

INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT

ICHTHYS GAS FIELD
DEVELOPMENT

REFERRAL OF PROPOSED
ACTION—BROWSE BASIN AND
BLAYDIN POINT, DARWIN

ENVIRONMENT PROTECTION AND
BIODIVERSITY CONSERVATION
ACT 1999 (CWLTH)

Document No.
DEV-EXT-RP-0053

Revision	Date	Description	Prepared	Checked	Approved
0	5 May 2008	Issued for information	R Askew <i>RA</i>	G Oliver <i>GO</i>	S Kildare <i>SK</i>

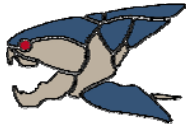


INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: i

DOCUMENT DISTRIBUTION

Copy No.	Name	Hard Copy	Electronic Copy
00	Document Control	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
02	INPEX Management Group		<input checked="" type="checkbox"/>
03	INPEX External Affairs		<input checked="" type="checkbox"/>

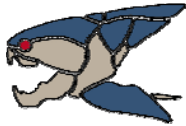


INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: ii

TABLE OF CONTENTS

1	CONTACTS	1
1.1	Referring party.....	1
1.2	Responsible party.....	1
1.3	Proponent.....	1
2	SUMMARY OF PROPOSED ACTION	2
2.1	Short description	2
2.2	Latitude and longitude	2
2.3	Locality	7
2.4	Size of the development footprint or work area	7
2.5	Street address of the site	10
2.6	Lot description	10
2.7	Local government area and council contact.....	10
2.8	Project life.....	10
2.9	Alternatives.....	10
2.10	State assessment.....	11
2.11	Component of larger action	11
3	DETAILED PROJECT DESCRIPTION.....	12
3.1	Description of proposal.....	12
3.1.1	Site selection	12
3.1.2	Major project components	13
3.1.3	Key associated activities.....	20
3.1.4	Emissions, discharges and wastes.....	26
3.1.5	Rehabilitation and decommissioning	28
3.2	Alternative locations, time frames or activities forming part of the referred action.....	29
3.3	Previously considered alternatives and the “do nothing” case	30
3.4	Context, planning framework and state/local government requirements.....	30
3.4.1	Commonwealth legislative requirements	30
3.4.2	State/territory legislative requirements.....	31
3.5	Environmental impact assessments under Commonwealth, state or territory legislation	32
3.6	A staged development or component of a larger project.....	32
4	AFFECTED ENVIRONMENT	33
4.1	Matters of national environmental significance.....	33
4.2	Important or unique aspects of the environment	40
5	NATURE AND EXTENT OF LIKELY IMPACTS	50
5.1	Likely impacts on matters of national environmental significance.....	50
5.2	Likely impacts for nuclear actions, actions affecting Commonwealth land or actions taken by the Commonwealth.....	53
6	MEASURES TO AVOID OR REDUCE IMPACTS.....	54



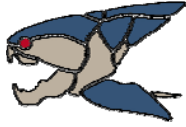
INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: iii

6.1	Environmental management program	54
6.1.1	Onshore environment plans.....	54
6.1.2	Offshore environment plans.....	55
6.2	Monitoring environmental performance	56
7	CONCLUSION ON THE LIKELIHOOD OF SIGNIFICANT IMPACTS	57
7.1	Proposed action is not likely to have significant impacts.....	57
7.1.1	Key reasons	57
7.2	Proposed action is likely to have significant impacts.....	58
8	ASSESSMENT APPROACH UNDER THE EPBC ACT	59
9	ENVIRONMENTAL HISTORY OF THE RESPONSIBLE PARTY	60
10	INFORMATION SOURCES AND ATTACHMENTS	63
10.1	References	63
10.2	Reliability of information	64
10.3	Attachments	65
11	SIGNATURES AND DECLARATIONS.....	66
11.1	Party who prepared the Referral	66
11.2	Party who is responsible for action.....	66
11.3	Proponent.....	66

LIST OF TABLES

Table 2-1:	Latitudes and longitudes of notional development areas.....	2
Table 2-2:	Conceptual Project schedule	10
Table 3-1:	Estimated dredge volumes for Project activities	22
Table 3-2:	Provisional earthwork volumes anticipated for construction of the onshore facilities.....	24
Table 4-1:	Threatened and migratory species that may inhabit the Project area (DEWHA 2008)	34
Table 4-2:	Migratory species that may inhabit the Project area (DEWHA 2008)	37
Table 6-1:	List of EMPs that may be required for the Project	54



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: iv

LIST OF FIGURES

Figure 2-1: Offshore notional development area comprising the Field, pipeline and fixed-platform notional development areas	4
Figure 2-2: Offshore pipeline notional development areas with example pipeline routes for each option	5
Figure 2-3: Onshore development area at Blaydin Point	6
Figure 2-4: Location map and example offshore pipeline routes	8
Figure 2-5: Darwin Harbour and existing infrastructure	9
Figure 3-1: Indicative underwater schematic of the drilling centres, CPF and FPSO	15
Figure 3-2: Indicative above-water schematic of the drilling centres, CPF and FPSO	16
Figure 3-3: Conceptual site plan for the onshore gas-processing facility, onshore pipeline and MOF at Blaydin Point	19
Figure 3-4: Navigation channels, turning basin and pipeline route	23
Figure 3-5: Land-clearing and vegetation communities	25
Figure 9-1: INPEX Environmental Policy	62

ATTACHED APPENDICES

APPENDIX A	FIGURES
APPENDIX B	EPBC DATABASE SEARCH AREAS



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
Basin and Blaydin Point, Darwin

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 1 of 66

1 CONTACTS

1.1 REFERRING PARTY

Contact: Mr Sean Kildare

Position: General Manager External Affairs

INPEX Browse, Ltd.

Level 35, Exchange Plaza

2 The Esplanade

PERTH WA 6000

Telephone: +61 8 9223 8433

Fax: +61 8 9223 8455

Email: skildare@inpex.com.au

1.2 RESPONSIBLE PARTY

Contact: Mr Jiro Okada

Position: Managing Director

INPEX Browse, Ltd.

Level 35, Exchange Plaza

2 The Esplanade

PERTH WA 6000

Telephone: +61 8 9223 8433

Fax: +61 8 9223 8455

Email: jokada@inpex.com.au

1.3 PROPONENT

As above.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
Basin AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
 Revision: 0
 Date: 5 May 2008
 Page No: 2 of 66

2 SUMMARY OF PROPOSED ACTION

2.1 SHORT DESCRIPTION

INPEX Browse, Ltd. (INPEX) proposes to develop the Ichthys Field in the Browse Basin to produce liquefied natural gas (LNG), liquefied petroleum gas (LPG) and condensate for export to markets in Japan and elsewhere.

For this purpose, INPEX intends to install offshore facilities for the extraction of natural gas and condensate at the Ichthys Field and a gas export pipeline from the field to onshore facilities at Blaydin Point near Darwin in the Northern Territory. The company intends to construct a two-train gas-processing plant and product offloading jetty at a site zoned for development on Blaydin Point. Additional condensate will be extracted and exported from the offshore facilities.

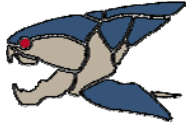
Hereafter, the Ichthys Gas Field Development Project is referred to as the “Project”.

2.2 LATITUDE AND LONGITUDE

Table 2-1, Figure 2-1, Figure 2-2 and Figure 2-3 define the notional development areas for the Project. This includes two alternative offshore pipeline routes.

Table 2-1: Latitudes and longitudes of notional development areas

Location reference	Latitude			Longitude		
	degrees	minutes	seconds	degrees	minutes	seconds
OFFSHORE NOTIONAL DEVELOPMENT AREA (ICHTHYS FIELD, PIPELINES AND NOTIONAL FIXED-PLATFORM DEVELOPMENT AREA)						
I1	13	44	55.44S	123	15	04.50E
I2	13	49	55.44S	123	15	04.50E
I3	13	49	55.44S	123	20	04.51E
I4	13	54	55.44S	123	20	04.51E
I7	14	19	23.25S	123	32	00.76E
I8	14	25	11.69S	123	20	35.70E
I5	14	03	08.17S	123	05	39.70E
I6	13	56	25.25S	123	02	09.61E
PIPELINE ROUTE—OPTION 1						
P1	13	44	55.44S	123	15	04.50E
P3	12	33	40.19S	125	53	50.63E
P7	12	13	43.41S	129	27	47.85E
P9	11	58	06.81S	130	25	42.63E
P11	12	02	48.28S	130	40	15.41E
P12	12	21	05.95S	130	41	15.03E



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
Basin and Blaydin Point, Darwin

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 3 of 66

P10	12	29	42.77S	130	17	50.74E
P8	12	45	42.65S	129	34	19.91E
P4	13	03	18.72S	126	07	23.22E
P2	14	19	23.77S	123	32	01.45E
PIPELINE ROUTE—OPTION 2						
P1	13	44	55.44S	123	15	04.50E
P3	12	33	40.19S	125	53	50.63E
P5	11	14	31.68S	128	04	32.73E
P9	11	58	06.81S	130	25	42.63E
P11	12	02	48.28S	130	40	15.41E
P12	12	21	05.95S	130	41	15.03E
P10	12	29	42.77S	130	17	50.74E
P7	12	13	43.41S	129	27	47.85E
P6	11	50	20.32S	128	07	14.08E
P4	13	03	18.72S	126	07	23.22E
P2	14	19	23.77S	123	32	01.45E
ONSHORE DEVELOPMENT AREA (BLAYDIN POINT)						
B1	12	32	09.03S	130	52	29.30E
B2	12	32	10.90S	130	53	27.36E
B3	12	33	00.13S	130	54	32.01E
B4	12	31	33.23S	130	55	07.42E
B5	12	31	20.35S	130	55	00.33E
B6	12	31	05.43S	130	54	41.56E
B7	12	30	30.70S	130	53	15.65E
B8	12	30	47.85S	130	54	59.74E
B9	12	30	41.85S	130	55	11.18E
B10	12	30	38.35S	130	55	31.65E
B11	12	30	44.80S	130	55	34.17E
B12	12	30	52.43S	130	55	20.75E
B13	12	31	26.88S	130	55	39.73E
B14	12	31	54.22S	130	55	25.76E
B15	12	32	40.33S	130	54	54.22E
B16	12	32	34.38S	130	55	12.54E
B17	12	32	54.94S	130	55	23.86E
B18	12	33	08.27S	130	54	43.69E
B19	12	32	54.96S	130	53	46.63E



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 4 of 66

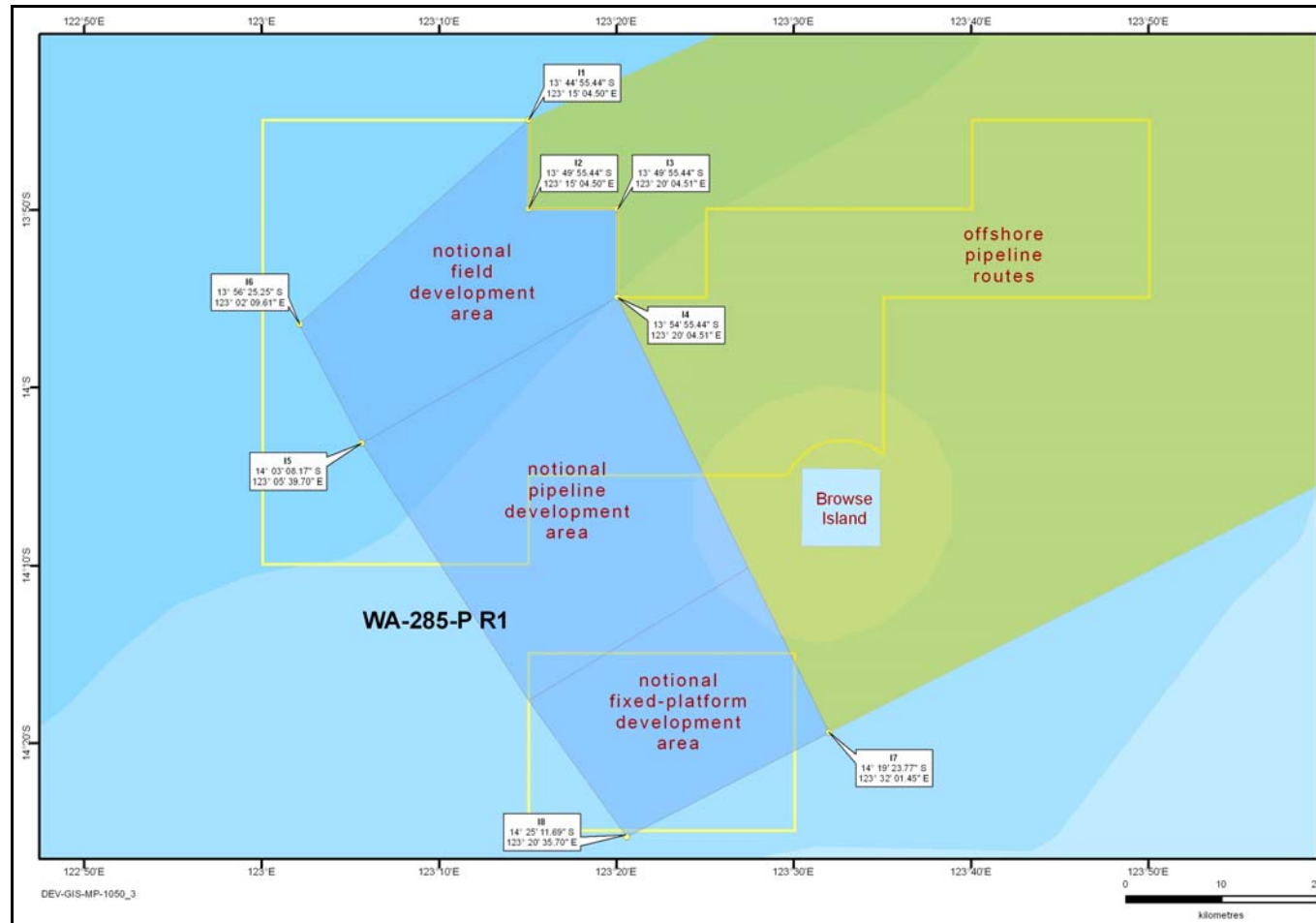


Figure 2-1: Offshore notional development area comprising the Field, pipeline and fixed-platform notional development areas



