Appendix 23

Visual impact assessment

REPORT

Ichthys Gas Field Development Project

Visual Impact Assessment

Prepared for

INPEX Browse, Ltd.

Level 22, 100 St George's Terrace
Perth 6000 WA

March 2010

INPEX Document No. C036-AH-REP-0034

URS

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Date: March 2010
Reference: 42906736
Status: Rev 6 – Final

This report may be cited as follows:

URS Australia Pty Ltd. 2009. *Ichthys Gas Field Development Project: visual impact assessment*. Report prepared for INPEX Browse, Ltd., Perth, Western Australia

.

Table of Contents

Tables, Figures, Appendices

Tables

Figures

Appendices

Introduction Section 1

1.1 Background

INPEX Browse, Ltd. (INPEX) proposes to develop the natural gas and associated condensate contained in the Ichthys Field in the Browse Basin at the western edge of the Timor Sea about 200 km off Western Australia's Kimberley coast. The field is about 850 km west-south-west of Darwin in the Northern Territory.

The two reservoirs which make up the field are estimated to contain 12.8 tcf (trillion cubic feet) of sales gas and 527 MMbbl (million barrels) of condensate. INPEX will process the gas and condensate to produce liquefied natural gas (LNG), liquefied petroleum gas (LPG) and condensate for export to overseas markets.

For the Ichthys Gas Field Development Project (the Project), the company plans to install offshore facilities for the extraction of the natural gas and condensate at the Ichthys Field and a subsea gas pipeline from the field to onshore facilities at Blaydin Point in Darwin Harbour in the Northern Territory. A two-train LNG plant, an LPG fractionation plant, a condensate stabilisation plant and a product loading jetty will be constructed at a site zoned for development on Blaydin Point. Around 85% of the condensate will be extracted and exported directly from the offshore facilities while the remaining 15% will be processed at and exported from Blaydin Point.

In May 2008 INPEX referred its proposal to develop the Ichthys Field to the Commonwealth's Department of the Environment, Water, Heritage and the Arts and the Northern Territory's Department of Natural Resources, Environment and the Arts. The Commonwealth and Northern Territory ministers responsible for environmental matters both determined that the Project should be formally assessed at the environmental impact statement (EIS) level to ensure that potential impacts associated with the Project are identified and appropriately addressed.

Assessment will be undertaken in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) and the *Environmental Assessment Act* (NT) (EA Act). It was agreed that INPEX should submit a single EIS document to the two responsible government departments for assessment.

URS Australia Pty Ltd was commissioned to carry out environmental work associated with INPEX's preparation of the EIS and this assessment of the visual impacts of the Project was prepared in part fulfilment of that commission.

1.2 Scope of work

This visual impact assessment considers the changes to the day-time and night-time visual amenity of the onshore development area on Blaydin Point, Darwin Harbour, as well as the nearshore area where a jetty is proposed to be installed. The key receptors to visual amenity changes are the Darwin and Palmerston communities, and as such the visual impact assessment is based on the views from key points around the shoreline of Darwin Harbour.

The visual impact assessment was carried out through a process of desktop reviews, site inspections, impact assessment through computer-generated visual simulation modelling, and identification of options that would mitigate any identified visual impacts. These phases are described in more detail as follows:

1) Desktop study

The desktop study included a review of the conceptual layout of the onshore gas-processing facility, including any tall or wide infrastructure such as tanks and stacks, and the jetty and module offloading facility that will extend into Darwin Harbour. This review also allowed for an understanding of the functional design requirements of major infrastructure, such as the necessary height of emission stacks or length of the jetty.

Introduction Section 1

A list of viewpoints of interest to the community from around Darwin Harbour was compiled in consultation with government authorities. A viewshed analysis was undertaken to plot the likely visual catchments of the onshore development area, from the various viewpoints of interest.

2) Site inspection

Site inspections were used to ground-truth the viewshed analysis, and confirm the visual catchments of the onshore development area from the identified viewpoints of interest.

3) Visual simulations

Photographs were taken toward Blaydin Point from each of the viewpoints. Computer-generated visual simulations of the proposed onshore infrastructure and jetty were created on top of digital photography, with appropriate scaling to simulate the view from the human eye. These provide a conceptual demonstration of the changes to visual amenity that could arise from the Project, both during the day and from artificial lighting at night.

4) Assessment of visual impact

In order to quantify the Project's visual impact from different perspectives around Darwin Harbour, the viewpoints were classified in terms of distance, proportion of the view taken up by the Project facilities, number of potential viewers, and values of the viewing area. The results of these classifications were presented in a visual assessment matrix.

5) Potential mitigation options

Potential mitigation measures were identified through consultation with INPEX's design engineers, and consideration of the limitations and opportunities associated with the Blaydin Point site.

