsula is listed on the National Heritage List. Further information on the values of the Burrup Peninsula are provided in Sections 2.2 and 3.9 of this referral.

3.5 Describe the status of native vegetation relevant to the project area.

Native vegetation within the NWS Project area has largely been cleared within the fence line of the KGP with only small pockets of degraded vegetation remaining. The KGP Buffer Zone was established to avoid encroachment of incompatible land uses or developments. The vegetation in this Buffer Zone remains largely uncleared, except for the Southern Expansion Lease. None of the vegetation within the Buffer Zone or immediately surrounding the onshore NWS Project represents a Threatened or Priority Ecological Community and the vegetation types present are well represented in the broader Karratha area and Pilbara in general.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The nearshore marine infrastructure and 1TL and 2TL are located within the waters of Mermaid Sound in the broader Dampier Archipelago. The bathymetry ranges from coastal intertidal areas to approximately 40 m in depth toward the State waters boundary outside of the archipelago.

3.7 Describe the current condition of the environment relevant to the project area.

The main onshore component of the NWS Project Extension Proposed Action is the KGP, which is managed in accordance with regulatory requirements, an operating licence and Woodside’s internal standards. The main operational area within the onshore development footprint which delineates the KGP lease, is largely cleared. The buffer lease which surrounds the KGP remains largely uncleared, though there are some known weed occurrences. The Proposed Action will not result in an increase to the development footprint or existing disturbance footprint.

The offshore aspects of the Proposed Action include 1TL and 2TL from the KGP facility to the State waters boundary and associated coastal infrastructure (i.e. jetties and discharge outfalls). This infrastructure is located within the waters of the Mermaid Sound.

Much of Mermaid Sound, according to the Environmental Quality Management Framework set out by the WA DoE (now DBCA) (2006), is afforded a high level of ecological protection; however, the areas around existing wharfs, jetties, ship turning basins (such as the NWS Project nearshore infrastructure) and local dredge spoil disposal grounds (such as spoil ground A/B) have been allocated a moderate level of ecological protection. Areas around the outfalls were recommended, and subsequently endorsed by the Western Australian Environmental Protection Authority as moderate to low levels of Ecological Protection. Woodside manages the jetty outfall discharges to an established moderate level of protection 100 m around the discharge points.

The NWSJV's long running Chemical and Ecological Monitoring of Mermaid Sound (ChEMMS) program commenced in June 1985 and comprises of annual chemical and biological monitoring of the intertidal and subtidal environment at KBSF, sites surrounding KGP and appropriate reference sites. The most recent sediment results have shown elevated heavy metals and hydrocarbons at several locations adjacent to KGP and some reference sites compared to ANZECC/ARMCANZ (2000) trigger levels. Elevated levels of nickel and cadmium are attributed to high background occurrence; these are also recorded at reference sites and are typical of the Pilbara region. Other elevated levels (total petroleum hydrocarbons (TPH), mercury and chromium) were associated with localised historic contamination, including sites at North East Creek and the KBSF. Subsequent testing confirmed that mercury and chromium had low bioavailability.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the project area.

A search of the WA State Heritage Register on the 9th October 2018 indicated the two closest registered sites are to the east of the development envelope: Watering Cove and Hearson's Cove, both on the eastern coastline of the Burrup Peninsula and at least 5 km from the NWS Project facilities. Hearson Cove is listed historic landing place of the Northwest Exploring Expedition led by F.T. Gregory. This expedition laid the basis for the colonisation of the Pilbara in the 1860s and remains a popular tourist and recreational site (Heritage Council, 2016).

3.9 Describe any Indigenous heritage values relevant to the project area.

The Western Pilbara region and associated islands contain a prolific and diverse range of Aboriginal heritage sites and objects. Aboriginal heritage represented include petroglyph (rock art) sites, ethnographic sites, standing stones, shell middens, artefact scatters, quarries and grinding patches. It has been estimated that the Dampier Archipelago may contain up to one million rock art images known as petroglyphs (Woodside, 2006), at a density of between 17 and 76 heritage sites per square kilometre (Bird & Hallam, 2006). State records and the NWSJV's own surveys during the operation of the NWS Project have identified a range of Aboriginal heritage site types, inside and adjacent the NWS Project facilities. An audit of Aboriginal heritage sites within the NWS Project development footprint confirmed the presence of 134

Aboriginal heritage sites preserved in situ (Mott et al, 2007). Woodside maintains a database of Aboriginal heritage sites and restricts access to identified features within the operating site.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area.