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 5 of 66

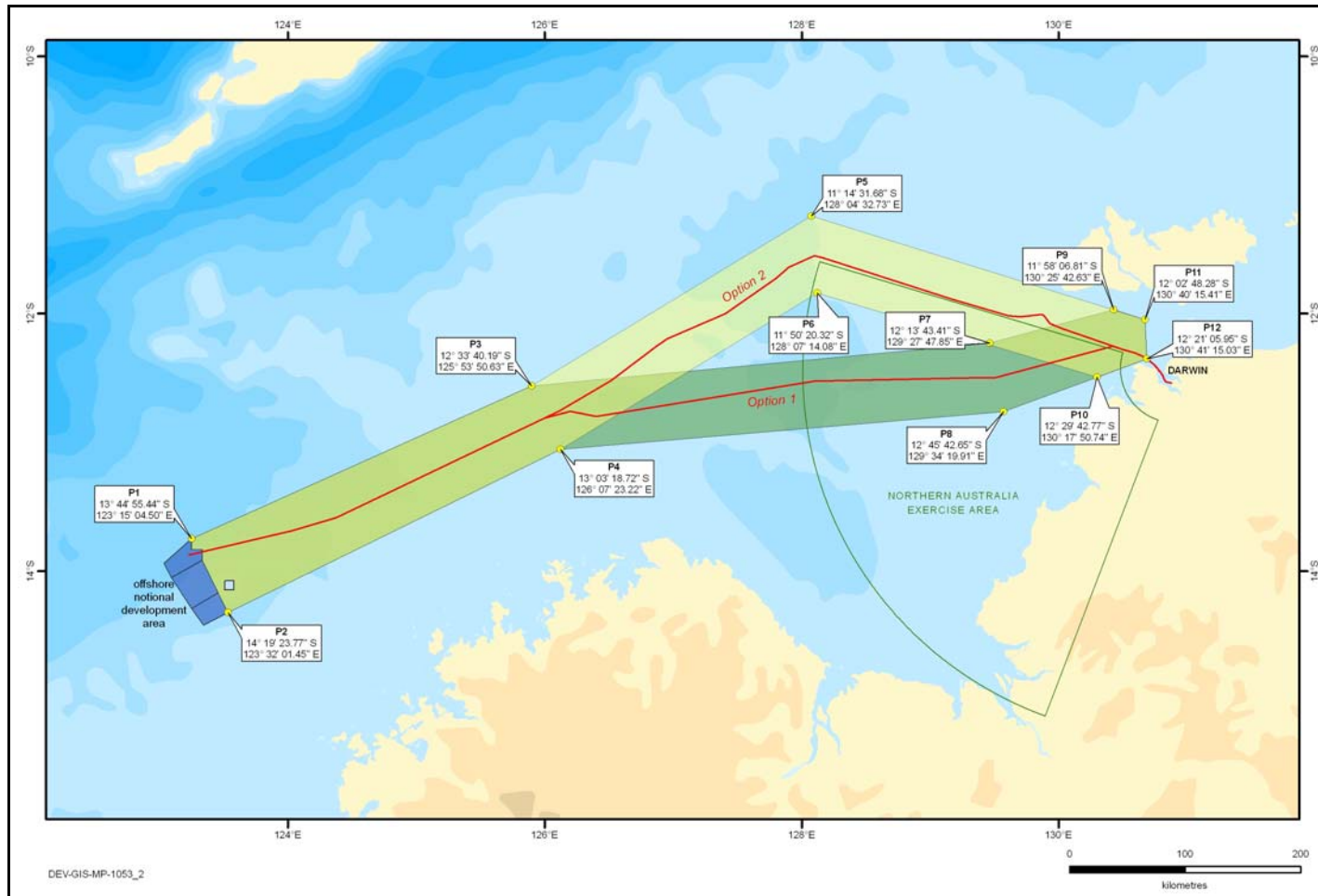


Figure 2-2: Offshore pipeline notional development areas with example pipeline routes for each option



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 6 of 66

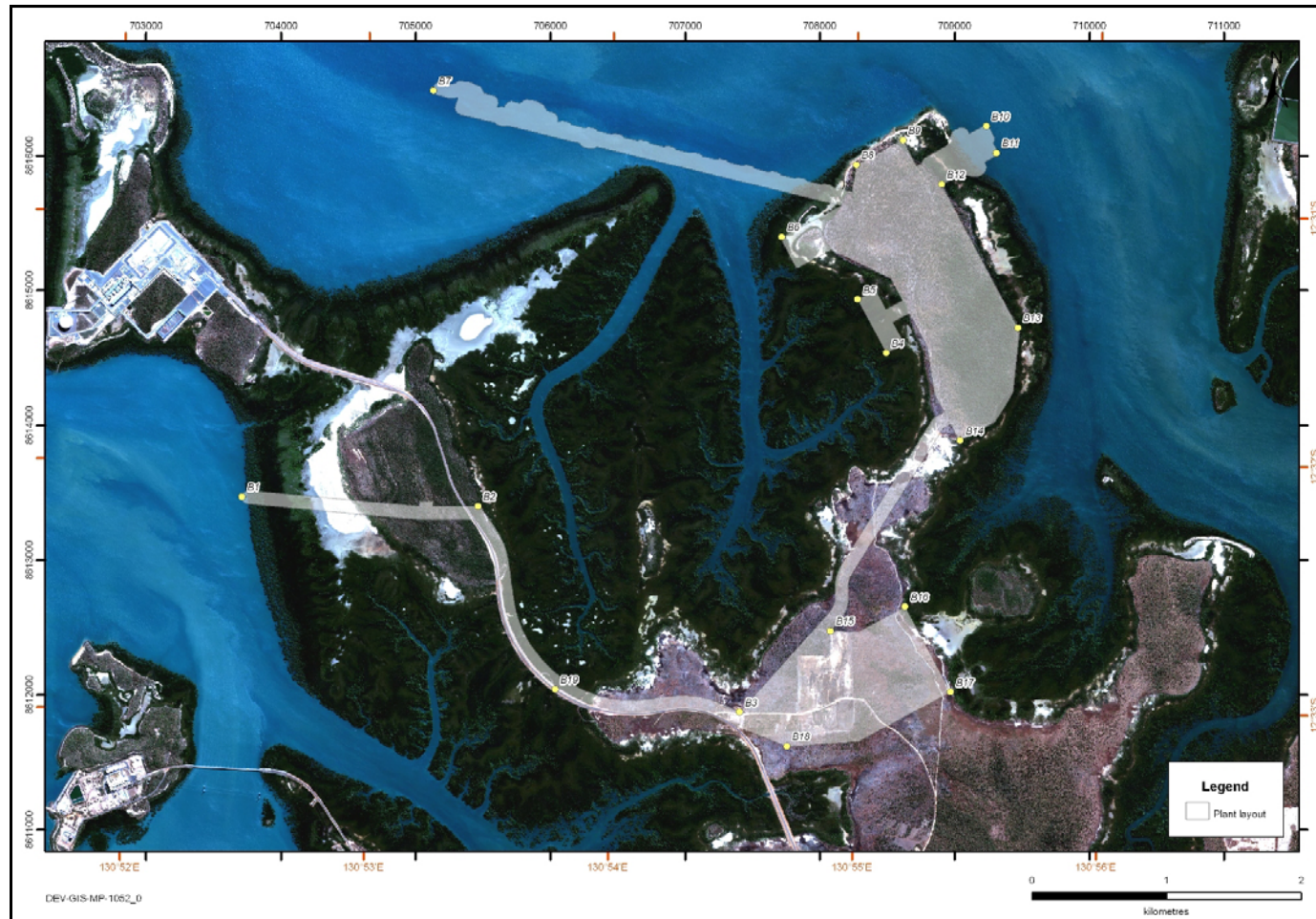



Figure 2-3: Onshore development area at Blaydin Point

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 7 of 66
---	--	--

2.3 LOCALITY

The Ichthys Field is located in the Browse Basin, 440 km north of Broome in Western Australia, and 825 km west-south-west of Darwin in the Northern Territory (illustrated in Figure 2-4 and Figure 2-5 below). The offshore processing facilities will be located in the vicinity of the Ichthys Field in water depths of more than 100 m.

A subsea pipeline will run between the Ichthys Field and Darwin Harbour. Two routes are currently under consideration as discussed in Section 3.2. The pipeline will reach the shore at the point indicated on Figure 2-4, then continue along Middle Arm via an approximately 8-km-long onshore section of pipe.

The onshore gas-processing facilities will be located at Blaydin Point in Darwin Harbour. The onshore site is currently unallocated Crown land, but is zoned for development.

2.4 SIZE OF THE DEVELOPMENT FOOTPRINT OR WORK AREA

The development footprint of the Project area has three main components: the offshore notional development area, the offshore pipeline route and the onshore development area.

The notional offshore development area encompasses an area of approximately 50 000 ha. It is illustrated in Figure 2-1 and represents the area within which the offshore exploration and production facilities of the Ichthys Field will be located.

The offshore pipeline route (either Option 1 or Option 2 indicated in Figure 2-2) from the field to the shore crossing on Middle Arm will have an approximate footprint of 360 ha. This is allowing for the average length of the pipeline (900 km) with an appropriate buffer of 2 m on either side). The average width of the disturbance footprint on each side of the pipeline will allow for varying stabilisation methods depending on seabed conditions and depths. The pipeline corridor is likely to be wider within nearshore areas where more stabilisation is required and narrower within offshore areas where no stabilisation is required.

The onshore development area involves a development footprint of approximately 300 ha. This includes the onshore gas-processing facilities, the storage and product export area, the onshore pipeline route with a 50-m-wide buffer, the administration facilities, and the construction laydown and future expansion areas as illustrated in Figure 2-3.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 8 of 66

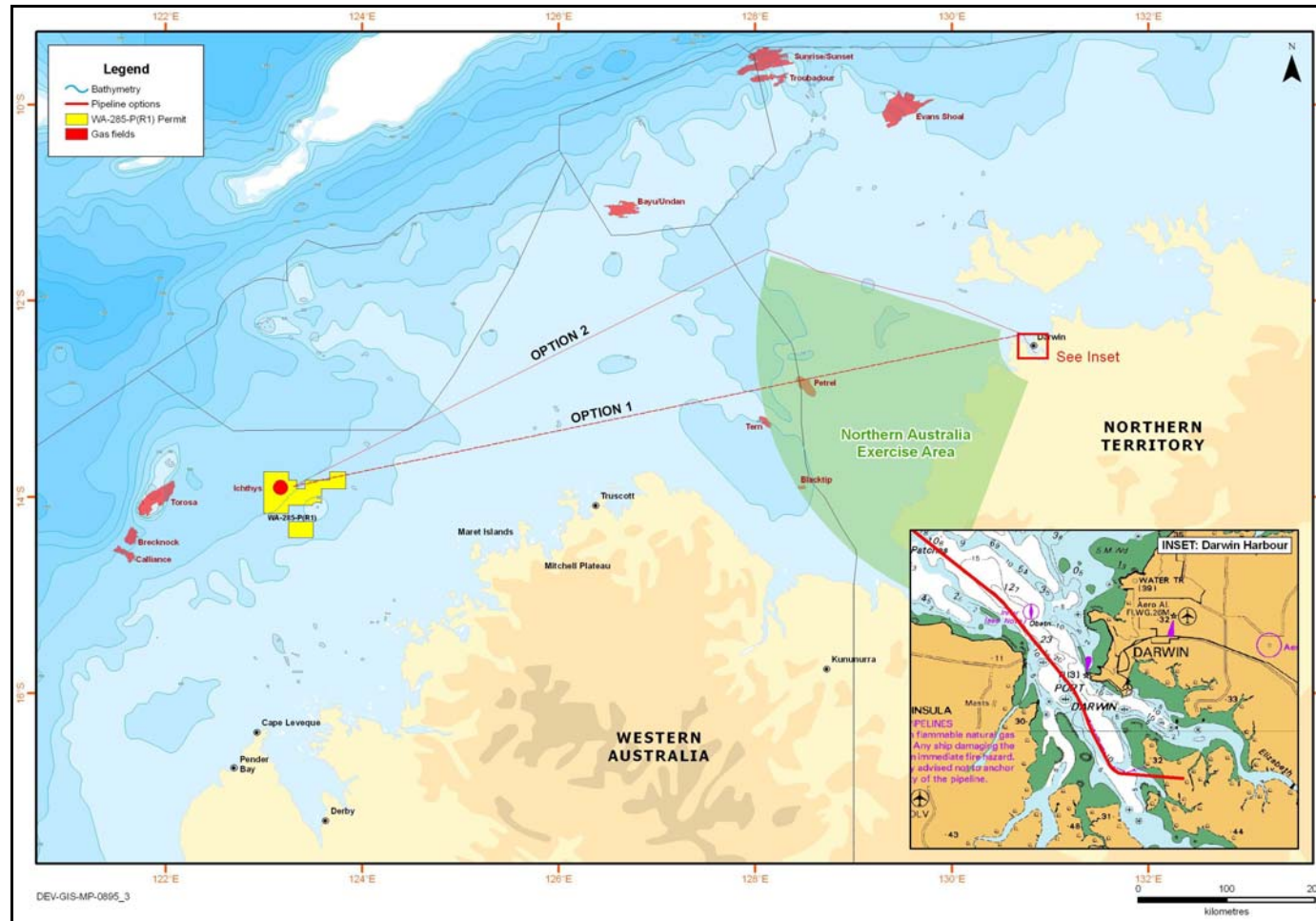


Figure 2-4: Location map and example offshore pipeline routes



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 9 of 66



Figure 2-5: Darwin Harbour and existing infrastructure



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 10 of 66

2.5 STREET ADDRESS OF THE SITE

The onshore development area as presented in Figure 2-3 is currently unallocated Crown land which has been zoned for development. There is no street address for the site as yet. The nearest gazetted road reserve is Wickham Point Road leading to the ConocoPhillips Darwin Liquefied Natural Gas Plant (Darwin LNG Plant).

2.6 LOT DESCRIPTION

The Ichthys Field is covered by Location 3SL/03-4 within the WA-285-P R1 exploration permit area in the Browse Basin.

The proposed onshore location is currently defined as Hundred of Ayers, Wickham Point, Parcel Nos 1813, 1814.

2.7 LOCAL GOVERNMENT AREA AND COUNCIL CONTACT

Litchfield Shire Council: (08) 8983 1912, <council@lsc.nt.gov.au>. Local town planning is, however, conducted by the Northern Territory Government.

2.8 PROJECT LIFE

The infrastructure described in this Referral will be in place for the operational life of the Project which is expected to extend beyond 40 years.


A conceptual Project schedule is presented in Table 2-2. This includes key milestones associated with Project design, construction and operation.

Table 2-2: Conceptual Project schedule

Development stage	Start	End
Concept selection	2nd half 2007	1st half 2008
FEED	2nd half 2008	Mid 2009
FID	2nd half 2009	–
Construction and commissioning	2nd half 2009	2nd half 2013 / 1st half 2014
Production	2nd half 2013 / 1st half 2014	After 2054

2.9 ALTERNATIVES

Alternative components of the Project include alternative offshore design and alternative offshore pipeline routes. Refer to Section 3.2 for more details.


	<p>INPEX BROWSE, LTD.</p> <p>ICHTHYS GAS FIELD DEVELOPMENT</p> <p>REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN</p>	<p>Doc No: DEV-EXT-RP-0053</p> <p>Revision: 0</p> <p>Date: 5 May 2008</p> <p>Page No: 11 of 66</p>
---	---	--

2.10 STATE ASSESSMENT

INPEX submitted a Notice of Intent (NOI) to the Northern Territory Government on 27 March 2008. This NOI represented an initial statement of advice and was intended to initiate the environmental assessment process by the government. Refer to Section 3.4 for more details.

2.11 COMPONENT OF LARGER ACTION

For the purposes of this Referral, the Project is not a component of a larger action. Refer to Section 3.6 for more details.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 12 of 66
---	--	---

3 DETAILED PROJECT DESCRIPTION

3.1 DESCRIPTION OF PROPOSAL

3.1.1 Site selection

Following the appraisal of the Ichthys Field's gas and condensate reserves based on exploration conducted in 1999, INPEX investigated the options to bring the hydrocarbon products to market. This included site selection studies conducted from 2002 to 2004 to assess possible locations for the onshore gas-processing component of the Project.


The studies indicated that the Maret Islands in the Kimberley region of Western Australia were the most appropriate location for the onshore facility based on what was understood at the time of the environmental, political, engineering and commercial constraints. INPEX initiated an approvals process with the Commonwealth Government in 2006 in order to pursue this option. The Referral under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) was submitted in May 2006. This approvals process is ongoing. However, companies wishing to locate an onshore facility in the Kimberley region continue to face a complex series of constraints that make project development and site approvals a challenging and increasingly uncertain process.

This uncertainty has prompted INPEX to revisit sites considered in earlier stages of the development process and in mid-2007 it was determined that it would be technologically feasible to export Ichthys gas to an onshore gas-processing facility in the Darwin region.

In consultation with the Northern Territory Government, the Blaydin Point site was selected as the preferred option for the onshore component of the Project. It is the government's preferred site for an LNG facility and is zoned as an industrial area under the Northern Territory Planning Scheme specifically for LNG (DPI 2008).

In addition, INPEX has previously undertaken a sensitivity study assessing a number of potential northern Australian sites against a range of environmental, social and economic criteria. This study was aimed at the identification of an onshore site for the development of a project separate from the Ichthys Field development and drew on previous experience in other major site selection studies for industrial facilities in northern Western Australia, and experience in the Northern Territory coastal and marine environment. This study found major advantages to development within the Darwin Harbour area, and specifically at Blaydin Point, compared with other sites in Northern Australia (URS 2006).