2.1 Conceptual Project design

The conceptual design of the onshore and nearshore development areas on which this visual impact assessment is based included the following key components:

- An onshore gas-processing facility with two gas-processing trains as well as large storage tanks for LNG, LPG and condensate. A shielded and enclosed ground flare will also be constructed on the site.
- Nearshore infrastructure consisting of a product offloading jetty for LNG, LPG and condensate tankers, and a module offloading facility.

Lighting

The onshore gas-processing facility and jetty will be lit at night-time to provide light for operability and plant safety. Shielding around the perimeter of the ground flare will minimise light emissions from this facility to low levels.

Air emissions

Some of the air emissions from the onshore gas-processing facility could be visible on occasion from medium to long distances, although management controls will be in place to minimise this. These may include dust generated during site clearing and earthworks, or smoke generated by flaring during commissioning and during operational process upsets.

Operating hours

Construction activities are expected to be undertaken mainly during daylight hours. Operations at the onshore facilities will be carried out 24 hours per day.

2.2 Darwin Harbour landscape

The shoreline around Darwin Harbour contains relatively large tracts of undeveloped land, mainly comprising tidal flats vegetated by mangrove stands. Some residential, industrial and infrastructure development has been undertaken around the shorelines of East Arm, while the shoreline throughout Middle Arm is almost completely undeveloped.

Major man-made features of the shoreline within Darwin Harbour include the following:

- ConocoPhillips Darwin LNG Plant, on Wickham Point approximately 5 km to the west of Blaydin Point
- East Arm Wharf, on the northern shoreline, approximately 3 km away from Blaydin Point across the waters of East Arm
- Darwin central business district, on the eastern side of the main body of the Harbour
- Suburban developments from Darwin in the north to Palmerston in the east of the harbour shoreline. A small residential area also exists in Mandorah, on the western side of the mouth of the Harbour.

These man-made features also represent the major sources of artificial light around Darwin Harbour, along with beacons throughout the Harbour that are used for shipping navigation. These light sources contribute to an overall light “glow” from the city area, which is visible (if very faintly) from up to 40 km away (M Guinea, Charles Darwin University, pers comm. Sept 2008).

3.1 Viewpoints

Fourteen areas of interest to the visual impact assessment were identified in consultation with the NT Department of Natural Resources, Environment, the Arts and Sport (NRETAS), with review from relevant government and non-government agencies including NT Tourism. These visual impact sites were selected to account for a range of viewing angles, potential receptor types and residential, cultural, heritage and tourism values. The locations of identified viewpoints of interest to this study and their primary uses and values are listed in Table 3-1. Their locations around Darwin Harbour are presented in Figure 3-1.

Table 3-1 Viewpoints considered in the visual impact assessment, and their primary values

Site	Use of the site, and values of views
Mandorah jetty	Tourism, low density residential
Darwin central business district (view from high-rise building)	Tourism, high density urban and residential
Survivors Lookout, Darwin Wharf precinct	Tourism, heritage
Stokes Hill Wharf, Darwin Wharf precinct	Tourism, heritage
Hilly residential area at Stuart Park	Medium density residential
Harbour foreshore at Tipperary Waters	Medium density residential
Harbour foreshore at Bayview	Medium density residential
Charles Darwin National Park Lookout	Tourism, heritage
East Arm public boat ramp	Tourism, recreation
Planned residential subdivision in Berrimah (highest ground)	Planned medium density residential
Palmerston suburban area (highest ground)	Medium density residential
Planned residential subdivision in Palmerston (highest ground)	Planned medium density residential
Elizabeth River Bridge	Transport, tourism
Planned residential subdivision in Weddell (highest ground)	Planned medium density residential