The proposed action is situated across the following leases:

• Karratha Gas Plant: De Wit Location Lot 199 On Plan 216680 [Crown Lease LGE I123606]

• Karratha Gas Plant Buffer Zone: De Wit Location Lot 197 Burrup Road, Burrup [Crown Lease LGE I123606]

• Southern Expansion Lease: De Wit Location Lot 379 and Part Lot 380 Burrup Road, Burrup [Crown Lease LGE I161020]

• Plant Access Road (Northern and Southern): De Wit Location Lot 655 and Lot 195 Burrup Road, Burrup [Crown Lease LGE I237587]

• King Bay Supply Facility: De Wit Location Lot 151 and Lot 204 On Plan [Crown Lease LGE I154282]

In addition, the proposed action is also covered by the following leases and licences:

• Karratha Gas Plant Loading Jetties Seabed Lease; and

• Pipeline licences: TPL 15 and TPL 16 / PL 58.

3.11 Describe any existing or any proposed uses relevant to the project area.

The NWS Project Extension Proposed Action will take place on land that is currently used for ongoing supply of LNG, LPG and condensate to domestic and international markets. The site also processes gas for domestic gas supply. The current land use will not change as a result of the Proposed Action.

Section 4 - Measures to avoid or reduce impacts

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action.

Woodside currently manages potential environmental, social and heritage impacts of the NWS Project through an operating licence administered by the DWER and through the Woodside Management Systems and internal standards. These will continue to be applied and updated as necessary.

The following measures are currently in place to avoid or reduce impacts to National Heritage places as a result of the NWS Project Extension Proposed Action:

• Access by project personnel to areas outside the development footprint will continue to be strictly controlled. Project personnel will continue to be educated on the sensitivity of the Burrup Peninsula through mechanisms such as site inductions;

• Atmospheric emissions are expected to be in line with current permitted levels and Woodside, as operator of the NWS Project will continue to assess emission reduction opportunities that could result in a staged decrease in emissions over time; and

• Annual Aboriginal heritage sites audits conducted with traditional owners and a qualified archaeologist, to inspect and monitor and report on the conditions of the sites within the development footprint.

The following measures are currently in place to avoid and reduce the potential impacts to marine fauna, habitats and communities as a result of the NWS Project Extension Proposed Action:

• The operation of 1TL and 2TL from KGP to the State waters boundary (including IMR activities) is governed by the approved NWS Trunklines (State Waters) Environment Plan (State Waters EP) with a comprehensive series of preventative and mitigation measures outlined within the State Waters EP;

• Planned discharges to the marine environment from the two outfalls (jetty outfall and administrative drain) are managed under the DWER operating licence and the associated controls, measures and conditions, including:

• Established engineering controls at both discharge streams (e.g. holding basin at the jetty outfall and secondary treatment of sewage at the administrative drain);

• Regular monitoring of discharges at both outfalls (monthly at the administrative drain and prior to each batch discharge at the jetty outfall);

• Established measures including an effluent treatment plant, oil contaminated water (OCW) drainage system, oil and water separation systems, to reduce and manage contaminants prior to discharge; and

• Ambient annual monitoring of the receiving marine environment is undertaken as part of the long running ChEMMS program.

• Preventative and mitigation measures associated with unplanned discharges to the marine or onshore environment from a major hydrocarbon source such as a pipeline rupture or leak are outlined within the State Waters EP and include (though not limited) the following measures:

• Compliance with various Woodside operating standards and procedures;

• Compliance with Woodside’s Oil Spill Response Plans and preparedness operating standard;

• Compliance with relevant Australian Marine Orders prohibiting discharge from vessels within state waters;

• Engagement with specialist oil spill specialists (i.e. AMOSC, AMSA and OSRL); and

• Emergency response drills and exercises.

• Preventative and mitigation measures associated with unplanned discharges to the marine environment from an onshore spill or leak are outlined under the KGP Dangerous Goods Storage Licence (DGS010009) and the associated controls, measures and conditions, as well as the conditions and procedures outlined with the primary approvals;

• Lighting requirements will continue to be restricted to what is required for safety purposes;

• Management of terrestrial flora and fauna, including weeds and feral species in accordance with relevant management plans; and

• Vessel movements within the Dampier Port will continue to be controlled by the Harbour Master. Noise emissions associated with vessel movements will continue to be localised and vessels will limit time spent at the jetties.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved.