This Referral will initiate the Commonwealth environmental approvals process for the Ichthys Gas Field Development Project at the Blaydin Point site in Darwin. This will run in parallel with the approvals process for the alternative Maret Islands site in the Kimberley region of Western Australia until a decision is made by INPEX and its joint venture participant, Total, to pursue only one of these options.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 13 of 66
---	--	---

3.1.2 Major project components

The infrastructure required for the Project, with onshore facilities based at Blaydin Point, will include the following major components:

- approximately 50 subsea wells spread over a number of drilling centres and fed back to the offshore processing facilities via subsea flowlines
- a central processing facility (CPF) for offshore gas and liquid extraction and processing
- floating production, storage and offtake (FPSO) facilities for offshore storage and export of condensate
- an offshore pipeline from the CPF to a shore-crossing location on the western side of Middle Arm, Darwin Harbour
- an onshore pipeline from the shore-crossing location to a gas-processing plant
- onshore gas processing at Blaydin Point.

A range of supporting infrastructure will also be required, including:

- a product offloading jetty (whose final layout will be determined through stakeholder consultation)
- a materials offloading facility (MOF)
- sealed weatherproof roads
- common utilities and a control room
- associated on-site infrastructure (e.g. offices, workshops and warehouse)
- power generation facilities
- a wastewater treatment plant.

A description of the major Project components and their supporting infrastructure is provided in the following subsections.

Offshore extraction, processing and condensate offtake

The offshore infrastructure will consist of a number of drilling centres, including approximately 50 subsea wells which will be tied back to manifolds. Drilling centres will have infield flowlines and flexible risers for submarine transfer of the reservoir gas and fluids to the CPF, an offshore semi-submersible platform. The CPF will contain the initial gas-processing and compression facilities as well as various utilities and living quarters for up to 200 personnel.

Condensate will be transferred from the CPF to a moored FPSO for stabilisation and export. Condensate will be exported from the FPSO via a floating loading hose to offtake tankers. The FPSO will also treat and dispose of produced water. It will be located approximately 2 km from the CPF and will contain liquid (condensate and water) treatment facilities, living quarters and associated utilities.


	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 14 of 66
---	--	---

Figure 3-1 and Figure 3-2 below illustrate the offshore development concept from, first, an underwater and, secondly, an above-water perspective.

A fixed platform concept is also being considered as an alternative to having floating facilities. This alternative includes the construction of one or more fixed platforms in shallower waters (depths of 100–120 m) 40 km south-west of the Ichthys Field that may vary in size and functionality. The fixed facilities will include gas and condensate separation, condensate stabilisation, liquid treatment, MEG (monoethylene glycol) regeneration, gas dehydration and compression, support facilities and accommodation.

If the fixed platform option is adopted, the condensate would be stored on a floating storage and offtake (FSO) unit moored about 2 km from the fixed platform or, alternatively, stored in one of the platform bases and exported through a floating loading buoy.

Subsea pipeline

It is proposed that gas and liquid hydrocarbons will be transported from the Ichthys Field to the Blaydin Point onshore processing facilities via a subsea pipeline. The pipeline will be in the range of 850–935 km long, depending on the route taken, with an expected minimum diameter of 42 inches (c.1.07 m).

The subsea pipeline route is yet to be finalised, with the following two options currently being considered (Figure 2-4).

- Option 1: A direct line from the offshore facility to the mouth of Darwin Harbour, and then through the harbour to Blaydin Point.
- Option 2: A route extending north-east around the existing (military) Northern Australia Exercise Area then south-east to Darwin Harbour, entering as for Option 1.

The pipeline routes and associated installation activities will be designed to avoid direct and indirect impacts on Browse Island and its adjoining reef. The pipeline route will deviate from a direct route in order to avoid any other subsea obstructions or sensitive habitats found during the seabed route survey.

Within Darwin Harbour, it is proposed that the subsea pipeline will follow a similar route to the existing ConocoPhillips Bayu-Undan pipeline to Wickham Point (Figure 2-4 and Figure 2-5).



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 15 of 66

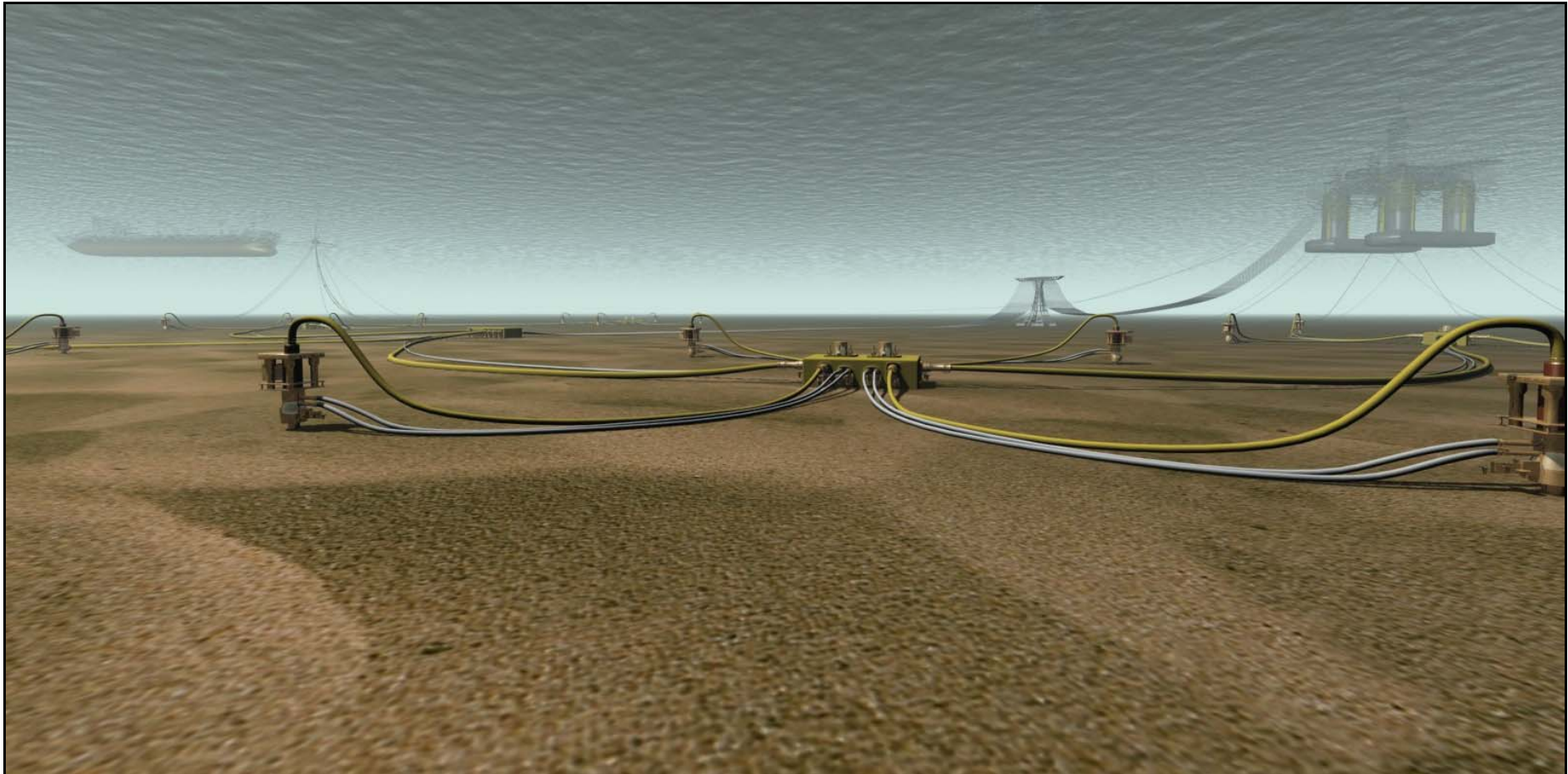


Figure 3-1: Indicative underwater schematic of the drilling centres, CPF and FPSO



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 16 of 66



Figure 3-2: Indicative above-water schematic of the drilling centres, CPF and FPSO



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 17 of 66

Shore crossing and onshore pipeline

The subsea pipeline will be linked to the Blaydin Point onshore processing facility via a length of onshore pipeline. The onshore pipeline route and shore-crossing location have not yet been finalised and their selection depends on a range of geotechnical, economic and environmental factors to be studied as part of the environmental impact assessment process.

At this stage, the preferred shore crossing is located between Wickham Point and Channel Island as indicated in Figure 3-3.

The onshore pipeline would follow the existing road alignment of Wickham Point Road for approximately 2.5 km, then proceed northerly to the onshore processing facility site at Blaydin Point, a total distance of approximately 8 km.

Onshore gas-processing facility

Hydrocarbon gas and liquids brought onshore via the subsea pipeline will be treated at an onshore gas-processing facility at Blaydin Point. Gas and liquids (condensate and LPGs) will be separated and processed. All products will then be stored for export via international shipping from Darwin Harbour.

The onshore gas-processing facility will have a nominal design life of 40 years. The initial development of the gas field, onshore gas-processing plant and associated infrastructure is currently proposed to provide the following capacity:

- LNG: approximately 8 Mt/a from two trains, increasing to approximately 10 Mt/a through debottlenecking
- LPG: approximately 1.6 Mt/a
- Condensate: approximately 100 000 bpd (85 000 bpd to be processed and exported from the offshore facility, 15 000 bpd to be processed onshore).

A conceptual site plan for the proposed onshore facilities is presented in Figure 3-3.

The primary components of the onshore gas-processing facility are as follows:

- a gas reception area (with a pig receiver and slug catcher)
- two LNG liquefaction trains
- an LPG fractionation plant
- a condensate stabilisation plant
- gas turbines for power generation
- LNG, LPG and condensate storage facilities.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053

Revision: 0

Date: 5 May 2008

Page No: 18 of 66

Product export

Products from the onshore gas-processing facility will be exported by ship, using the product offloading jetty. The final layout and orientation of the jetty will be determined through stakeholder consultation.

Shipping movements during operations are expected to consist of approximately two to three LNG shipments per week, one to two LPG shipments per week and one condensate shipment per month.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 19 of 66

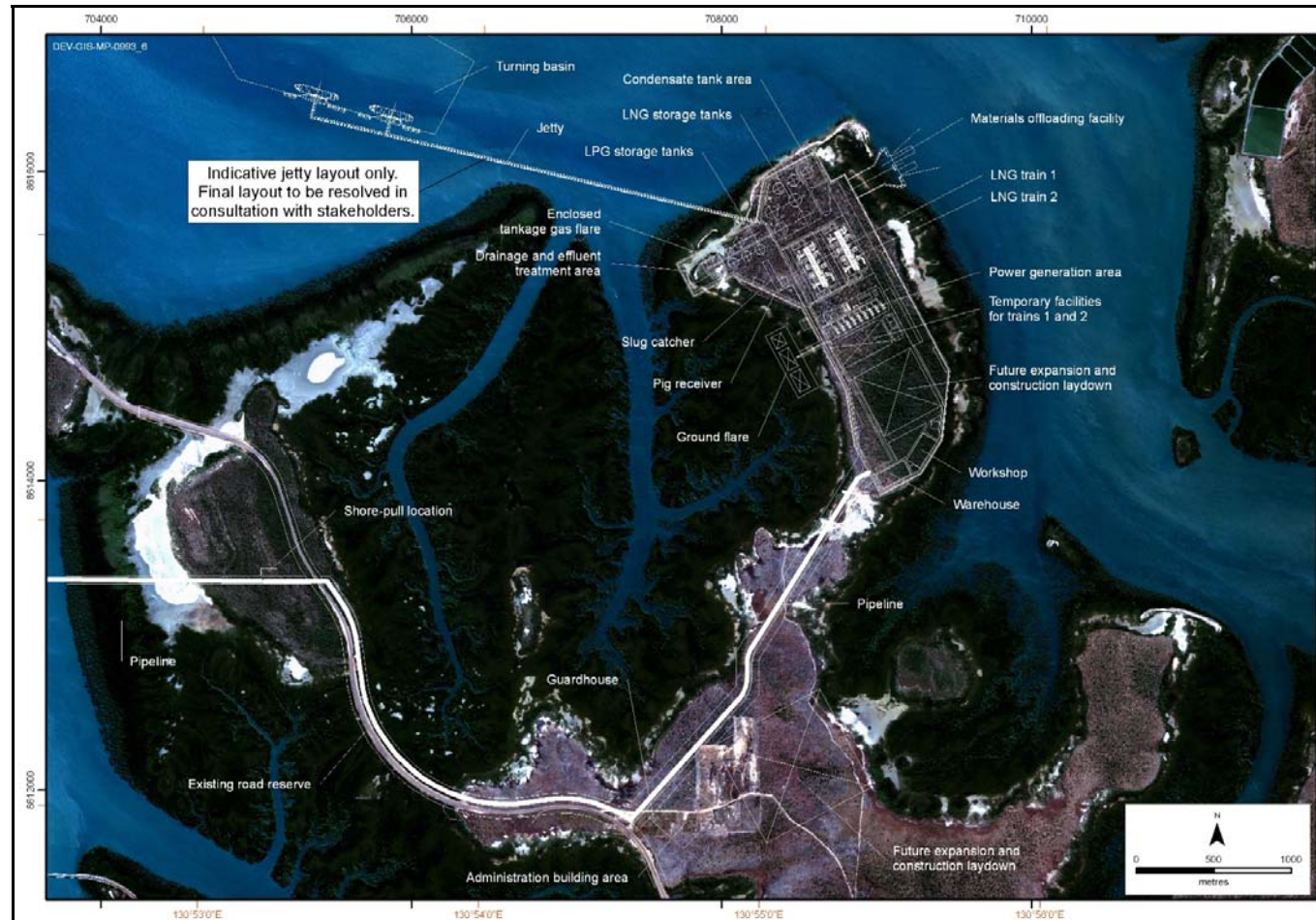



Figure 3-3: Conceptual site plan for the onshore gas-processing facility, onshore pipeline and MOF at Blaydin Point

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 20 of 66
---	--	---

3.1.3 Key associated activities

A range of activities will be specific to different phases of the Project. The key activities that have a potential to impact “matters of national environmental significance” (as defined by the EPBC Act) occur within the 4–5 year construction phase of the project. Other activities during commissioning and operations have a limited potential to impact matters of national environmental significance. Key activities associated with the Project are outlined below.

Offshore activities

Drilling and subsea structure installation

Subsea systems comprise subsea wells, a wellhead and a subsea tree connected to a manifold. Development of the Ichthys Field will require the drilling of a number of wells over the Project’s lifetime. The final number of wells required will be determined in detailed design but will be in the order of 50 wells with around 20 wells being drilled in the initial construction period.

Drilling is likely to be undertaken using a semi-submersible rig which is anchored into position. In the process of drilling the development wells, rocks crushed and ground by the drill bit are generated. These are referred to as “drill cuttings”. Drill cuttings must be continuously removed from the hole using drilling fluids. The majority of these cuttings are discharged to sea.

The subsea system constructed on top of the wells forms the interface between the well and the CPF. The subsea trees and manifolds will be installed by the drilling rig as part of the drilling process. Installation on the seabed will involve either piled foundations or spread-concrete foundations. Further geotechnical investigation will determine which option will be used. Infield flowlines, jumpers and umbilicals will be installed from pipelay vessels or diving support vessels and connection to the subsea equipment and the CPF will be completed by remotely operated vehicles (ROVs) or by divers.

Installation and commissioning of the floating and fixed facilities

Offshore facilities and their process components are typically constructed at off-site fabrication shipyards.

Integration of the process modules and hulls typically takes place at the fabrication yards with the completed facilities being sailed into place at the gas field. Once the facilities are in place, they will be detached from the towing or transport vessel and either de-ballasted in the case of floating facilities or lifted and fixed to the seabed in the case of the fixed platform.

The export pipeline and flowline risers will be installed between the seabed and the CPF and the facility will be pressure-leak tested with seawater containing corrosion inhibitors.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053

Revision: 0

Date: 5 May 2008

Page No: 21 of 66

INPEX intends to maximise offsite trialling and pressure-testing of facility components. Completion of the offshore facilities will coincide with the completion of the onshore plant and when all facilities are certified as ready the first hydrocarbons can be introduced into the system.