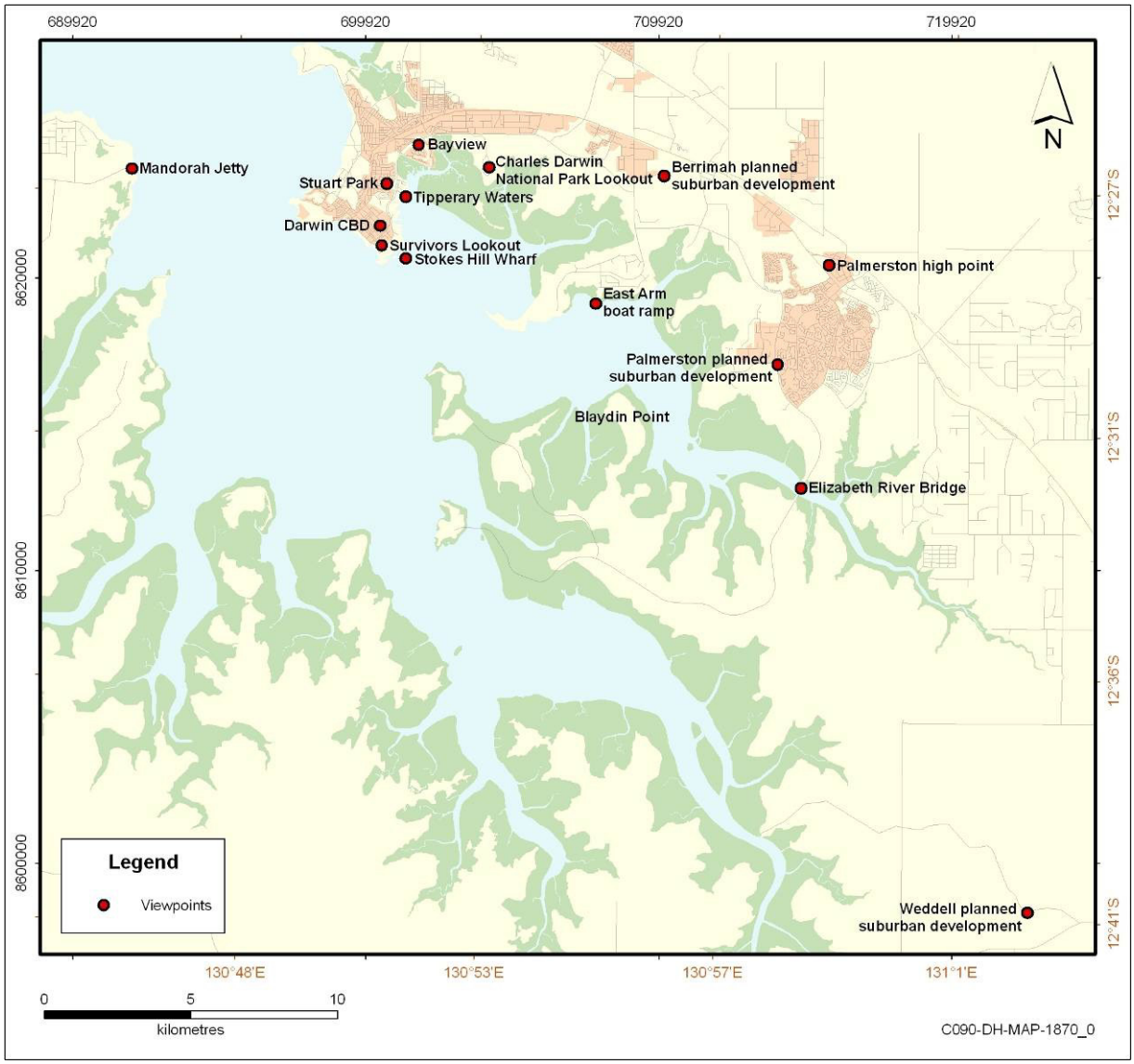


Figure 3-1 Viewpoints considered in the visual impact assessment

3.2 Viewshed analysis

Viewshed analysis identifies areas that are visible from a given location. Computer simulated viewsheds were created using the Viewshed Analysis module in *ArcGIS Version 9.2 Spatial Analyst* based on a detailed digital terrain model. Viewsheds were created for all the viewpoints of interest around Darwin Harbour (Figure 3-1).

The digital terrain model was based on the 1:10 000 orthophoto map sheets supplied by the NT Department of Planning and Infrastructure (DPI), which cover Darwin Harbour and its surrounds from the Cox Peninsula to East Point. Vertical accuracy was to ±1 m or better, and horizontal accuracy was to 0.5 m or better.

3.2.1 Pre-processing

The digital elevation model (DEM) utilised in this assessment did not include mangrove areas or the Darwin Wharf Precinct; rather, the coastline in these areas was interpreted from a separate set of coastline data.

The height of vegetation throughout the viewing catchment was modelled using the publicly available National Vegetation Inventory System (NVIS) vegetation mapping. The NVIS vegetation data is thematic and had to be converted to a raster (or grid) format with 10 m resolution. The vegetation mapping was intersected with land use mapping. Developed areas and areas of cleared land in the land use mapping were given zero elevation. The elevations in this combined vegetation–land use map were then added to the DEM to account for the height of woodland vegetation and the screening effect it could provide in the subsequent analysis.

The elevation of the gas-processing plant was determined from a three-dimensional plant layout designed by INPEX. This information was converted to 3D points in ArcGIS and then to a grid format (10 m resolution) using natural neighbour interpolation. The gas plant elevations were merged with the DEM raster so that the cells from the gas plant would override the cells from the DEM.

The elevations of cells in the DEM model at the viewpoint locations (Table 3-1) were increased by 1.8 m to account for an average person's height in the viewshed analysis.

3.2.2 Site inspections

Site inspections were carried out at each viewpoint to ground-truth the viewshed analysis. Some discrepancies were identified between the results of the viewshed analysis and the actual vistas from the viewpoints. This was due to buildings or vegetation close to the viewpoint, or inaccuracy in the DEM. For instance, the viewsheds for Charles Darwin Lookout and the Palmerston suburban area suggested that the onshore development area should be clearly visible. However, vegetation at those sites effectively screens Blaydin Point from view.