A review of potential impacts associated with the NWS Project Extension Proposed Action against the relevant Matters of National Environmental Significance (MNES) indicates that

significant impacts are unlikely and specific outcomes are not required.

Monitoring undertaken by the NWSJV and analysis of trends within the data indicate no adverse effects have resulted from the operation of the NWS Project to date beyond those predicted and assessed under previous approvals. Additionally, Woodside's air quality monitoring has indicated no emissions were occurring at levels which may cause harm to petroglyphs. The CSIRO 2017 report on the petroglyphs has shown there were no significant trends associated with a rate of colour change between control sites and sites closer to industrial activity. Woodside will continue to operate the Proposed Action in line with regulatory requirements, operating licences and Woodside's internal standards in order to manage potential impacts to as low as reasonably practicable levels.

Section 5 – Conclusion on the likelihood of significant impacts

A checkbox tick identifies each of the matters of National Environmental Significance you identified in section 2 of this application as likely to be a significant impact.

Review the matters you have identified below. If a matter ticked below has been incorrectly identified you will need to return to Section 2 to edit.

5.1.1 World Heritage Properties

No

5.1.2 National Heritage Places

No

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)

No

5.1.4 Listed threatened species or any threatened ecological community

No

5.1.5 Listed migratory species

No

5.1.6 Commonwealth marine environment

No

5.1.7 Protection of the environment from actions involving Commonwealth land

No

5.1.8 Great Barrier Reef Marine Park

No

5.1.9 A water resource, in relation to coal/gas/mining

No

5.1.10 Protection of the environment from nuclear actions

No

5.1.11 Protection of the environment from Commonwealth actions

No

5.1.12 Commonwealth Heritage places overseas

No

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action.

The NWS Project Extension Proposed Action is expected to result in the long-term processing of third party gas and fluids and NWSJV field resources through the NWS Project facilities and the continued operation of the NWS Project until around 2070. The Proposed Action is not expected to result in an increase in emissions or discharges, nor is there proposed to be any additional disturbance outside the development footprint.

Woodside operates the NWS Project in line with the relevant conditions of approval, operating licences and Woodside's internal standards and procedures. As part of the implementation, Woodside undertakes monitoring of the following:

- Monitoring waste water prior to discharge;
- ChEMMS program, including:
    - Contaminant concentrations in sediments, oysters and mud whelks
    - Mangrove health
    - Coral health
- Groundwater monitoring; and
- Stack emissions sampling as per DWER operating licence requirements

Analysis of monitoring data indicate there have been no long term significant environmental effects as a result of the operation of the NWS Project. Therefore, ongoing operation of NWS Project until around 2070, in line with the current environmental management regime, is unlikely to result in significant impacts to MNES or the environment.

Section 6 – Environmental record of the person proposing to take the action

Provide details of any proceedings under Commonwealth, State or Territory law against the person proposing to take the action that pertain to the protection of the environment or the conservation and sustainable use of natural resources.

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Please explain in further detail.

Woodside, as operator of the NWS Project, believes excellence in environmental performance is essential to business success worldwide and is compatible with balancing the economic, social and environmental needs of sustainable development.

Woodside employs a structured approach to the management of environment via the formal and documented Woodside Management System (WMS). Through policies, expectations, processes, procedures and guidelines, the WMS requires that impacts from Woodside's operations are either avoided or kept to as low as reasonably practicable.

Woodside's commitment to responsible environmental management was recognised by the Australian Petroleum Production and Exploration Association (APPEA) as the recipient of awards in 2009, 2012, 2015, 2016 and 2017 with the judges' finding that Woodside had shown consistent excellence in environmental management. This included strategic planning, risk management, monitoring and evaluation.

Woodside's thorough and systematic approach to environmental risk management has resulted in a thirty-year record of oil and gas operations without any major environmental incidents.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application.

Woodside has not been subject to any proceedings, either past or present, under a Commonwealth or State law for the protection of the environment or the conservation and sustainable use of natural resources.