Pipeline installation

The offshore subsea pipelines will be laid using a pipelay barge kept in position using either dynamic position systems or an anchor system, depending on the depth of water, seabed conditions and vessel availability. Pipeline sections are welded together on the pipelay barge and laid over the stern of the barge. Prior to laying the pipeline, pre-lay preparation may involve sand-wave pre-sweeping.

In order to protect the pipeline from damage and movement, the entire length of the pipeline will require concrete-weight coating.

Following the installation of the pipeline and stabilising rock armour, further disturbance to the seabed is not foreseen.

Darwin Harbour activities

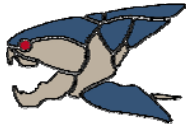
Construction of the pipeline and shore crossing

It is likely that the subsea pipeline will require burial (in a pre-dredged trench) in some or all parts of the alignment in Darwin Harbour, and may also require rock dumping to ensure bottom stability and protection from groundings or anchor dragging from other vessels. A source of subtidal marine sands somewhere in the Darwin region may be required to provide pipeline trench backfill material of the appropriate grain size.

The pipeline shore crossing is likely to be constructed using an open-cut trench design similar to that used at the ConocoPhillips LNG facility at Wickham Point. This involves dredging and excavating a trench, installing onshore winches and pulling the pipeline to shore from the anchored pipelay barge with a winch cable. Following the shore-pull operation, the trench may be rock-dumped offshore and reinstated onshore.

Construction of the jetty

The product offloading jetty is likely to be constructed using conventional piling techniques working out from an abutment. These techniques involve piling from jack-up barges. The jetty deck is likely to be constructed from precast deck sections installed on beams spanning the piled substructures.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 22 of 66

Dredging and dredge spoil disposal

Dredging will be required for the development of a navigation channel and ship-turning basin, as well as for the preparation of the pipeline approach. Requirements for dredging the MOF are anticipated to be relatively small. The current estimate of total spoil volume is approximately 5 Mm³. A breakdown of the estimated dredge volumes are detailed in Table 3-1 below.

Figure 3-4 below illustrates the navigation channels and turning basin for the LNG and LPG carriers.

A dredge spoil disposal location will be required and options are currently being investigated, including the option of using settlement ponds at East Arm Wharf and offshore areas adjoining Darwin Harbour. INPEX will consult with key stakeholders (including the Darwin Port Corporation, the Darwin Harbour Advisory Committee, the Department of Natural Resources, Environment and the Arts (NRETA), the Commonwealth's Department of the Environment, Water, Heritage and the Arts (DEWHA) and the local community) to identify appropriate disposal locations. A dredge management plan will be developed prior to the commencement of dredging.

Table 3-1: Estimated dredge volumes for Project activities

Activity	Volume of dredging required
Shipping channel and turning basin	Approximately 4 Mm ³
Pipeline approach	Less than 1 Mm ³ within Darwin Harbour
Materials offloading facility	Under investigation, but volumes are expected to be relatively small

Maintenance dredging will also be required during operations to preserve appropriate water depths within the shipping channel and turning basin. Dredge spoil volumes to be generated have not yet been calculated but will be significantly less than the initial volumes during construction.

Marine exclusion zones

Throughout construction and into operations there will be a need for an exclusion zone in the nearshore marine waters around Blaydin Point. This is to ensure the safety of personnel and the public. The size of the exclusion zone is yet to be determined but will include the MOF area, the jetty and a perimeter exclusion zone around Blaydin Point. These exclusion zones will be prescribed by safety analysis and established in consultation with relevant stakeholders. They are anticipated to be consistent with those implemented for the ConocoPhillips-operated LNG plant at Wickham Point.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 23 of 66

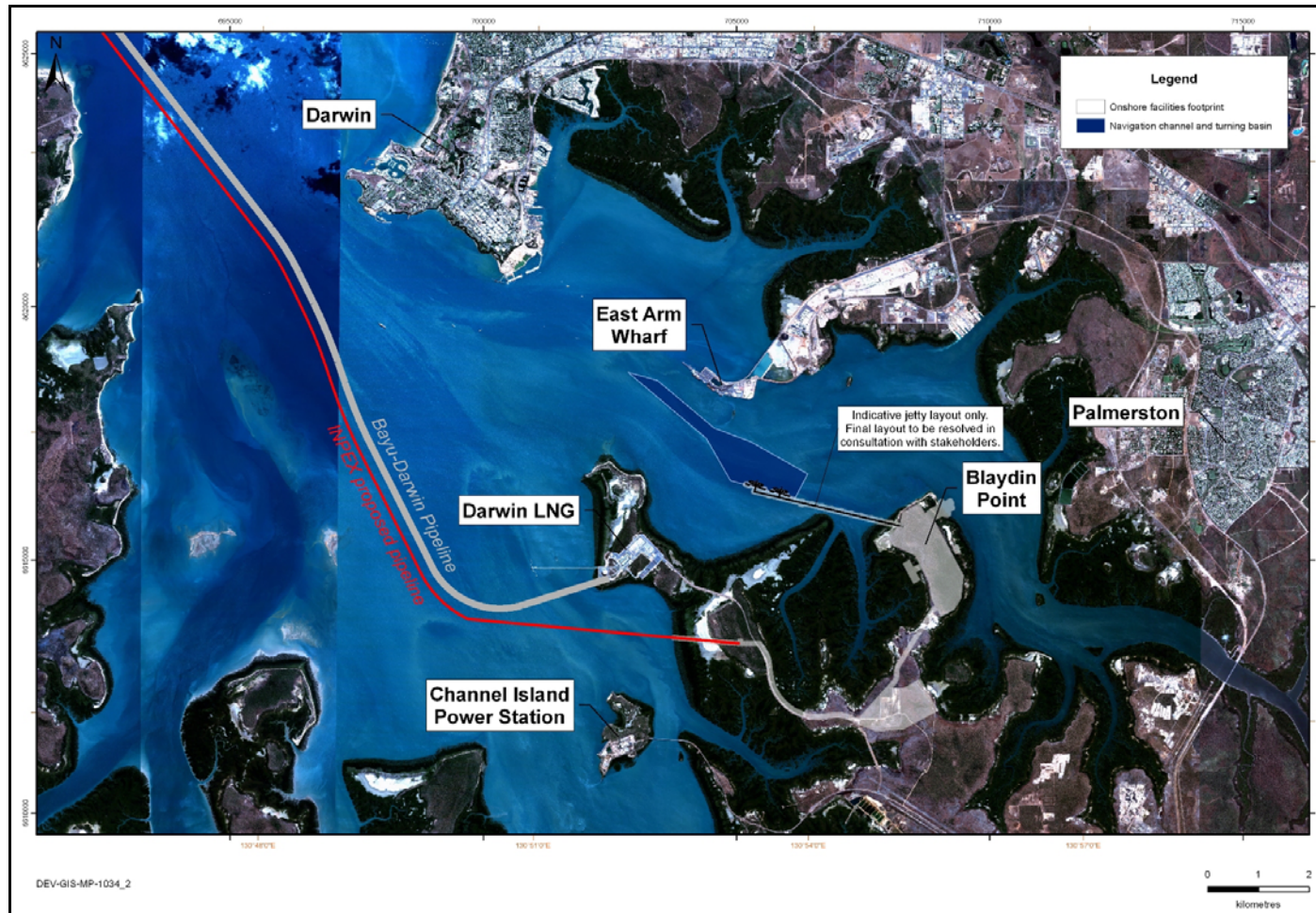
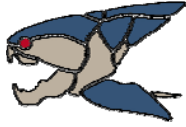


Figure 3-4: Navigation channels, turning basin and pipeline route



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 24 of 66

Shipping movements

An increase in shipping movements within Darwin Harbour can be anticipated from the construction phase onwards. During construction, ship movements would include, but not be limited to, heavy-lift vessels and barges, pipe-laying vessels and pipe transport barges, miscellaneous cargo ships and dredging vessels. With the exception of heavy-lift barges, which will use the MOF to be constructed at Blaydin Point, construction phase cargo is expected to be offloaded at East Arm Wharf. The materials and equipment required during construction will be transported by road.

Onshore development area construction activities

Land clearing

It is anticipated that clearing and earthworks will be conducted over the area identified in Figure 3-5. The total area to be cleared within this proposal is approximately 300 ha. INPEX has aimed to minimise clearing to the greatest possible extent and will rehabilitate any mangrove areas which will be temporarily disturbed.

Site earthworks

It is anticipated that most of the earthworks will be local cut-to-fill operations. The onshore sites for the gas-processing plant and administration area have been designed to minimise borrow material requirements. Flare construction will maximise use of borrow material from an existing borrow pit located south of the Project administration area. Additional borrow pits may need to be developed to meet full Project needs.

Volumes of the cut, fill, rock protection and borrow requirements for the onshore gas plant and administration area are summarised in Table 3-2. Borrow material along with aggregate, sand and other earthwork material will be placed on the site, as will related plants such as crushing and screening and concrete batching.

Table 3-2: Provisional earthwork volumes anticipated for construction of the onshore facilities

Facility	Cut (Mm³)	Fill (Mm³)	Balance (Mm³)	Rock protection (Mm³)
Onshore gas plant	0.7	0.8	0.1	0.058
Flare	none	0.6	0.6	0.012



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 25 of 66

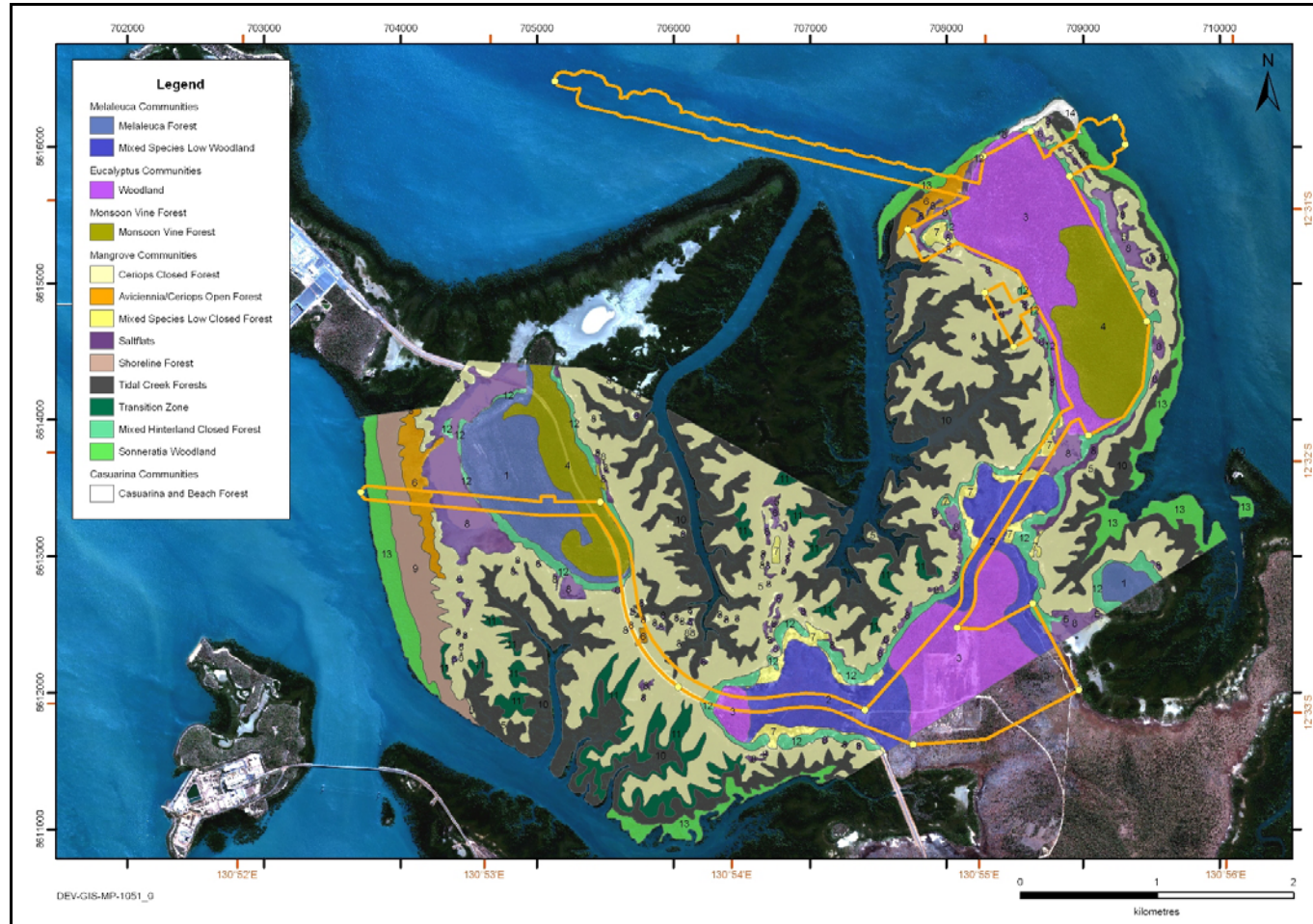


Figure 3-5: Land-clearing and vegetation communities



Assembly of the gas-processing plant

At this stage the construction method for major components of the onshore gas-processing facility has not been finalised. It is likely that a combination of on-site purpose-built modules and imported pre-assembled modules will be used to construct the plant. Suppliers for pre-assembled modules have not yet been identified but may be sourced from within Australia or from Asia.

Services and utilities

It is assumed that public utility services such as water supply may be required from the onset of construction and may also be required into the operations phase. Construction of a wastewater treatment plant will also likely be necessary.

Construction workforce

The workforce required at the peak of construction activity is provisionally assumed to be in the order of 2000 to 3000 people working on site. While local workers will be utilised to the maximum extent possible, some of the construction work force could be on a fly-in, fly-out roster.

Housing will be provided locally (in Darwin and Palmerston) or potentially at a third-party construction camp, also external to the Blaydin Point site.

Construction schedule

Construction for the Project is scheduled to commence in the second half of 2009 and is expected to be completed in the second half of 2013 to first half of 2014.


This conceptual schedule will be influenced by many factors, particularly the plant construction methods. It is not yet known whether the plant components will be purpose-built modules or installed using pre-assembled modules.

3.1.4 Emissions, discharges and wastes

Air emissions

Emissions from the onshore gas-processing facility will include the following:

- nitrogen oxides (NO_x)
- sulfur oxides (SO_x)
- carbon dioxide (CO₂)
- carbon monoxide (CO)
- particulate matter
- methane (CH₄)
- volatile organic compounds (VOCs).

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 27 of 66
---	--	---

Air emissions from the onshore facility will be modelled to ensure that ground-level concentrations will comply with the relevant ambient air quality standards, notably the national environment protection standards set by the National Environmental Protection Measure (NEPM).

In addition, ozone (O₃) will be produced from the reaction of nitrogen oxides with VOCs in sunlight; this will also be modelled and compared against the NEPM. Cumulative air emissions from other existing industries will be taken into account within the air quality assessments to be conducted as part of the environmental assessment process.

Greenhouse gas emissions

INPEX recognises the capacity of greenhouse gases (GHGs) to impact on the environment on a global scale through their contribution to the phenomenon of global warming. As part of INPEX's commitment to the reduction of GHGs across its operations, a GHG emissions assessment has been conducted for all onshore and offshore activities associated with the Ichthys Project.

The Project will have two significant sources of GHG emissions: reservoir carbon dioxide (CO₂) and combustion GHG emissions. Reservoir CO₂ is the term used to describe CO₂ that is naturally present in the natural gas reservoir and which has traditionally been vented to the atmosphere when the reservoir gas is processed to produce LNG. Combustion GHGs are produced in large volumes from the gas production process, from gas turbines for compression and power generation, and to a lesser extent from acid gas removal units, hot-oil furnaces and flares.


INPEX is committed to reducing GHGs from its operations. In order to realise this commitment, an assessment will be undertaken through the design process to identify technical abatement and offset opportunities to reduce net GHG emissions. INPEX's environmental policy requires the company to actively promote the reduction of GHG emissions in a safe and technically and commercially viable manner.

Liquid discharges

Process discharges from the offshore facilities are likely to consist of produced water, cooling water, sewage and deck drainage.