3.3 Ranking of visual impacts

Visual impact at the various viewpoints was ranked according to the following criteria:

- distance from the onshore/nearshore development area
- proportion of the view taken up by the proposed onshore and nearshore facilities
- number of potential viewers
- values of the viewing area

Viewpoints from which the onshore development area was visible were broadly considered to be “medium” to “high” impact sites. Viewpoints where the view to Blaydin Point was significantly obscured by vegetation, buildings or topography were considered “low” (or “no”) impact sites.

3.4 Visual simulation

Computer-simulated photomontages of the onshore and nearshore infrastructure were developed by INPEX for “high” and “medium” impact viewpoints.

Photomontages were based on digital photographs taken from each of the viewpoints, which were given spatial reference from a hand held global positioning system (GPS) along with record of time of day or night, focal length, elevation, camera angle and bearing. Photographs were taken using a 50 mm lens, with a set of four photographs stitched together to form a horizontal panorama. This technique creates an image approximately 60 degrees wide and 10–15 degrees tall, which is considered similar to the view from the human eye.

The digital photographs were matched with georeferenced topography and aerial photography, using camera angle location and direction as well as reference objects. Lighting, material editing and surface rendering were completed using the *3ds Max* modelling, animation and rendering software package.

Night-time simulated views were also created for two “medium” impact viewpoints, although these are conceptual only as lighting designs for the onshore gas-processing plant and jetty are in the early stages of development. Simulating night-time reflections and light glow is also very complex and is difficult to achieve with accuracy via computer imagery—for this reason, a night-time simulation from close range (from the East Arm boat ramp viewpoint) has not been included.

4.1 Viewshed analysis and ground-truthing

The viewshed analysis, showing the viewing catchment for each viewpoint of interest, is presented in Appendix A. Results from this preliminary task suggested that 12 of the total 14 viewpoints would be impacted to some extent by the Project. At the remaining sites the views of Blaydin Point were obscured by topography, suggesting no potential impact by the Project.

Site inspections removed 3 viewpoints from the assessment, including the Charles Darwin National Park lookout due to vegetation screening, the planned residential area in Berrimah due to a small hill and the highest point in residential Palmerston due to vegetation. Photographs were taken at each viewpoint during the site inspection; these are presented in Appendix B.

Therefore, the final list of viewpoints that could be impacted by the Project consisted of 9 sites. This process of deduction is presented in Table 4-1.

Table 4-1 Development of final list of viewpoints, through viewshed analysis and site inspection

Viewpoint	Viewshed analysis: Blaydin Point visible (✓/x)	Site inspection: Blaydin Point visible (✓/x)	Site included in final assessment (✓/x)
1 Mandorah Jetty	✓	✓	✓
2 Darwin central business district (view from high-rise building)	✓	✓	✓
3 Survivors Lookout, Darwin Wharf precinct	✓	✓	✓
4 Stokes Hill Wharf, Darwin Wharf precinct	✓	✓	✓
5 Hilly residential area at Stuart Park	✓	✓	✓
6 Harbour foreshore at Tipperary Waters	✓	✓	✓
7 Harbour foreshore at Bay View	✓	✓	✓
8 Charles Darwin National Park Lookout	✓	X	X
9 East Arm public boat ramp	✓	✓	✓
10 Planned residential subdivision in Berrimah (highest ground)	✓	X	X
11 Palmerston suburban area (highest ground)	✓	X	X
12 Planned residential subdivision in Palmerston (highest ground)	X	X	X
13 Elizabeth River Bridge	✓	✓	✓
14 Planned residential subdivision in Weddell (highest ground)	X	X	X

4.2 Ranking of viewpoints

Viewpoints from which the onshore development area was visible were broadly considered to be “medium-” to “high-” impact sites. Viewpoints where the views to Blaydin Point were significantly obscured by vegetation, buildings or topography were considered “low-” (or “no-”) impact sites. These rankings are presented in Table 4-2.

The only site rated “high” impact is the East Arm public boat ramp, as the onshore and nearshore facilities would be clearly visible from this viewpoint, over a moderate distance. This view of the Project could potentially be experienced by a large number of people that utilise the boat ramp for recreational fishing, boating, or tourism.

The view from high-rise buildings in the Darwin central business district was rated “medium” impact, as were six other sites. The onshore and nearshore development area would be visible from these viewpoints, but over relatively long distances and with some partial obstructions to this view. The proportion of the view taken up by the onshore and nearshore development areas from these distances would be small.

The view from Mandorah was rated “low” impact, as the distance to Blaydin Point is very long and the onshore development area would be barely visible. Blaydin Point is not visible from Weddell or from the highest point in Palmerston.