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes

6.3.1 If the person taking the action is a corporation, please provide details of the

corporation's environmental policy and planning framework.

Woodside's approach to environmental management is detailed in the Health, Safety, Environment and Quality Policy and Climate Change Policy (see attachment).

Woodside sets compulsory environmental performance requirements through the life-cycle of projects and operations. This approach is based on:

• A robust environmental risk-management approach;

• Sound science to underpin this approach;

• Strong partnerships with local and international researchers;

• Ongoing stakeholder engagement; and

• Transparency of Woodside's environmental knowledge.

Woodside adopts a systematic, risk-based approach that allows for a consistent approach to address the environmental impacts and risk associated with the company's activities. This approach allows resources to be focused on the impacts and risks that have the largest potential for consequence.

Having robust science is core to Woodside's environmental management approach and processes. Woodside's strong capability in environmental studies enables the acquisition of environmental data critical to inform impact assessments and decision making. Furthermore, strong partnerships, sound research and transparency are the key elements of Woodside's approach to the environment.

Woodside has an established methodology that identifies impacts and risks and assess the potential consequence of an activity. This methodology mandates that a hierarchy of controls is applied to appropriately manage risk. This approach means we identify ways to eliminate or avoid an impact before we consider ways of reducing or minimising it. The management measures include at a minimum those that are considered good international industry practice.

The end result of this risk-based process is that the residual impacts of an activity are at a level we consider to be acceptable, and that residual risks are reduced to a level that is as low as reasonably practicable.

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

Yes

6.4.1 EPBC Act No and/or Name of Proposal.

Woodside has referred a number of proposals under the EPBC Act for both exploration and development programs. The following list details the previous EPBC Act referrals submitted by

Woodside for gas developments related to both its role as NWS operator and operator of other Joint Venture activities.

Development referrals submitted by Woodside as operator of the NWS Project:

• 2011/5980 – Greater Western Flank Phase 1 Gas Development;

• 2007/3436 – North West Shelf Gas Venture Phase VI Expansion;

• 2006/3191 – Woodside Project Facilities Increase;

• 2005/2500 – North Rankin B gas compression facility;

• 2005/2464 – Western Flank Gas Development;

• 2004/1805 – Development of Angel Gas and Condensate Field; and

• 2003/914 – Goodwyn A Low Pressure Train Project.

Development referrals submitted by Woodside as operator of the other Joint Ventures:

• 2013/7079 – Browse FLNG Development;

• 2011/5936 – Julimar Brunello Gas Development Project;

• 2008/4111 – Development of Browse Basin Gas Fields (Upstream);

• 2006/2968 – Pluto Gas Project Including Site B;

• 2005/2258 – Pluto Gas Project;

• 2005/2110 – Greater Enfield (Vincent) Development; and

• 2001/1257 – Enfield Full Field Development.

In addition, the list below details the most recent EPBC Act referrals for exploration programs undertaken by Woodside as operator of other Joint Ventures:

• 2013/7081 – Babylon 3D Marine Seismic Survey;

• 2012/6618 – Outer Canning Exploration Drilling Program off NW Coast of WA;

• 2012/6493 – Rosebud 3D Marine Seismic Survey in WA-30-R and TR/5;

• 2011/5959 –Tridacna 3D Ocean Bottom Cable Marine Seismic Survey;

• 2010/5720 – Vincent M1 and Enfield M5 4D Marine Seismic Survey;

• 2010/5420 – Koolama 2D Seismic Survey Dampier Basin;

• 2010/5415 – Laverda 3D Marine Seismic Survey and Vincent M1 4D Marine Seismic Survey;

• 2009/5037 – Drill and Profile Exploration Well Somerset 1, License Area T34P;

• 2008/4558 – Enfield M4 4D Marine Seismic Survey; and

• 2008/4430 – Torosa-5 Appraisal Well, WA-30-R.

Section 7 – Information sources

You are required to provide the references used in preparing the referral including the reliability of the source.

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source).