For the onshore processing facilities, a wastewater discharge outfall at an appropriate location may be required for nearshore disposal of treated wastewater which may contain trace levels of hydrocarbons and production chemicals. As the onshore gas-processing plant will be air-cooled, there will be no requirement for warm-water discharge. Other water discharges will include stormwater from non-process areas and treated sewage.

Modelling will be undertaken to demonstrate the environmental acceptability of any discharge streams. A liquid discharge and drainage management plan will be developed prior to the commencement of construction.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 28 of 66
---	--	---

Wastes

Waste streams during construction are likely to include:

- offcuts of fabrication materials, such as steel and electrical wiring
- packaging materials, such as wood, cardboard and plastic
- general domestic wastes and sewage from crib rooms and toilets
- machinery wastes, including lubricating oil, filters, etc.

Waste streams during operations are likely to include:

- hydrocarbon and chemical wastes
- packaging materials, such as wood, cardboard and plastic
- general domestic wastes and sewage from crib rooms and toilets
- machinery wastes, including lubricating oil, filters and oily rags.

Waste streams will be characterised in more detail, and disposal methods investigated during the development of the waste management plan for the Project. The philosophy for waste management will be to reduce at source, reuse and recycle where possible.


3.1.5 Rehabilitation and decommissioning

Decommissioning of the both the onshore and offshore facilities will commence at the end of the Project's life in accordance with relevant national and state legislation and any conditions laid down during the approvals process.

Decommissioning of the offshore facilities will involve the removal of the CPF, FPSO, wellheads and manifolds. Decisions on the decommissioning of the infield flowlines, risers, suction pile anchors and the export pipeline will be subject to a comprehensive risk assessment conducted in consultation with the regulatory authorities.

Onshore decommissioning and rehabilitation will be agreed with the Northern Territory Government prior to the commencement of decommissioning. Options for the rehabilitation of the site will be appraised and a final decommissioning plan determined. Options may range from site levelling for further industrial use to rehabilitation to a state equivalent to that which existed prior to the Project being constructed. There will also be a need for rehabilitation plans for temporarily disturbed areas such as the shore crossing, pipeline routes and temporary construction laydown areas.

The initial design of facilities to be installed at Blaydin Point will include reasonable practicable measures to ensure that decommissioning can be safely performed.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 29 of 66
---	--	---

3.2 ALTERNATIVE LOCATIONS, TIME FRAMES OR ACTIVITIES FORMING PART OF THE REFERRED ACTION

Blaydin Point is the Northern Territory Government's preferred site for an LNG facility and is zoned as an industrial area under the Northern Territory Planning Scheme specifically for LNG (DPI 2008). The government has designated Middle Arm Industrial Estate for all future gas processing in the Darwin region. No alternatives to Blaydin Point are therefore being considered for the onshore component of the Project as part of this Referral.


Alternatives that form part of this Referral

Alternatives that form part of this Referral include the following:

- Alternatives for the offshore concept may include having fixed platforms in shallower waters 40 km south-west of the Ichthys Field. The potential location for the fixed platforms has been included in the notional offshore development area as a "notional fixed-platform development area" and a "notional pipeline development area" (Figure 2-1). These have been included on the database search for "matters of national environmental significance" (see Section 3.4.1).
- Alternative routes for the offshore pipeline are part of this referred action. Option 1 extends directly from the offshore facilities (either the CPF or the shallow-water fixed platform) to the mouth of Darwin Harbour and thence to the shore crossing at Blaydin Point (a total distance of approximately 850 km) and Option 2 travels north-east and then south-east to avoid crossing the military zone known as the Northern Australia Exercise Area (a total distance of approximately 935 km). These options each allow for a 60-km-wide development area which will be narrowed to a localised footprint of the 42-inch pipeline and required stabilisation methods such as trenching and rock dumping. The final route will be selected in consultation with the relevant authorities, and in particular with the Australian Defence Force, but will approximate a direct route with minor deviations to accommodate potential subsea structures and sensitive habitats.
- Other potential pipeline shore-crossing and overland routes may be investigated as alternative options.

Alternatives that do not form part of this Referral

In parallel with this Referral, INPEX is undertaking an approvals process for an onshore gas-processing facility at the Maret Islands in the Kimberley region of Western Australia. This alternative approval includes infrastructure at the Ichthys Field which is specifically designed for the Maret Islands case. This approvals process is ongoing and is independent of this Referral.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 30 of 66
---	--	---

3.3 PREVIOUSLY CONSIDERED ALTERNATIVES AND THE “DO NOTHING” CASE

“Do nothing” case

The consequences of “doing nothing” would essentially be threefold:

- As the permit holder and Operator for the Ichthys Field, INPEX has an obligation to undertake exploration of its permit area, verify the nature and extent of the reserves within the area, and if resources are found, investigate the manner in which it can make these reserves available to gas buyers. Should the Project not proceed, this obligation would not be met.
- Significant social and economic advantages resulting from the Project, to northern Australia in general and to the Darwin region in particular, would be lost. The Project would generate major new export income and employment and would strengthen the Northern Territory’s economic development. It would be the largest private-sector investment in the history of the Darwin region and would provide opportunities for business and employment for over four decades.
- The opportunity to deliver substantial tax revenues to Australian governments over a period of 40 years would be lost and INPEX would be unable to contribute to the growth and development of the Australian economy.


3.4 CONTEXT, PLANNING FRAMEWORK AND STATE/LOCAL GOVERNMENT REQUIREMENTS

The Project will be subject to Commonwealth jurisdiction for offshore infrastructure and the offshore component of the subsea gas-export pipeline, and to Northern Territory jurisdiction for all nearshore and onshore facilities. INPEX will require approvals or permits from Commonwealth, Western Australian state and Northern Territory legislation for different components of the Project as described below.

3.4.1 Commonwealth legislative requirements

Onshore components of the Project will require approval under the EPBC Act due to the potential for impact on “matters of national environmental significance”. In addition, offshore components of the Project may require the following Commonwealth approvals:

- Two pipeline licences may need to be issued under the *Petroleum (Submerged Lands) Act 1967* (Cwlth):
 - a Commonwealth pipeline licence issued by Western Australia’s Department of Industry and Resources (as the “Designated Authority”) for the section of pipeline running through Commonwealth waters adjacent to Western Australia

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 31 of 66
---	--	---

- a Commonwealth pipeline licence issued by the Northern Territory's Department of Primary Industry, Fisheries and Mines for the second section running through Commonwealth waters adjacent to Northern Territory waters.
- A production licence must be obtained from the Department of Resources, Energy and Tourism (DRET) under the *Petroleum (Submerged Lands) Act 1967* (Cwlth).
- Environment plans prepared under the *Petroleum (Submerged Lands) (Management of Environment) Regulations 1999* (Cwlth).

(As noted below, a third pipeline licence will need to be issued by the Northern Territory Government for the pipeline section in the territorial waters within three nautical miles of the Northern Territory coast.)

3.4.2 State/territory legislative requirements


Northern Territory legislative requirements

The Project has been referred to the Environment, Heritage and the Arts Division (EHA) of NRETA via a Notice of Intent (NOI), under the *Environmental Assessment Act 1982* (NT); the NOI was submitted on 27 March 2008. Other Northern Territory legislative consents and licences which may be required by the Project are as follows:

- sacred sites clearance from the Aboriginal Areas Protection Authority under the *Northern Territory Aboriginal Sacred Sites Act 1989* (NT); this has already been received by INPEX
- a waste discharge licence from NRETA under the *Water Act 1992* (NT)
- an environmental protection licence from NRETA under the *Waste Management and Pollution Control Act 1998* (NT)
- a development consent authority from the Department of Planning and Infrastructure (DPI) under the *Planning Act 1999* (NT)
- a pipeline licence from the Department of Primary Industry, Fisheries and Mines under the *Petroleum (Submerged Lands) Act 1981* (NT)
- a pipeline licence, from the Department of Primary Industries, Fisheries and Mines (DPIFM), under the *Energy Pipelines Act 1981* (NT) for the section of the offshore pipeline that runs through Northern Territory waters up to the shore crossing.

Western Australian legislative requirements

The Western Australian Government will have no specific legislative requirements. Its Department of Industry and Resources (DoIR) will continue to operate as the "Designated Authority" for the Commonwealth Department of Resources, Energy and Tourism in Commonwealth waters offshore Western Australia for the following:

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 32 of 66
---	--	---

- the issue of Commonwealth approval for the section of pipeline running through Commonwealth waters adjacent to Western Australia
- the administration of offshore titles, exploration permits, etc., on behalf of the Commonwealth Government
- the administration of the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999 (Cwth) within state-managed jurisdiction.

3.5 ENVIRONMENTAL IMPACT ASSESSMENTS UNDER COMMONWEALTH, STATE OR TERRITORY LEGISLATION

INPEX submitted an NOI to the Northern Territory Government on 27 March 2008. This NOI represents an initial statement of advice to the Northern Territory Government and is intended to initiate the environmental assessment process by the Environment, Heritage and the Arts Division (EHA) of the territory's Department of Natural Resources, Environment and the Arts (NRETA).

The NOI was prepared in accordance with the *Environmental Assessment Act 1982* (NT) and the accompanying Environmental Assessment Administrative Procedures 1984 and is aimed at assisting in the determination of the level of assessment. The level of assessment applied is expected to be a public environmental report (PER) or an environmental impact statement (EIS).


Consultation to date has focused on government agencies, including the Northern Territory's Chief Minister's office, the DPI, NRETA, Darwin Port Corporation and other selected stakeholders such as the Amateur Fishermen's Association of the Northern Territory (AFANT), the Environment Centre Northern Territory and Aboriginal representatives from the Larrakia people.

A comprehensive stakeholder and community consultation program will be undertaken during the environmental impact assessment process and on an ongoing basis throughout the life of the Project.

3.6 A STAGED DEVELOPMENT OR COMPONENT OF A LARGER PROJECT

Provision will be made within the design of the onshore gas-processing plant to allow for an expansion of the facilities. However, any future expansion would be contingent on its economic feasibility and would be subject to a separate environmental assessment process.

For the purposes of this Referral, the Project is not a component of a larger action.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 33 of 66
---	--	---

4 AFFECTED ENVIRONMENT

4.1 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The EPBC Act “Protected Matters search tool” was accessed on the Internet on 5 May 2008 at <<http://www.environment.gov.au/erin/ert/epbc/index.html>> to identify “matters of national environmental significance” (DEWHA 2008). Four separate reports were generated as follows:

- Notional offshore development area—an area search comprising three components: the notional field development area, the notional pipeline development area and the notional fixed-platform development area with a 1-km buffer (Figure 2-1)
- Pipeline Option 1—an area search along the pipeline route direct from the Ichthys Field to the edge of Darwin Harbour with a 1 km buffer (Figure 2-2)
- Pipeline Option 2—an area search along the pipeline route around the Northern Australia Exercise Area with a 1 km buffer (Figure 2-2)
- Onshore development area—point search centred at Blaydin Point with a 20-km buffer to ensure that Darwin Harbour and the onshore areas were included.

The four search reports and the coordinates used are provided in Appendix B which is an attachment to this Referral document.

4.1 (a) World heritage properties

There are no world heritage properties in or adjacent to the offshore or onshore Project area.

4.1 (b) National heritage places

There are no national heritage places in or adjacent to the offshore or onshore Project area.

4.1 (c) Wetlands of international significance (Ramsar)

There are no wetlands of international significance in terms of the Ramsar Convention in or adjacent to the offshore or onshore Project area.

4.1 (d) Listed threatened species and ecological communities

The EPBC Act Protected Matters Report identifies 8 threatened animal species that may inhabit the notional offshore development area, 11 species along the pipeline route and 16 in the onshore development area (Table 4-1 below). There were no differences in the species identified within the two pipeline routes.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
 Revision: 0
 Date: 5 May 2008
 Page No: 34 of 66

Table 4-1: Threatened and migratory species that may inhabit the Project area (DEWHA 2008)

Species	Common name	Status	Notional offshore development area	Pipeline routes and Darwin Harbour	Onshore development area
BIRDS					
<i>Erythrotriorchis radiatus</i>	Red goshawk	Vulnerable			✓
<i>Erythrura gouldiae</i>	Gouldian finch	Endangered/migratory			✓
<i>Geophaps smithii smithii</i>	Partridge pigeon (eastern)	Vulnerable			✓
<i>Tyto novaehollandiae kimberli</i>	Masked owl (northern)	Vulnerable			✓
MAMMALS					
<i>Balaenoptera musculus</i>	Blue whale	Endangered/migratory	✓	✓	
<i>Megaptera novaeangliae</i>	Humpback whale	Vulnerable/migratory	✓	✓	
<i>Dasyurus hallucatus</i>	Northern quoll	Endangered			✓
<i>Xeromys myoides</i>	Water mouse	Vulnerable			✓
<i>Saccolaimus saccolaimus nudicluniatus</i>	Bare-rumped sheath-tail bat	Critically endangered			✓
REPTILES					
<i>Chelonia mydas</i>	Green turtle	Vulnerable/migratory	✓	✓	✓
<i>Dermochelys coriacea</i>	Leatherback turtle	Vulnerable/migratory	✓	✓	✓
<i>Natator depressus</i>	Flatback turtle	Vulnerable/migratory	✓	✓	✓
<i>Caretta caretta</i>	Loggerhead turtle	Endangered/migratory	✓	✓	✓
<i>Eretmochelys imbricata</i>	Hawksbill turtle	Vulnerable/migratory	✓	✓	✓
<i>Lepidochelys olivacea</i>	Pacific (olive) ridley turtle	Endangered/migratory		✓	✓




INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
 Revision: 0
 Date: 5 May 2008
 Page No: 35 of 66

SHARKS					
<i>Rhincodon typus</i>	Whale shark	Vulnerable/migratory	✓	✓	✓
<i>Pristis microdon</i>	Freshwater sawfish	Vulnerable		✓	
<i>Pristis zijsron</i>	Green sawfish	Vulnerable		✓	
PLANTS					
<i>Ptychosperma bleeseri</i> *	Darwin palm	Endangered			✓
<i>Typhonium taylori</i>	A herb of the arum family	Endangered			✓

* Now *Ptychosperma macarthurii*.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 36 of 66
---	--	---

4.1 (e) Listed migratory species

There are 45 listed migratory species that may inhabit the offshore and onshore Project area (DEWHA 2008). Ten of these migratory species are also identified as threatened species and are listed in Table 4-1 above; the remainder are presented in Table 4-2 below. It should be noted that some species occur in more than one category (e.g. the cattle egret is listed as a migratory wetland bird and a migratory marine bird).

4.1 (f) Commonwealth marine areas

The proposed offshore production facilities and pipeline will be situated in the Commonwealth marine environment. The EPBC Act Protected Matters Report for the notional offshore development area and the alternative pipeline routes identified 115 species covered by the marine provisions of the EPBC Act that may be present. These are:

- 23 bird species
- 1 mammal species (dugong)
- 34 species of fish (pipefish, seahorses and pipehorses)
- 31 species of reptiles (seasnakes, turtles and a crocodile species)
- 24 species of cetaceans (including the 10 whale and dolphin species listed in Table 4-1 above and Table 4-2 below).