Table 4-2 Rating of the Project’s potential visual impact from affected viewpoints

Site		Values	Comments	Distance (km)	Visibility
1	Mandorah Jetty	Tourism Low-density residential	Blaydin Point is visible in the far distance from this location, with no obstructions. The proportion of the view taken up by the Project would be extremely low.	18	Low
2	Darwin central business district (view from high-rise building)	Tourism High density urban and residential	The onshore development area is visible, behind the East Arm Wharf. The long distance reduces the proportion of the view taken up by the Project. Viewers from this aspect may be long-term residents (e.g. of apartments or offices).	10	Medium
3	Survivors Lookout, Darwin Wharf precinct	Tourism Heritage	Most of Blaydin Point is visible; the view is similar in nature to that from Stokes Hill Wharf but with buildings and wharf in the foreground. The long distance decreases the proportion of view taken up by the Project.	9	Medium
4	Stokes Hill Wharf, Darwin Wharf precinct	Tourism Heritage	Blaydin Point is visible across the water, without obstructions. The long distance reduces the proportion of the view that would be taken up by the Project. This site is considered an important tourism location within central Darwin.	8	Medium
5	Hilly residential area at Stuart Park	Medium density residential	Blaydin Point is visible from this area, although distant and partly obscured by the infrastructure at East Arm Wharf as well as buildings or vegetation close to the viewpoint.	11	Medium
6	Harbour foreshore at Tipperary Waters	Medium density residential	Blaydin Point is visible from this area, although distant and partly obscured by the infrastructure at East Arm Wharf.	10	Medium

Site		Values	Comments	Distance (km)	Visibility
7	Harbour foreshore at Bayview Haven	Medium density residential	Blaydin Point is visible from this area, although distant and partly obscured by the infrastructure at East Arm Wharf.	10	Medium
8	Charles Darwin National Park lookout	Tourism Heritage	Blaydin Point is not visible from this vantage point due to tree cover close to the lookout, which completely obscures the view in that direction.	9	None
9	East Arm public boat ramp	Recreation Tourism	Blaydin Point is clearly visible, with no obstructions across the water. This is the closest viewpoint to the onshore development area. The tanks, product loading jetty and the presence of LNG tankers in the nearshore area are all easily discernible from this site.	3.5	High
10	Planned residential subdivision in Berrimah (highest ground)	Planned medium-density residential	Blaydin Point is obscured from this viewpoint by a small hill in the middle distance. Some of the Project infrastructure may be partly visible at the sides of this hill. The distance to Blaydin Point is fairly large, at around 10 km, reducing the proportion of the view taken up by the Project.	8	Low
11	Palmerston suburban area (highest ground)	Medium-density residential	Blaydin Point is completely obscured from this viewpoint by vegetation in the middle-distance.	8	None
12	Planned residential subdivision in Palmerston (highest ground)	Planned medium-density residential	This area is vegetated with tall trees. Therefore the view to Blaydin Point is heavily obscured for a person standing at ground level.	4	Low
13	Elizabeth River Bridge	Transport route Tourism	This viewpoint is relatively close to Blaydin Point, but the view is partly obscured by a hill on Middle Arm. While there may be a large number of viewers from this angle, most are likely to be very transient (i.e. in vehicles travelling across the bridge), reducing the viewing time.	5	Medium
14	Planned residential subdivision in Weddell (highest ground)	Planned medium-density residential	Blaydin Point is not visible from this vantage point due the landform (hills) and vegetation in that direction. The distance to Blaydin Point from this site is large, at around 15 km.	20	None

4.3 Visual simulations

Photomontages with computer-generated models of the onshore and nearshore development areas were created for the “high” and some of the “medium” impact viewpoints included in the visual impact assessment (listed in Table 4-2). Simulations from the Survivor’s Lookout and from Stuart Park were not developed, as the views from these areas are very similar to those from Stokes Hill Wharf and Tipperary Waters respectively, but with a greater degree of obstruction in the foreground.

Night-time views were developed for Stokes Hill Wharf and Darwin central business district to simulate the addition of lighting from the onshore gas-processing plant and jetty into night views of Darwin Harbour. These are conceptual only, as lighting plans for the onshore gas-processing plant and jetty are in the early stages of development. A night-time simulation from East Arm boat ramp has not been included as accuracy in night-time reflections and night glow is difficult to achieve at such close range via computer imagery.

The complete set of visual simulations from 6 viewpoints is presented in Appendix C.

5.1 Vegetated buffers

Retaining a strip of natural vegetation around the onshore development area will "buffer" the visual impact of the site to receivers at some viewpoints, including the East Arm public boat ramp. Much of the proposed infrastructure will be taller than the tree line and will not be completely hidden, but the retention of vegetation in the foreground will reduce the otherwise stark contrast between the onshore development area and surrounding undeveloped mangrove coastline. However, it is recognised that the nature of the nearshore infrastructure (jetty and module offloading facility) precludes the retention of shoreline vegetation around some parts of the onshore development area, and that these areas would need to be cleared of vegetation.