Reference Source	Reliability	Uncertainties
Advisian 2017. Chemical and Ecological Monitoring of Mermaid Sound – 2017 Compliance Report. Report prepared for Woodside Energy Ltd, December 2017.	Non-publicly available document from reputable source.	Not applicable
ANZECC & ARMCANZ 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy Paper No 4, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra, ACT.	Publicly available document from reputable source.	Not applicable
Astron Environmental Services Pty Ltd (Astron Environmental) 2018, Karratha Gas Plant – Weed and Vegetation Management Plan, Report prepared for Woodside Energy Ltd, April 2018.	Non-publicly available document from reputable source.	Not applicable
Bird C & Hallam S 2006, Archaeology and rock art in the Dampier Archipelago, Report prepared for National Trust of Australia (WA), Available from: https://www.nationaltrust.org.au/wpcontent/uploads/2015/10/ArchaeologyandrockartintheDampierArchipelago-1.pdf	Publicly available document from reputable source.	Not applicable
Chevron Australia Pty Ltd (Chevron) 2010. Draft Environmental Impact	Publicly available document from reputable source.	Not applicable

Reference Source	Reliability	Uncertainties
Statement/Environmental Review and Management Program for the Proposed Wheatstone Project. Chevron Australia		
Commonwealth of Australia 2018, Report into Protection of Aboriginal rock art of the Burrup Peninsula, Senate Environment and Communications References Committee, Available from: https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/BurrupPeninusla/Report	Publicly available document from reputable source.	Not applicable
CSIRO 2006, Burrup Peninsula Air Pollution Study: Final Report, Western Australia DOIR Rock Art Committee, Available from: http://www.dampierrockart.net/Media/2006-1016%20Burrup%20final%20report.pdf	Publicly available document from reputable source.	Not applicable
Department of Conservation and Land Management (CALM) 2005, Indicative Management Plan for the Proposed Dampier Archipelago Marine Park and Cape Preston Marine Management Area, Perth, Western Australia.	Publicly available document from reputable source.	Not applicable
Department of Environment (DoE) 2006, Pilbara Coastal Water Quality Consultation Outcomes: Environmental Values and Environmental Quality Objectives, Available from: http://epa.wa.gov.au/sites/default/files/Policies_and_Guidance/pilbaracoastalwaterquality_Marine%20Report%201.pdf [3 October 2018].	Publicly available document from reputable source.	Not applicable
Department of Environment and Conservation (DoEC) 2012, Marine Turtles in Western Australia. Available from: http://www.dec.wa.gov.au/our-enviro	Publicly available document from reputable source.	Not applicable

Reference Source	Reliability	Uncertainties
nment/science-and-research/marine-research/marine-turtles-in-wa.html [24 September 2018]		
Department of Environment and Conservation (DoEC) 2013, Murujuga National Park Management Plan 78 2013, Perth, Western Australia, Available from: https://www.dpaw.wa.gov.au/images/documents/parks/management-plans/decarchive/murujuga-national-park-management-web-final.pdf [3 October 2018].	Publicly available document from reputable source.	Not applicable
Department of Environment and Energy (DoEE) 2018, Dampier Archipelago (including Burrup Peninsula), Australian Heritage Database Search, Available from: http://www.environment.gov.au/cgibin/ahdb/search.pl?mode=place_detail;place_id=105727 [15 October 2018]	Publicly available document from reputable source.	Not applicable
Department of Planning, Lands and Heritage (DoPLH) 2017, Draft State Planning Policy 4.1: Industrial Interface, Western Australian Planning Commissions. Available from: https://www.planning.wa.gov.au/dop_pub_pdf/SPP_4.1_Industrial_Interface.pdf [15 October 2018].	Publicly available document from reputable source.	Not applicable
Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2012, Species Group report card – marine reptiles Supporting the marine bioregional plan for the North-west Marine Region.	Publicly available document from reputable source.	Not applicable

Section 8 – Proposed alternatives

You are required to complete this section if you have any feasible alternatives to taking the proposed action (including not taking the action) that were considered but not proposed.

8.0 Provide a description of the feasible alternative?

The alternative to the NWS Project Extension Proposed Action is allowing the current NWSJV field resources to deplete and the NWS Project facilities to be retired and decommissioned post-production, potentially resulting in loss of jobs and economic and social investment in the region. The commercialisation of third party gas and fluids that may otherwise have been commercialised through the NWS Project may potentially be delayed.