Some of the bird, seasnake, turtle and cetacean species may transit through the area but no critical habitats have been identified at the Ichthys Field or along the pipeline routes. Project activities will be significantly remote from islands or reefs that could be expected to provide critical resource needs.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
 Revision: 0
 Date: 5 May 2008
 Page No: 37 of 66

Table 4-2: Migratory species that may inhabit the Project area (DEWHA 2008)

Species	Common name	Notional offshore development area	Pipeline routes and Darwin Harbour	Onshore development area
MARINE BIRDS				
<i>Apus pacificus</i>	Fork-tailed swift		✓	✓
<i>Ardea Alba</i>	Great egret, white egret		✓	✓
<i>Ardea ibis</i>	Cattle egret		✓	✓
<i>Sterna albifrons</i>	Little tern		✓	✓
<i>Calonectris leucomelas</i> (= <i>Puffinus leucomelas</i>)	Streaked shearwater	✓	✓	
MARINE MAMMALS				
<i>Balaenoptera edeni</i>	Bryde's whale	✓	✓	
<i>Balaenoptera bonaerensis</i>	Antarctic minke whale	✓	✓	
<i>Dugong dugon</i>	Dugong		✓	
<i>Orcaella brevirostris</i> *	Irrawaddy dolphin*		✓	
<i>Orcinus orca</i>	Killer whale, orca	✓	✓	
<i>Sousa chinensis</i>	Indo-Pacific humpback dolphin		✓	
<i>Tursiops aduncus</i> (Arafura/Timor Sea)	Spotted bottlenose dolphin		✓	
<i>Physeter macrocephalus</i>	Sperm whale	✓	✓	
REPTILES				
<i>Crocodylus porosus</i>	Estuarine crocodile, saltwater crocodile			✓



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN


Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 38 of 66

TERRESTRIAL BIRDS				
<i>Coracina tenuirostris melvillensis</i>	Melville cicadabird		✓	✓
<i>Haliaeetus leucogaster</i>	White-bellied sea-eagle		✓	✓
<i>Hirundo rustica</i>	Barn swallow		✓	✓
<i>Merops ornatus</i>	Rainbow bee-eater		✓	✓
<i>Poecilodryas superciliosa cervinientris</i>	Derby white-browed robin		✓	✓
<i>Rhipidura rufifrons</i>	Rufous fantail		✓	✓
WETLAND BIRDS				
<i>Actitis hypoleucos</i>	Common sandpiper		✓	✓
<i>Ardea alba</i>	Great egret, white egret		✓	✓
<i>Ardea ibis</i>	Cattle egret		✓	✓
<i>Arenaria interpres</i>	Ruddy turnstone		✓	✓
<i>Calidris alba</i>	Sanderling		✓	✓
<i>Calidris tenuirostris</i>	Great knot		✓	✓
<i>Charadrius leschenaultii</i>	Greater sand plover		✓	✓
<i>Charadrius mongolus</i>	Lesser sand plover, Mongolian plover		✓	✓
<i>Charadrius veredus</i>	Oriental plover, oriental dotterel		✓	✓
<i>Glareola maldivarum</i>	Oriental pratincole		✓	✓
<i>Limosa lapponica</i>	Bar-tailed godwit		✓	✓
<i>Limosa limosa</i>	Black-tailed godwit		✓	✓
<i>Numenius minutus</i>	Little curlew, little whimbrel		✓	✓

	<p>INPEX BROWSE, LTD.</p> <p>ICHTHYS GAS FIELD DEVELOPMENT</p> <p>REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN</p>	<p>Doc No: DEV-EXT-RP-0053</p> <p>Revision: 0</p> <p>Date: 5 May 2008</p> <p>Page No: 39 of 66</p>
---	---	--

<i>Numenius phaeopus</i>	Whimbrel	–	✓	✓
<i>Pluvialis squatarola</i>	Grey plover	–	✓	✓

* In 2005 the “Irrawaddy” dolphins of northern Australia were recognised as a new species, the Australian snubfin dolphin *Orcaella heinsohni* (see <http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=45> (viewed 5 May 2008).

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 40 of 66
---	--	---

4.2 IMPORTANT OR UNIQUE ASPECTS OF THE ENVIRONMENT

4.2 (a) Soil and vegetation characteristics

Soils

At Blaydin Point, the dominant soils on the undulating terrain are shallow (<0.25 m) to moderately deep (0.25 to <0.5 m), very gravelly massive earths. The soils are classified as Rudosols and Yellow Kandosols in the Australian Soil Classification (Isbell 1996). Soils in drainage lines and estuarine frontage are very poorly drained (Hydrosols) and subject to regular or seasonal inundation and waterlogging. A very high risk of occurrence of potential acid sulfate soils is identified in these areas (Isbell 1996). The risk of erosion is moderate to high, due to the intense monsoonal rainfall environment and the structureless nature of soils (Fogarty, Lynch & Wood 1984).

The tidal mudflats surrounding the Blaydin Point site are likely to be similar in nature to those at nearby Wickham Point, that is, composed of Quaternary marine alluvium, of clay, silt and some fine sand (URS 2002).

Vegetation


INPEX has initiated baseline surveys of the Blaydin Point site, and a preliminary vegetation map generated from these surveys is presented in Figure 3-5.

The surveys found that terrestrial vegetation of Blaydin Point comprises eucalyptus woodland, with patches of dense monsoon vine forest. The eucalyptus woodland is dominated by *Eucalyptus tectifica* and *E. polycarpa*, while monsoon vine forest is composed predominantly of *Acacia auriculiformis* (GHD 2007). This vegetation type is of regional conservation interest and is represented in over 35 000 ha regionally, of which approximately 50 ha is found on Blaydin Point.

These areas are surrounded by an area of mixed hinterland closed forest, which gives way to primarily mangrove (*Ceriops* spp.) closed forest and tidal creek forest. These mangrove communities are of regional significance and are included in a conservation zone. Of the 1595 ha of mangroves within Darwin Harbour, 95% are within this conservation zone and 1.5% have been cleared to date in total (Water Monitoring Branch 2005).

The northern and eastern shoreline edges of Blaydin Point are lined by *Sonneratia* woodland. Limited areas of salt flat and *Avicennia* open forest also occur on Blaydin Point (GHD 2007).

The surveys found only one plant species listed as threatened under Northern Territory legislation (the *Territory Parks and Wildlife Conservation Act 1980*). This is the cycad *Cycas armstrongii*, which is endemic to the territory and classed as vulnerable. Although it is locally abundant across the western Darwin region, the Cobourg Peninsula and the Tiwi Islands, it is listed as vulnerable because of its poor representation in conservation reserves (approximately 1%), and because its preferred habitat of deep loamy soils is favoured for agriculture, horticulture and

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 41 of 66
---	--	---

forestry (GHD 2007). Apart from land clearing, the most significant threat to the population of *C. armstrongii* is fire.

4.2 (b) Water flows, including rivers, creeks and impoundments

Blaydin Point is on the central northern tip of the Middle Arm Peninsula, and consists of an “island” surrounded by intertidal flats, which are inundated at high tide. There are no rivers or creeks traversing the onshore Project area, although a tidal creek runs down the western side of the site.

The phreatic groundwater table varies seasonally by up to 10 m and discharges to the drainage lines and estuarine fringes (Fogarty, Lynch & Wood 1984).

4.2 (c) Outstanding natural features, including caves

As described in Section 4.2 (a), the Blaydin Point onshore Project site contains patches of monsoon vine forest, and is fringed by mangrove communities. INPEX has been advised by the Northern Territory regulatory agencies that both these communities are considered of conservation value within the region.

There are no other significant natural features in the onshore or offshore Project areas.

4.2 (d) Gradient

The onshore Project area is relatively low-lying. Fogarty, Lynch and Wood (1984) described the terrain at Blaydin Point as gently undulating (1–3% slope) to undulating (3–10%) rises with less than 30 m relief.

Within the nearshore Project area, a 20-m-deep channel extends down the centre of Darwin Harbour, from Darwin port limits to the confluence of Middle Arm and East Arm. The channel favours the eastern side of the harbour, with broad shallower areas, intertidal flats and shoals occurring on the western side (URS 2002).

The channel continues into East Arm, towards Blaydin Point, at water depths of >15 m LAT (Lowest Astronomical Tide); the bathymetry in this area has been modified by previous dredging for the East Arm Port development (URS 2002).

A slightly deeper channel extends into Middle Arm, up to the western side of Channel Island. A shallower channel (generally at depths of <10 m LAT) separates Wickham Point from Channel Island and terminates in Jones Creek.

Depths along the pipeline route start at 250 m at the Ichthys Field, decreasing to between 50–150 m for approximately 700 km, then decreasing gradually until reaching the shore-crossing location at Blaydin Point. A detailed topographic survey of the sea floor has not yet been conducted but will be undertaken after the pipeline route has been finalised, in order to inform the final pipeline design.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 42 of 66

4.2 (e) Buildings or other infrastructure

There are no existing buildings or other infrastructure at the Blaydin Point onshore Project site. Nearby on the Middle Arm Peninsula there is an access road to the Darwin LNG Plant on Wickham Point. The Channel Island power station is also located in close proximity to the Middle Arm Peninsula, to the south-west of the Project area.

In the nearshore area, the Bayu-Undan pipeline extends through the harbour to the Darwin LNG Plant. Underwater power and communication cables also extend across the harbour on the seafloor between Mandorah and Myilly Point (URS 2002).

4.2 (f) Marine areas

Notional offshore development area

The Ichthys Field lies 220 km from mainland Western Australia on the North West Shelf, in water depths of 230–280 m. The seabed in the vicinity of the well field is predominantly silty mud with heavy bioturbation (mixing of sediments by burrowing organisms).


Soft substrates are typical of deep continental-shelf seabeds and this habitat type is very widely distributed in the deeper parts of the North West Shelf. INPEX has conducted ROV and grab sample investigations in the vicinity of the Ichthys Field in order to gain a better understanding of the seabed.

Pipeline routes

The pipeline routes from the Ichthys Field to the entrance to Darwin Harbour have not yet been surveyed. Information on the seabed characteristics along the pipeline routes is based on publicly available broad-scale mapping carried out and collated by various organisations such as Geoscience Australia.

Between the Ichthys Field and Darwin Harbour, both pipeline route options initially cross the Oceanic Shoals Bioregion designated by IMCRA (Interim Marine and Coastal Regionalisation of Australia) followed by a relatively short section of the Bonaparte Bioregion and finally the Anson–Beagle Bioregion. The seabed along the routes across the Oceanic Shoals and Bonaparte bioregions is predominantly composed of sands with areas of silty sands-muds generally associated with the lee of basins or palaeochannels. Nearer to shore the pipeline routes cross the northern part of the Anson–Beagle Bioregion which is characterised by gravelly sands, indicative of the significant input of sediments from terrigenous sources.

A portion of Pipeline route Option 2 parallels the existing Bayu-Darwin pipeline. The seabed habitats along this portion of Option 2 have been described by LeProvost Dames & Moore (1997) as predominantly silty sands with some ribbons of mobile, megarippled coarser sands. To the north of Charles Point, there are frequent sand waves (up to 3.5 m high). There are also isolated areas of calcarenite outcrops and

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 43 of 66
---	--	---

scarps (LDM 1997), although the pipeline will be routed to avoid these where practicable.

Darwin Harbour

The Blaydin Point onshore development area is situated on the banks of Darwin Harbour, a large tidal estuary that experiences large semidiurnal tides (up to 8 m) and marked fluctuations in salinity due to freshwater inflows during the annual wet season.

Darwin Harbour has a complex assemblage of habitat types, with large differences in the extent of these. Many of the habitats are present as small units on a single shoreline, with complex habitats such as rocky shores, mangroves and mudflats all occurring within a small area (URS 2002).

4.2 (g) Kinds of fauna

Notional offshore development area


The soft sandy substrate of the Ichthys Field generally supports a diverse infaunal assemblage dominated by polychaetes and crustaceans that are widely distributed in the region. These bare substrates do not favour the development of diverse epibenthic communities.

Surveys conducted by INPEX identified a range of benthic communities, with composition influenced by substrate type, water depth and probably current regime. Deeper areas (150–250 m) generally supported very sparse benthic communities. Soft substrates supported few species of epibenthic organisms. Hard substrates were colonised by a more diverse assemblage, with species decreasing in density with decreasing depth. The more common epibenthic organisms associated with areas of hard substrate included sponges, gorgonians, crinoids and black corals, in low to medium densities. Species density also appeared to relate to sediment movement and seabed profile, with higher-profile features supporting significantly more abundant communities than the flatter pavements.

Pipeline routes

Pipeline routes surveys will be conducted as part of the environmental assessment process. However, it is likely that the benthic communities the pipeline will traverse will be similar in nature to those within the Bayu-Undan pipeline corridor. The predominant benthic fauna of the soft substrate areas are expected to be polychaete worms and amphipods (small shrimp-like crustaceans) with lower abundances of solitary corals, gastropod and bivalve molluscs, brittlestars and a variety of other crustaceans (LDM 1997).

Any areas of subtidal hard substrate within the pipeline corridors are likely to be colonised by epibenthic biota, predominantly sponges and soft corals, the latter including gorgonian sea fans and sea whips, and potentially some scattered hard corals (LDM 1997).

	<p>INPEX BROWSE, LTD.</p> <p>ICHTHYS GAS FIELD DEVELOPMENT</p> <p>REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN</p>	<p>Doc No: DEV-EXT-RP-0053</p> <p>Revision: 0</p> <p>Date: 5 May 2008</p> <p>Page No: 44 of 66</p>
---	---	--

Darwin Harbour

Major biota communities within the Darwin Harbour include the following:


- rocky shore communities, particularly in the intertidal zone, which are dominated by gastropods, chitons, bivalves, barnacles and *Galeolaria* worms
- mangroves, with associated rich assemblages of invertebrate fauna
- benthic fauna, including amphipod crustaceans and polychaete worms, which provide a food source for fish and birds
- algal and sponge communities that have been found to be a food source for dugongs (Whiting 2001)
- coral communities, which are scattered as individual coral heads or colonies, not continuous reefs. Soft corals were found to be abundant on intertidal rock platforms at Wickham Point, along with sponges and mushroom-shaped ascidians (tunicates)
- seagrasses, in sparse beds, and with limited distribution
- subtidal pavement biota, such as sponges, soft corals and gorgonian whips, in locations where strong currents flow
- fish, of both resident benthic and transient pelagic species, in high abundance
- reptiles, including turtles and saltwater crocodiles
- mammals, including dugongs, Indo-Pacific humpback dolphins and Irrawaddy river dolphins (the Australian populations of which have recently been described as a new species *Orcaella heinsohni*, the Australian stumpfin dolphin) (URS 2002).

The corals found in Darwin Harbour are those which are tolerant of conditions which exclude the majority of coral species; these include variable salinity, high turbidity and sedimentation. It is likely that at least those individual animals living well within the harbour, such as the portion of the National Estate-registered coral area at Channel Island, are in suboptimal habitats and are naturally stressed (LDM 1997). Also, knowledge to date of the fish and invertebrate species living in Darwin Harbour suggests that there is a broad distribution of the majority of marine species and few, if any, species that would be restricted to the harbour itself. Instead Darwin Harbour is one of many areas inhabited by the broader range of species (URS 2004).

Onshore development area

Detailed fauna studies of the Project area have commenced, including desktop studies of available databases and field surveys. These studies aim to characterise the habitats and species present within the area and provide an assessment of their local, regional and national significance.

Surveys conducted by INPEX in the dry season of 2007 (GHD 2007) recorded one bat species (*Mormopterus loriae ridei*) and little evidence of ground-dwelling

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 45 of 66
---	--	---

mammals with only one mammal, the cosmopolitan pest species *Rattus rattus* recorded during the trapping regime.

Of the 67 bird species observed, the most abundant and widespread was the white-throated honey eater (*Melithreptus albogularis*) followed by the little friarbird (*Philemon citreogularis*). Honeybirds (family Meliphagidae) were the most abundant and species-rich of groups followed by the fantails and flycatchers (family Dicruridae).

A total of 14 species of reptile and 5 species of amphibians were recorded, including the introduced cane toad, *Bufo marinus*.

4.2 (h) Current state of the environment

Notional offshore development area

Although the environment in the offshore development area can be considered to be virtually undisturbed, petroleum companies have been undertaking seismic surveys and exploratory drilling for potential oil and gas fields within the Browse Basin region for several years. Petroleum seismic surveys and exploration may cause low levels of disturbance; such as release of contaminants from drilling operations.

Pipeline routes

The pipeline routes traverse largely undisturbed seabed habitat. The routes pass through areas where trawl fisheries operate and there may therefore be some pre-existing disturbance to the seabed in these areas.


Once the pipeline enters Darwin Harbour, it will run parallel with the existing Bayu-Undan pipeline which is in a previously disturbed area. For Option 1 that passes through the military zone of the Northern Australia Exercise Area, the INPEX pipeline will meet the Bayu-Undan pipeline at the entrance to Darwin Harbour and run parallel with it for approximately 30 km. Option 2 which circumvents the military zone parallels the Bayu-Undan pipeline for approximately 330 km.