5.2 Lighting

Light from the onshore and nearshore development areas will be attenuated to some extent over the 4-km distance to Palmerston, and 10-km distance to the Darwin central business district.

5.3 Air emissions

Visual impact should be considered when developing air emissions management controls for the Project. The possible negative impact of smoke and dust on the viewshed around Blaydin Point (and further offsite) may be reduced through actions such as:

- committing not to burn vegetation
- controlling dust by wetting down exposed surfaces during dry weather
- conducting clearing work in stages, where practicable, to minimise total exposed area
- minimising smoke generation through engineering design, e.g. using a low smoke flare system, automatic shutdown systems, tight shutoff valves and manual blowdown systems.

Acknowledgements

Section 6

Digital photography

Digital photographs used in visual simulations from viewpoints around Darwin Harbour were provided by ERM Australia Pty Ltd, Perth WA.

Visual simulations

Photomontages with computer-generated models of the Project facilities were created by INPEX Browse, Ltd., Perth WA.

Limitations

Section 7

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of INPEX Browse, Ltd. and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in Proposal 3050500 dated 11 January 2008.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

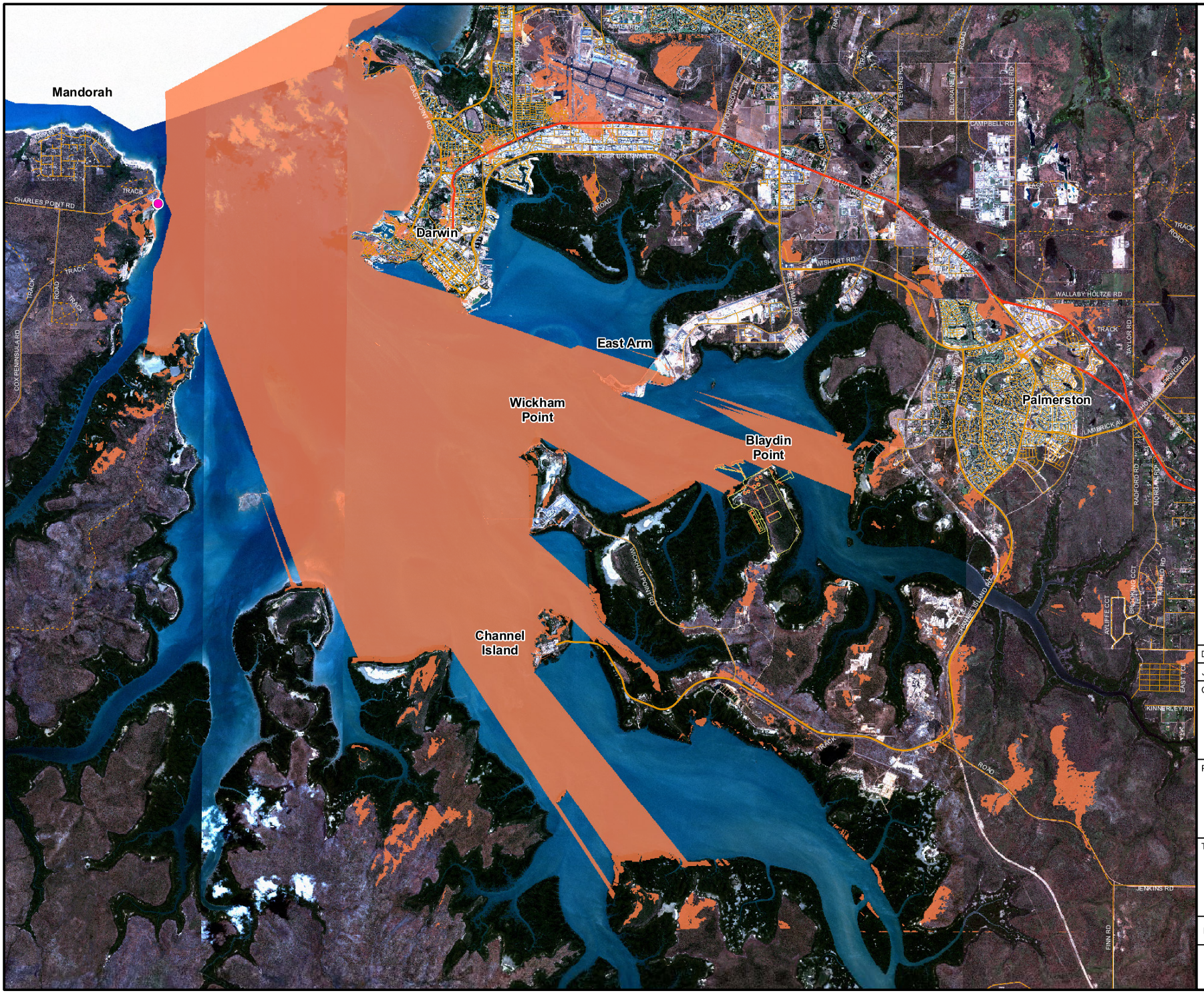
This report was prepared between March 2008 and March 2010 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Viewshed analyses