The option to continue operations of the NWS Project is considered preferable to this alternative for the following reasons:

• The construction of other/new facilities to process third party gas and fluids that could otherwise be processed through the NWS Project would result in additional physical disturbance onshore and offshore;

• Maximising use of existing NWS Project facilities is a key enabler for production of stranded gas or fields with marginal economics;

• Failure to develop future gas reserves may present a decrease in energy security for future customers and domestic requirements;

• The preferential development of natural gas as an energy resource is recognised as part of the transition as society moves to a lower carbon future, being less carbon-intensive than other fossil fuels such as coal and oil; and

• The continued operations of the NWS Project is expected to assist in supporting WA's ongoing economic growth and local employment opportunities over the life of the extended operations.

8.1 Select the relevant alternatives related to your proposed action.

Activities

8.9 Describe any public consultation that has been, is being or will be undertaken (including with Indigenous stakeholders).

Engagement has been undertaken with key Commonwealth and State Government stakeholders, who have expressed strong support for the continued operation of the NWS Project.

8.10 Describe any environmental impact assessments that have been, is being or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project for the alternative.

Not Applicable.

8.12 Nominate any matters of National Environmental Significance that are likely to be impacted by this alternative proposal by ticking the relevant checkboxes.

8.13 Describe any impacts on the flora and fauna relevant to the alternative proposal.

Not Applicable.

8.26 What are the proposed measures for any alternative action to avoid or reduce impact?

Not Applicable.

8.27 Do you have another alternative?

No

Section 9 – Contacts, signatures and declarations

Where applicable, you must provide the contact details of each of the following entities: Person Proposing the Action; Proposed Designated Proponent and; Person Preparing the Referral. You will also be required to provide signed declarations from each of the identified entities.

9.0 Is the person proposing to take the action an Organisation or an Individual?

Organisation

9.2 Organisation

9.2.1 Job Title

Senior Vice President NWS

9.2.2 First Name

Niall

9.2.3 Last Name

Myles

9.2.4 E-mail

feedback@woodside.com.au

9.2.5 Postal Address

11 Mount Street
Perth WA 6000
Australia

9.2.6 ABN/ACN

ABN

63005482986 - WOODSIDE ENERGY LTD.

9.2.7 Organisation Telephone

1800 442 977

9.2.8 Organisation E-mail

feedback@woodside.com.au

9.2.9 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

Not applicable

Small Business Declaration

I have read the Department of the Environment and Energy's guidance in the online form concerning the definition of a small a business entity and confirm that I qualify for a small business exemption.

Signature:..... Date: .....

9.2.9.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations

No

9.2.9.3 Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made

Person proposing the action - Declaration

I, NIALL J HYLES, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature:..... Date: 22/11/18

I, NIALL J. HYLES, the person proposing the action, consent to the designation of WOODSIDE ENERGY LTD as the proponent of the purposes of the action describe in this EPBC Act Referral.

Signature:..... Date: 22/11/18

9.3 Is the Proposed Designated Proponent an Organisation or Individual?

Organisation

9.5 Organisation

9.5.1 Job Title

Senior Vice President NWS

9.5.2 First Name

Niall

9.5.3 Last Name

Myles

9.5.4 E-mail

feedback@woodside.com.au

9.5.5 Postal Address

11 Mount Street
Perth WA 6000
Australia

9.5.6 ABN/ACN

ABN

63005482986 - WOODSIDE ENERGY LTD.

9.5.7 Organisation Telephone

1800 442 977

9.5.8 Organisation E-mail

feedback@woodside.com.au

Proposed designated proponent - Declaration

I, NIALL J. MYLES, the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature: ..... Date: 22/11/18

9.6 Is the Referring Party an Organisation or Individual?

Individual

9.7 Individual

9.7.1 Job Title

Environment Manager

9.7.2 First Name

Anthony

9.7.3 Last Name

McMullen

9.7.4 E-mail

feedback@woodside.com.au

Referring Party - Declaration

I, ANTHONY MCMULLEN, I declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

Signature:..... Date: 21/NOV/2018

Appendix A - Attachments

The following attachments have been supplied with this EPBC Act Referral:

1. Figure 1 NWS Extension Project Location and Development Footprint.pdf
2. Figure 2 NWS Extension Heritage Values.pdf
3. Figure 3 NWS Extension Surface Water Features.pdf
4. NWS Extension Project Development Footprint GIS File.zip
5. Woodside Climate Change Policy.pdf
6. Woodside Health, Safety, Environment and Quality Policy.pdf