Current uses (see Section 4.2 (m)) are unlikely to have had significant adverse environmental impacts.

Darwin Harbour

There is no evidence of widespread contamination impacts on sediment and water quality, although localised impacts can be identified such as elevated concentrations of metals at the Iron Ore Wharf and Darwin central business district, associated with past loading practices of ore concentrate (Padovan 2003).

No designated marine pest species have become established within Darwin Harbour (Russell and Hewitt 2000). However, ongoing monitoring and early

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 46 of 66
---	--	---

detection measures are required to prevent the spread of marine pests through containment and eradication.

Discharge of treated sewage and stormwater from urbanised areas also contributes to areas of localised lower water quality (Padovan 2003).

Onshore development area

The onshore development area is currently natural vegetation as described in Section 4.2 (a) and includes animals as described in Section 4.2 (g).

The declared weed *Lantana camara* has been recorded on nearby Wickham Point (URS 2002); at this stage its presence at Blaydin Point has not been confirmed. Lantana is a Class B/C weed (growth and spread to be controlled) under the *Weeds Management Act 2001* (NT) (NRETA 2007).

The onshore development area is inhabited by cane toads (*Bufo marinus*) and the black rat (*Rattus Rattus*) and indirect evidence has been recorded of feral pigs (*Sus scrofa*) on Blaydin point (GHD 2007). Other feral animals are likely to inhabit the area.

In addition, there are a number of human uses to the area (Section 4.2 (m)) which have caused low levels of disturbance through the creation of recreational vehicle tracks and informal camping grounds.

4.2 (i) Commonwealth Heritage Places and places on the Register of the National Estate

Not applicable. As the proponent is not a Commonwealth agency, and the proposal will not affect Commonwealth land, the proponent is not required to address this section.

4.2 (j) Known Indigenous heritage values


Not applicable. As the proponent is not a Commonwealth agency, and the proposal will not affect Commonwealth land, the proponent is not required to address this section.

An archaeological survey was commissioned by the Northern Territory Government. The report found that all of the Indigenous archaeological sites identified in the Project area at Blaydin Point can be managed appropriately. A Heritage Management Plan will be developed for this purpose.

4.2 (k) Other important or unique values of the environment

Maritime archaeology within Darwin Harbour

The Northern Territory Heritage Register, maintained by NRETA, shows that the wreck of the SS *Ellengowan* is located in the vicinity of the preferred nearshore pipeline alignment in Darwin Harbour. This is the oldest known shipwreck in Darwin

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 47 of 66
---	--	---

Harbour and is one of the earliest examples of shipping associated with European settlement in the area. It is a unique example of nineteenth-century maritime history in the Northern Territory and is the only known Norwegian-built iron steamer remaining in Australian waters. Therefore, its significance to maritime archaeology is rated highly (NRETA 2008b).

Other marine archaeological sites, including Second World War heritage sites and plane wrecks, also occur in the vicinity of the Project area within Darwin Harbour.

4.2 (l) Tenure of the action area (e.g. freehold, leasehold)

Notional offshore development area

The exploration permit WA-285-P R1 lies solely within Commonwealth waters. INPEX is the Operator and 76% equity holder of this permit, with Total E&P Australia holding a 24% participating interest. At the appropriate time in the development schedule, a portion of WA-285-P R1 will be subject to the acquisition of a production licence and will convert to a Production Area.

Onshore development area

The Project site on Blaydin Point is currently unallocated Crown land falling within the jurisdiction of the Litchfield Shire Council. The site is zoned for development, according to the Northern Territory Planning Scheme (DPI 2008)


4.2 (m) Existing land uses

Notional offshore development area and pipeline routes

The Ichthys Field and surrounding waters are utilised by the Royal Australian Navy, Australian and Indonesian fishing operations, commercial shipping operations and other petroleum development enterprises. There are numerous exploration activities under way within the Browse Basin. Eight exploration wells have been drilled by INPEX in the Ichthys Field. Other petroleum operations include the FPSOs *Jabiru Venture* and *Challis Venture*.

The two pipeline routes between the Ichthys Field and the Darwin Harbour entrance also traverse several commercial fisheries (LDM 1997):

- the Commonwealth-administered Northern Prawn Fishery. Most trawling activity takes place well to the north and south of the Bayu-Undan – Darwin pipeline route (and therefore away from INPEX's Option 2 pipeline route), although INPEX's Option 1 route passes through an area of some considerable trawling effort. In addition to restricted access to a very small portion of the trawling grounds during pipeline construction, an exclusion zone may also be designated around the pipeline alignment during the operations phase
- the Commonwealth-administered Western Skipjack, Southern Bluefin Tuna, Western Tuna and Billfish fisheries (though these are not known to be active in the Timor Sea region)

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 48 of 66
---	--	---

- the Northern Territory-administered Demersal, Shark, Spanish Mackerel, Coastal Line and Coastal Net fisheries. A variety of fishing methods are employed, including pelagic gill nets, hook and line, fish traps, cast nets and scoop nets. There may be some temporary limitations to access of some of the fishery areas during pipeline construction, though the only longer-term restrictions are likely to be prohibition of bottom-disturbing activities (such as anchoring) within the pipeline corridor.

Other than commercial fishing activity, water uses outside of Darwin Harbour within the Project area are limited to military exercises within pipeline Option 1 and eco-based tourism within coastal and nearshore waters distant from the pipeline route and offshore facility.

Darwin Harbour

Within Darwin Harbour, the most intensive use of the marine area is for commercial shipping, recreational fishing, tourism and military activities. Darwin Harbour is closed to commercial haul-net fishing and commercial mud-crab fishing. Commercial line fishing and limited gill netting is permitted within the harbour (URS 2002). Underwater power and communication cables extend across the harbour on the seafloor between Mandorah and Myilly Point, and the existing pipeline to the Darwin LNG Plant runs down the western side of the harbour (URS 2002).

The water surrounding Blaydin Point is used for recreational fishing, scuba diving, sailing and general boating. However, tour boats in Darwin tend to avoid the Blaydin Point area because of navigational hazards in the shallow nearshore waters (URS 2002).

Onshore development area


A number of industrial facilities are in operation on the Middle Arm Peninsula and Channel Island. These include the Darwin LNG Plant and the Channel Island power station and a number of aquaculture ventures including the Darwin Aquaculture Centre (URS 2002).

There is a sealed gazetted road passing adjacent to the proposed onshore development area leading to the ConocoPhillips Darwin LNG Plant. Other access and vehicle tracks at Blaydin Point are not maintained but are used for recreational purposes. There is evidence of recreational activity throughout Blaydin Point (e.g. informal camping and fishing areas).

There are also a number of borrow pits on Middle Arm Peninsula including a larger one within the Project area adjacent to the proposed administration facilities (Figure 3-3).

4.2 (n) Proposed land uses

The Northern Territory Government has zoned Blaydin Point on the Middle Arm Peninsula for development under the Northern Territory Planning Scheme 2008

	<p style="text-align: center;">INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN</p>	<p>Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 49 of 66</p>
---	--	---

(DPI 2008). Middle Arm Peninsula has been specifically allocated as an area for LNG development.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
Basin AND BLAYDIN POINT, DARWIN

Doc No: DEV-EXT-RP-0053

Revision: 0

Date: 5 May 2008

Page No: 50 of 66

5 NATURE AND EXTENT OF LIKELY IMPACTS

5.1 LIKELY IMPACTS ON MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

5.1 (a) Likely impact on the world heritage values of a declared world heritage property

There are no world heritage properties in or adjacent to the offshore or onshore Project areas.

5.1 (b) Likely impact on the heritage values of a listed national heritage place

There are no national heritage places in or adjacent to the offshore or onshore Project areas.

5.1 (c) Likely impact on the ecological character of a declared Ramsar wetland

There are no wetlands declared in terms of the Ramsar Convention in or adjacent to the offshore or onshore Project areas.

5.1 (d/e) Likely impact on the members of a listed threatened species or a listed migratory species, or their habitat

A number of threatened or migratory species or their habitat have been identified as being potentially present in the Project area (Table 4-1 and Table 4-2 above). The results from the EPBC database search give a relatively coarse assessment of the presence or absence of species which may not actually be present or utilise the Project area.

To ground-truth the database results, INPEX has been conducting baseline ecological surveys to identify listed threatened species, and potential breeding or roosting areas within the notional offshore development areas as well as the onshore development area at Blaydin Point.

Vessel transect, aerial and acoustic monitoring surveys of the Ichthys Field and inshore Kimberley waters were initiated in 2006 to determine the importance of these areas to cetaceans and other marine megafauna. In total, 19 species of whales and dolphins have been recorded through the surveys. Minke whales (*Balaenoptera acutorostrata*) of the dwarf minke and possibly Antarctic minke subspecies were recorded in the Browse Basin which may represent a feeding habitat for these whales while they are passing through. Pygmy blue whales (*Balaenoptera musculus brevicauda*) were recorded passing through the Browse Basin during October 2006. Whether this represents an annual migration or an opportunistic feeding event remains unknown. Humpback whales (*Megaptera novaeangliae*) have been identified in the Browse Basin between August and October during the peak of the annual migration from Antarctic feeding grounds to



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
Basin and Blaydin Point, Darwin

Doc No: DEV-EXT-RP-0053

Revision: 0

Date: 5 May 2008

Page No: 51 of 66

breeding and calving grounds in the Kimberley region. Most humpback whales were recorded well inshore of the Ichthys Field with the highest densities in Pender Bay and Camden Sound between late August and early September. These areas have been identified as important calving areas in this and previous studies. Fifteen species of toothed whales and dolphins were observed in the Browse Basin with large pods of dolphins common in offshore areas (Centre for Whale Research 2007). The notional offshore development area is not considered to provide any critical feeding, breeding or resting habitat for the species identified.


INPEX has also conducted preliminary flora and fauna studies of the onshore development area. These surveys recorded no significant plant and animal species within the onshore and nearshore development area (GHD 2007). However, the northern quoll (*Dasyurus hallucatus*) has previously been recorded on Middle Arm Peninsula and may use the Blaydin Point area. Loss of habitat is not considered to be a threat to the northern quoll population; rather the species is highly susceptible to cane toad poisoning and has declined or disappeared in areas of the Northern Territory where cane toads have recently invaded (NRETA 2008a).

Potential impacts from the Project on those species identified from the EPBC database search may result from the following:

- noise and physical disturbance to whales in offshore areas causing avoidance behaviour or physical injury
- accidental hydrocarbon and chemical spills
- habitat disturbance and displacement during construction of the onshore facilities, due to clearing of approximately 300 ha of vegetation on Blaydin Point and adjoining areas on Middle Arm Peninsula.

The impacts from these activities on threatened or migratory species will be limited due to the following factors:

- the small number of recorded threatened or migratory species within the Project area (offshore, pipeline route and onshore development areas)
- the lack of sensitive cetacean habitat, such as feeding, breeding or resting grounds within the notional offshore development area and pipeline routes
- the fact that there will be only localised and transient disturbance from drilling, subsea and production facility installation
- the slow movement of the offshore pipelay barge allowing animals adequate time for avoidance
- the fact that there will be little or no direct disturbance to potential foraging areas for dugongs and turtles
- the absence of suitable habitat for turtles along the shorelines around Middle Arm Peninsula
- the fact that vegetation associations in the Project area are well represented throughout the Darwin and broader Northern Territory region

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 52 of 66
---	--	---

- the low disturbance levels associated with offshore and onshore operational activities.

For the above reasons, the likelihood of significant impacts on “matters of national environmental significance” is expected to be low.

5.1 (f) Likely impact on the environment in part of the Commonwealth marine area

The offshore Project components, including part of the pipeline route, will be undertaken in a Commonwealth marine area and there may be requirements for disposal of dredge spoil within Commonwealth waters.


The seabed habitat within the disturbance footprint of the Project is predominantly sand with areas of silty sands-muds that support sparse and regionally well-distributed benthic communities. Listed bird, seasnake, turtle and cetacean species (as identified by the EPBC database search data in Appendix B, which is an attachment to this Referral document) may transit through the area. However no critical habitats or sensitive ecological receptors have been identified in the vicinity of the Ichthys Field or pipeline routes.

Activities associated with the offshore components will be typical of offshore petroleum production operations. Potential impacts from may result from noise and physical disturbance, liquid discharges and drill cuttings associated with drilling and installation of the offshore facilities and pipeline. These are predicted to be temporary and localised in effect.

Noise from drilling activities and operation of vessels and equipment at the field may induce disturbance behaviour or route alteration in migratory species but no significant physical disturbance is anticipated. Drilling and liquid discharges such as produced water and cooling water will be discharged from the offshore facility into deep water that will result in rapid dispersion and dilution.

There are also established management controls that will minimise the risk of significant impacts. These include the Western Australian *Guidelines on minimising acoustic disturbance to marine fauna, guidelines for drilling fluids management*, published by the Department of Industry and Resources, and management of liquid discharges through compliance with the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999 (Cwlth). Impacts associated with the offshore activities will be managed through an approved environmental management plan which examines the environmental risks and management measures.

Disturbance from sedimentation and potential contamination associated with offshore dredge spoil disposal will be examined through the formal assessment of dredge spoil disposal options in consultation with regulatory authorities and other stakeholders. The final dredge spoil disposal ground will be located away from sensitive environmental receptors.

	<p style="text-align: center;">INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN</p>	<p>Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 53 of 66</p>
---	---	--

In the unlikely event of an accidental hydrocarbon or chemical spill, an approved oil spill contingency plan will be in place to ensure the impacts are short-term and localised.

5.2 LIKELY IMPACTS FOR NUCLEAR ACTIONS, ACTIONS AFFECTING COMMONWEALTH LAND OR ACTIONS TAKEN BY THE COMMONWEALTH

Not applicable; the Project is not a nuclear action.



6 MEASURES TO AVOID OR REDUCE IMPACTS

As part of INPEX's commitment to undertaking its operations in an environmentally responsible manner, management measures for the avoidance and minimisation of impacts will be identified and incorporated into an environmental management program. This program is outlined below.

6.1 ENVIRONMENTAL MANAGEMENT PROGRAM

A suite of environmental management plans (EMPs) will be developed for the Project for key environmental aspects that have the potential to impact on the environment from construction through to operation. The EMPs will outline the potential impacts, describe INPEX's objectives, targets and key management measures, and detail indicators for monitoring, reporting and auditing requirements.


6.1.1 Onshore environment plans

A conceptual list of the EMPs that could be required for the Project at the Blaydin Point site is presented in Table 6-1 below.

Table 6-1: List of EMPs that may be required for the Project

Title
Air Emissions Management Plan
Noise and Vibration Management Plan
Visual Impact Management Plan
Liquid Discharge and Drainage Management Plan
Waste Management Plan
Dust Management Plan
Fire Management Plan
Clearing and Rehabilitation Management Plan
Acid Sulfate Soils Management Plan
Dredging Management Plan
Onshore Spill Management Plan
Greenhouse Gas Management Plan
Quarantine Management Plan

INPEX will develop provisional EMPs to serve as a guide for the development of more detailed construction EMPs (CEMPs) and eventual operational EMPs (OEMPs). Contracts tendered for the design, construction and commissioning of the Project will specifically detail the requirements for contractors with respect to EMP implementation.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 55 of 66
---	--	---

Contractors appointed to undertake construction activities will prepare CEMPs relevant to their activities. Prior to commencement, INPEX will review and approve CEMPs to ensure that they are consistent with the provisional EMPs and meet all the commitments made under the environmental approvals process for the Project, and any other legislative requirements and “ministerial conditions”.


6.1.2 Offshore environment plans

In addition to the EMPs, environment plans (EPs) will be produced for offshore activities in Commonwealth waters as required by the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999 (Cwlth). Activities that will have EPs include the following:

- drilling
- installation of the offshore facilities (including the CPF, FPSO and flowlines)
- installation of the pipeline (for both Northern Territory and Commonwealth waters)
- operation of the offshore facilities.

Final requirements for the activities to be covered in the EPs will be determined through consultation with the Designated Authority. The Designated Authority for Commonwealth waters offshore Western Australia is the DoIR; The Designated Authority for Commonwealth waters offshore the Northern Territory is the territory’s Department of Primary Industry, Fisheries and Mines.