Appendix A

Contents



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Client

INPEX

Project

ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

MANDORAH JETTY

Figure:	Rev: B
	A3

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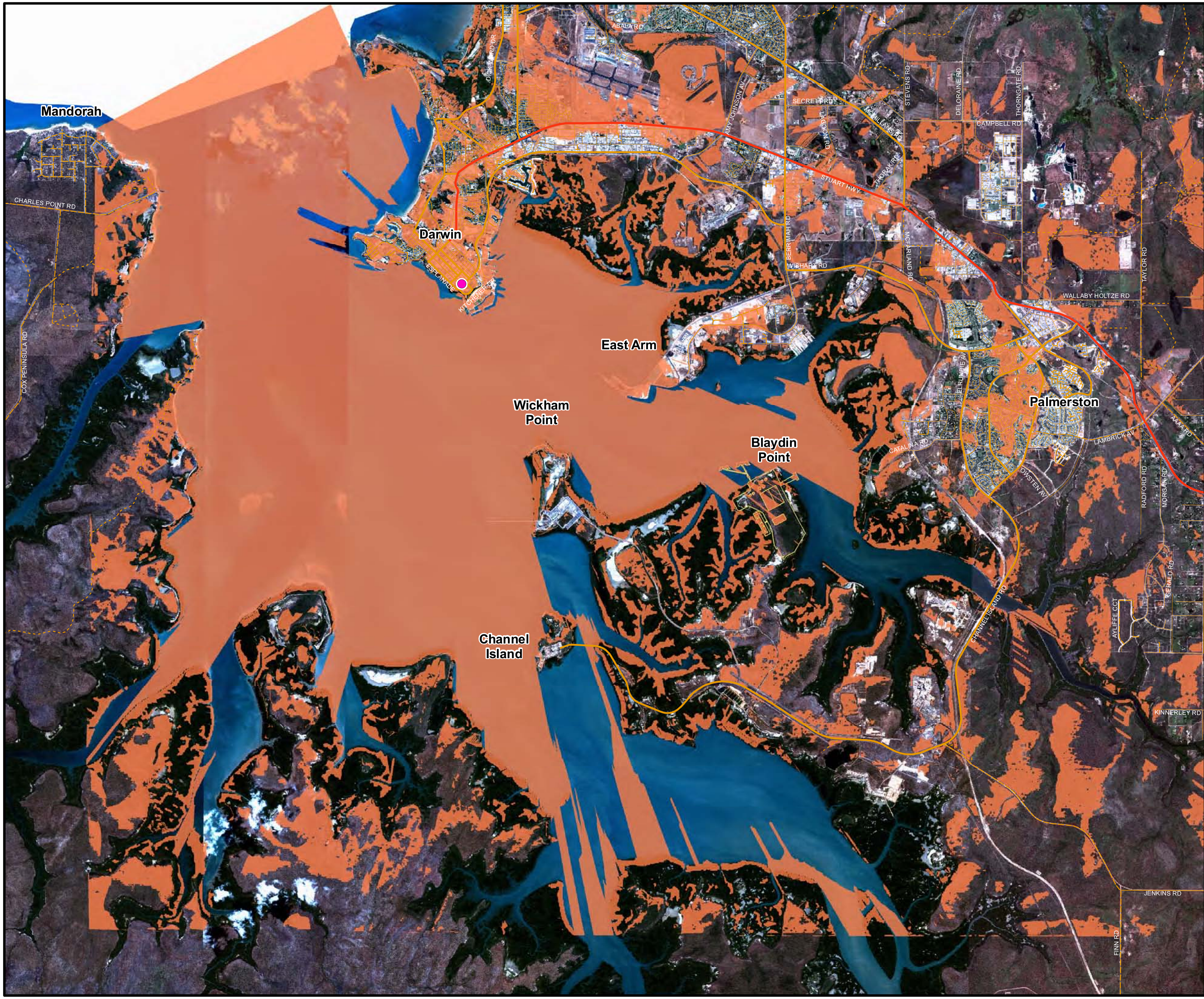

Legend

- Viewshed Location
- Area Visable from Viewshed Location
- Project Location

0 0.5 1 2 3 4 km

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Job No: 42906736	File No: 42906736_Site3_VS.mxd	

Client

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Project

ICHTHYS GAS FIELD DEVELOPMENT VISUAL IMPACT ASSESSMENT

Title

DARWIN CENTRAL BUSINESS DISTRICT (HIGH-RISE BUILDING)