In addition, one oil-spill contingency plan will be prepared to address offshore and inshore risks and will be approved by the appropriate authorities. INPEX currently has an approved plan for the drilling operations being conducted at the Ichthys Field and nearshore in the Kimberley. This plan will be updated to reflect changes in the Project’s scope and will also cover activities in the nearshore environment and Darwin Harbour.


	<p>INPEX BROWSE, LTD.</p> <p>ICHTHYS GAS FIELD DEVELOPMENT</p> <p>REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN</p>	<p>Doc No: DEV-EXT-RP-0053</p> <p>Revision: 0</p> <p>Date: 5 May 2008</p> <p>Page No: 56 of 66</p>
---	---	--

6.2 MONITORING ENVIRONMENTAL PERFORMANCE

An environmental monitoring program will be developed for the Project, which will aim to:

- identify environmental change, in particular changes that occur as a result of Project development activities
- validate modelling results (actual versus predicted results)
- contribute to reviews of environmental management procedures
- provide data for assessing adherence to EMPs and EPs and compliance with regulatory requirements.

Indicators to be monitored will be determined according to the extent and nature of potential environmental impacts identified during the environmental assessment process, and in consultation with the Northern Territory Government and other stakeholders.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 57 of 66
---	--	---

7 CONCLUSION ON THE LIKELIHOOD OF SIGNIFICANT IMPACTS

Do you THINK your proposed action is likely to have significant impacts?	
✓	No, complete Section 7.1
	Yes, complete Section 7.2

7.1 PROPOSED ACTION IS NOT LIKELY TO HAVE SIGNIFICANT IMPACTS

7.1.1 Key reasons

The Project is not likely to have a significant impact on “matters of national environmental significance” as identified in Section 4.2, namely listed threatened species, listed migratory species and the Commonwealth marine environment.

Environmental impacts associated with the Project will be localised and transitory. There are no significant impacts predicted to occur to the marine habitats or communities present in the Project area or to any critical resources for threatened and migratory species. The onshore development area on the Middle Arm Peninsula will occur within an area zoned for industrial development and is already subject to developments such as the ConocoPhillips LNG Plant at Wickham Point. Current industry within Darwin Harbour has associated commercial shipping activities and a number of previous dredging programs have been undertaken.

INPEX has assessed that the impacts associated with the project are non-significant based on the criteria as provided in the EPBC Act Policy Statement 1.1 *Significant impact guidelines: Matters of national environmental significance*. Impacts from the Project will not:

- lead to a long-term decrease in sizes of populations of threatened species
- reduce the area of occupancy of threatened species
- fragment existing populations of threatened species into two or more populations
- adversely affect habitat critical to the survival of threatened or migratory species
- disrupt the breeding cycles of threatened species
- modify, destroy, remove, isolate or decrease the availability of quality habitat to the extent that threatened or migratory species are likely to decline
- modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in a Commonwealth marine area results
- result in harmful invasive species becoming established in the habitats of threatened or migratory species, or in the Commonwealth marine area



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
Basin and Blaydin Point, Darwin

Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 58 of 66

- introduce disease that may cause threatened species to decline
- interfere with the recovery of threatened species
- seriously disrupt the life cycle (breeding, feeding, migration or nesting behaviour) of an ecologically significant proportion of a population of any migratory species
- result in a known or potential pest becoming established in the Commonwealth marine area
- have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (e.g. breeding, feeding, migration behaviour and life expectancy) and spatial distribution
- result in a substantial change in air or water quality (including temperature) which may adversely impact on biodiversity, ecological integrity, social amenity or human health
- result in persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the Commonwealth marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected
- have a substantial adverse impact on heritage values of the Commonwealth marine area, including damage or destruction of a historic shipwreck.

7.2 PROPOSED ACTION IS LIKELY TO HAVE SIGNIFICANT IMPACTS

Matters likely to be impacted	
	sections 12 and 15A (World Heritage)
	sections 15B and 15C (National Heritage places)
	sections 16 and 17B (Wetlands of international importance)
	sections 18 and 18A (Listed threatened species and communities)
	sections 20 and 20A (Listed migratory species)
	sections 21 and 22A (Protection of the environment from nuclear actions)
	sections 23 and 24A (Marine environment)
	sections 26 and 27A (Protection of the environment from actions involving Commonwealth land)
	section 28 (Protection of the environment from Commonwealth actions)

Key reasons

Not applicable.



INPEX BROWSE, LTD.
ICHTHYS GAS FIELD DEVELOPMENT
REFERRAL OF PROPOSED ACTION—BROWSE
BASIN AND BLAYDIN POINT, DARWIN


Doc No: DEV-EXT-RP-0053
Revision: 0
Date: 5 May 2008
Page No: 59 of 66

8 ASSESSMENT APPROACH UNDER THE EPBC ACT

Level of assessment	
x	Bilateral Agreement applies
	Accredited assessment
	Assessment on referral information
	Preliminary information
x	Public Environment Report
	Environmental impact statement
	Commission of Inquiry
	No comment/Not sure

Key reasons

It is recognised that development of a project of this scale within Darwin Harbour will attract high levels of public interest and careful management will be required to ensure the protection of environmental and social values. Environmental impacts associated with the Project can be compared to those for similar LNG projects such as the Pluto LNG Development on the Burrup Peninsula which was assessed by the Minister for the Environment at the public environmental report (PER) level in early 2007. INPEX believes that assessment at the PER level will provide for a suitable level of public involvement and formal assessment of the environmental impacts and management measures.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 60 of 66
---	--	---

9 ENVIRONMENTAL HISTORY OF THE RESPONSIBLE PARTY

Does the party taking the action have a satisfactory record of responsible environmental management. If yes, provide details.

INPEX has been operating in the Ichthys Field and the Maret Islands areas since 2000. In this time eight appraisal wells have been drilled and two years of boat-based field studies have been undertaken without any reportable environmental incidents. INPEX has also been acknowledged by the Australian Petroleum Production & Exploration Association (APPEA) which awarded its 2008 Environmental Award (exploration company category) to INPEX for its approach to low environmental impact geotechnical drilling activities on the Maret Islands.

INPEX Browse, Ltd. (INPEX) is a wholly-owned subsidiary company of INPEX CORPORATION. INPEX CORPORATION has been involved in the development of oil and gas resources for more than four decades and has been steadily increasing its exploration and development activities in many countries around the world.

INPEX CORPORATION is currently involved in a number of projects in Australian waters and in the Timor Sea Joint Petroleum Development Area (JPDA). These include the Griffin oil and gas project north of Exmouth and the Bayu-Undan oil and gas project in the JPDA.

During this extensive exploration and production history, INPEX has operated under well-developed management systems and has not experienced any major environmental incidents.

INPEX reports on its global environmental performance annually through its corporate sustainability report. This report is available through the INPEX corporate web site: <<http://www.inpex.com.au>>.


Is the party taking the action subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources? If yes, provide details.

NO.

For an action for which a person has applied for a permit under the EPBC Act, is the person making the application subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?

If yes, provide details.

NO.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 61 of 66
---	--	---

If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework? If Yes, provide details of environmental policy and planning framework.

YES.

INPEX's Environmental Policy is provided on the following page (Figure 9-1 below).

INPEX is committed to delivering energy in a safe and environmentally responsible manner. To assist in meeting this commitment, a Health, Safety and Environmental (HSE) Management Process has been developed. The process is based on a continuous improvement model, as defined within internationally recognised standards *AS/NZS ISO 14001:2004, Environmental management systems—Requirements with guidance for use* and *AS/NZS 4801:2001, Occupational health and safety management systems—Specification with guidance for use*. The Process provides INPEX with a tool for managing the impacts of its activities on the environment, as well as providing a structured approach to planning and implementing environment protection measures.

Ownership of the HSE Management Process resides with INPEX's line managers who will ensure that adequate resources are provided to guarantee the successful implementation and sustainability of the Process.



ENVIRONMENTAL POLICY

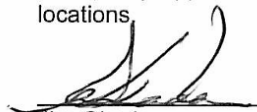
INPEX is an international oil and gas exploration and development company committed to delivering energy in a safe and environmentally responsible manner.

We recognise our responsibility to sustainable development and aim to minimise adverse impacts on the environment.

To implement this policy INPEX will:

- Plan and perform business activities so that negative impacts on the environment are avoided or kept as low as reasonably practicable.
- Comply with all applicable laws and regulations, and apply appropriate standards where laws and regulations do not exist or are considered insufficient.
- Implement and maintain an environmental management process to ensure compliance with obligations and commitments and drive continual improvement in environmental performance.
- Set, measure and review environmental standards, objectives and improvement targets.
- Endeavour to prevent pollution and seek continual improvement with respect to emissions, discharges, wastes, energy efficiency, resource consumption and overall environmental footprint.
- Actively promote the reduction of greenhouse gas emissions across our operations in a safe, technically and commercially viable manner
- Monitor the environment where we operate and adjust our operational approach if required.
- Maintain and regularly test emergency plans to ensure a quick and effective response in the event of emergencies.
- Provide training in environmental activities to ensure all employees are aware of their responsibilities and accountabilities in these areas.
- Communicate openly on environmental issues with stakeholders.
- Ensure that contractors understand and adhere to INPEX's environmental policy and procedures.

This policy applies to all INPEX controlled activities in Australia and related project locations.



Jiro Okada

Managing Director,
INPEX Perth Office




Akinori Sakamoto

Managing Director,
Project Representative Ichthys Project

October 2007

Figure 9-1: INPEX Environmental Policy

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 63 of 66
---	--	---

10 INFORMATION SOURCES AND ATTACHMENTS

10.1 REFERENCES

Centre for Whale Research, 2007. *INPEX environmental impact assessment studies. Technical appendix: Cetaceans and other marine megafauna.* Unpublished report prepared for INPEX Browse, Ltd., Perth, Western Australia.

DPI—see Department of Planning and Infrastructure.

Department of Natural Resources, Environment and the Arts. 2007. *Declared Weeds.* Department of Natural Resources, Environment and the Arts, Darwin. Viewed 20 March 2008, <<http://www.nt.gov.au/nreta/natres/weeds/ntweeds/declared.html#b>>.

Department of Natural Resources, Environment and the Arts. 2008a. *Threatened Species List.* Viewed 17 April 2008, <<http://www.nt.gov.au/nreta/wildlife/animals/threatened/specieslist.html>>.

Department of Natural Resources, Environment and the Arts. 2008b. *NT Heritage Register.* Viewed 17 April 2008, <<http://www.nt.gov.au/nreta/heritage/intregister/>>.

Department of Planning and Infrastructure. 2008. *Northern Territory Planning Scheme: Darwin & Surrounds.* Department of Planning and Infrastructure, Darwin, Northern Territory.

Department of the Environment, Water, Heritage and the Arts. 2008. Protected matters search tool. Viewed 5 May 2008, <<http://www.environment.gov.au/erin/ert/epbc/index.html>>.

DEWHA—see Department of the Environment, Water, Heritage and the Arts.


Fogarty, P.J., Lynch, B., and Wood, B. 1984. *The land resources of the Elizabeth, Darwin and Blackmore Rivers.* Technical Report No. 15. Conservation Commission of the Northern Territory, Darwin.

GHD. 2007. *Report for Blaydin Point Flora and fauna survey; preliminary report dry season survey 2007.* Report prepared for INPEX Browse, Ltd., Perth, Western Australia.

Isbell, R.F. 1996. *The Australian Soil Classification.* CSIRO Publishing, Canberra.

LDM—see LeProvost Dames & Moore.

LeProvost Dames & Moore. 1997. Bayu-Undan to Darwin gas pipeline: Draft environmental impact statement. Appendix D in *Darwin LNG plant draft environmental impact statement.* Report prepared for Phillips Oil Company Australia by Dames & Moore, Perth, Western Australia.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE Basin and Blaydin Point, Darwin	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 64 of 66
---	--	---

NRETA—see Department of Natural Resources, Environment and the Arts.

Padovan, A.V. 2003. *Darwin Harbour water and sediment quality*. pp. 5–18 in Proceedings: Darwin Harbour region—current knowledge and future needs. Department of Infrastructure, Planning and Environment, Darwin.

Russell, B. C. and Hewitt C.L. 2000. *Baseline survey of the Port of Darwin for introduced marine species*. Report to the Northern Territory Department of Transport and Works, Darwin.

URS—see URS Australia Pty Ltd.

URS Australia Pty Ltd. 2002. *Darwin 10 MTPA LNG Facility: Public Environmental Report*. Prepared for Phillips Petroleum Company Australia Pty Ltd, Darwin.

URS Australia Pty Ltd. 2004. *Darwin City Waterfront Redevelopment Project: Draft Environmental Impact Assessment*. Prepared for Department of Infrastructure, Planning and Environment, Darwin.

URS Australia Pty Ltd. 2006. *Downstream plant location study*. Unpublished confidential report (Report No. 42906149/R1200) to INPEX Masela Limited, Jakarta, Indonesia.


Whiting, S. 2001. *Preliminary observations of dugongs and sea turtles around Channel Island, Darwin Harbour*. Report to Power and Water Authority, Darwin.

Water Monitoring Branch. 2005. *The health of the aquatic environment in the Darwin Harbour Region*. Report No. 5/2005D. Natural Resources Management Division, Department of Natural Resources, Environment and the Arts, Darwin.

10.2 RELIABILITY OF INFORMATION

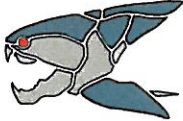
Information presented in this Referral form relating to “matters of national environmental significance” within the Project area is derived from a Protected Matters Report generated using the “Protected Matters search tool” on the EPBC website. A caveat is applied to this information, indicating that the report is a general guide only and is based on the most accurate mapping and registered information held by the Commonwealth’s Department of the Environment, Water, Heritage and the Arts at the time of report production.

The greater part of the remaining information has come from Northern Territory Government web sites, INPEX surveys, previously developed public documents for environmental impact assessment, and peer-reviewed scientific journals. There is no reason to suspect that any of this information could contain errors that would materially affect the conclusions drawn with respect to the potential for the proposed Project to significantly impact upon “matters of national environmental significance”.

	INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN	Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 65 of 66
---	--	---

10.3 ATTACHMENTS

You must attach	
Figures, maps or aerial photographs showing the project locality (Section 2)	See APPENDIX A–Figures
figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 4)	See APPENDIX A–Figures
If relevant, attach	
copies of any state or local government approvals and consent conditions (section 3.4)	
copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 3.5)	
copies of any flora and fauna investigations and surveys (section 4)	
technical reports relevant to the assessment of impacts on protected matters and that support the arguments and conclusions in the referral (section 4 and 5)	
report(s) on any public consultations undertaken, including with Indigenous Stakeholders (section 4).	

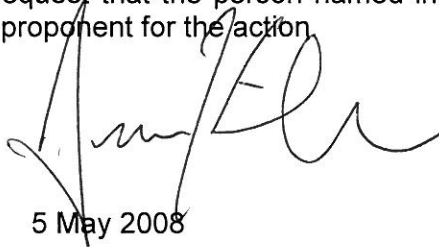
	<p>INPEX BROWSE, LTD. ICHTHYS GAS FIELD DEVELOPMENT REFERRAL OF PROPOSED ACTION—BROWSE BASIN AND BLAYDIN POINT, DARWIN</p>	<p>Doc No: DEV-EXT-RP-0053 Revision: 0 Date: 5 May 2008 Page No: 66 of 66</p>
---	---	--

11 SIGNATURES AND DECLARATIONS

11.1 PARTY WHO PREPARED THE REFERRAL

I declare that the information contained in this form is, to my knowledge, true and not misleading. I request that the person named in Section 11.3 below (if any) be designated as the proponent for the action.

Signature:



Date: 5 May 2008

Full name: Sean Kildare

11.2 PARTY WHO IS RESPONSIBLE FOR ACTION

I declare that the information contained in this form is, to my knowledge, true and not misleading.

Signature:



Date: 5 May 2008

Full name: Jiro Okada

11.3 PROPONENT

As above.