Figure: Rev: B A3

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Project

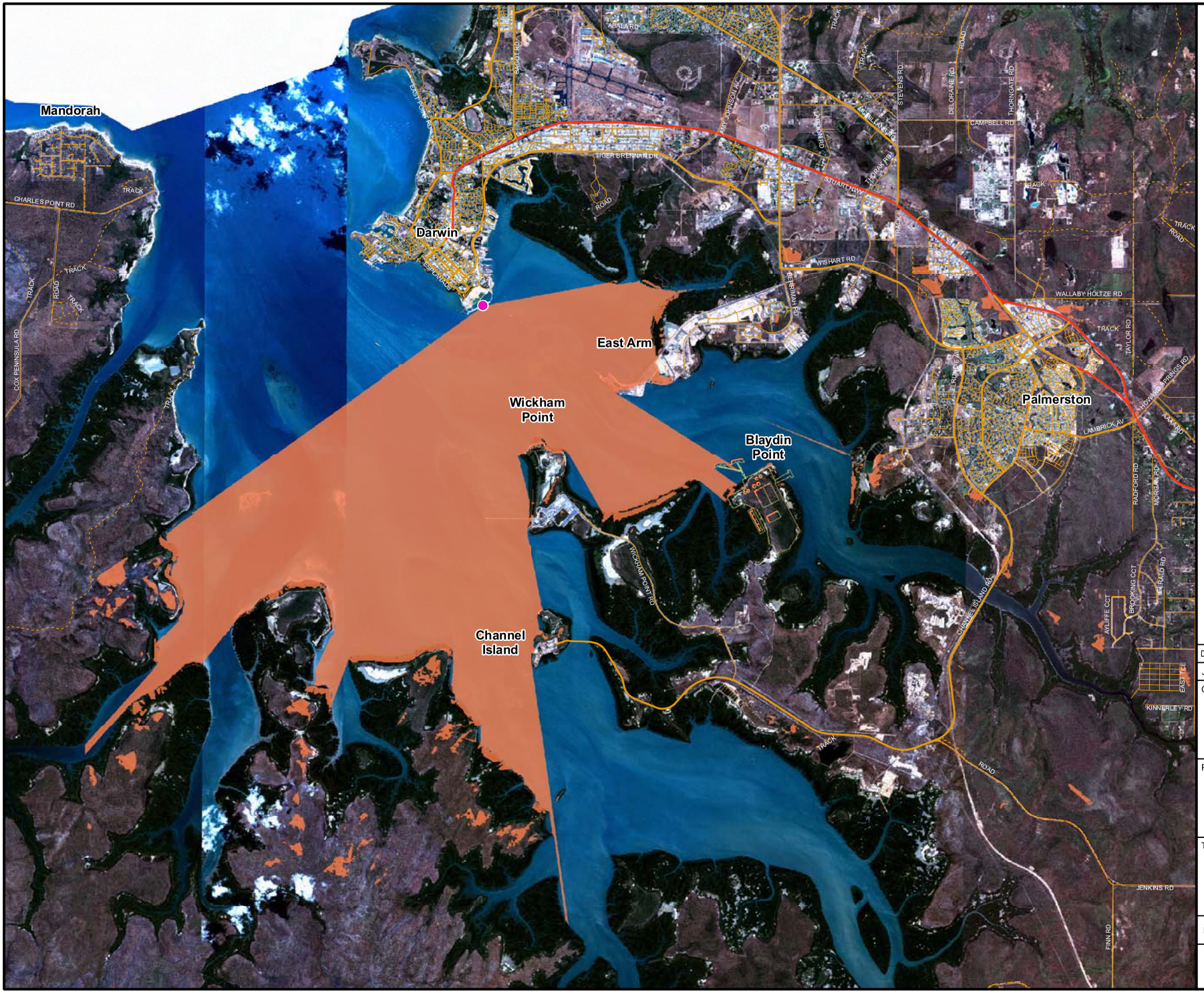
ICHTHYS GAS FIELD
DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

SURVIVORS LOOKOUT
DARWIN WHARF PRECINCT

Figure:	Rev: B
	A3

URS



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INPEX

Project

ICHTHYS GAS FIELD
DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

STOKES HILL WHARF
DARWIN WHARF PRECINCT

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Legend

- Viewshed Location
- Project Location
- Area Visable from Viewshed Location

0 0.5 1 2 3 4 km

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INPEX

Project

ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

HILLY RESIDENTIAL AREA AT STUART PARK

Figure:	Rev: B
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INPEX

Project

ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

HARBOUR FORESHORE AT TIPPERARY WATERS

Figure:	Rev: B
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Job No: 42906736	File No: 42906736_Site4_VS.mxd	

Client

INPEX

Project

ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

HARBOUR FORESHORE AT BAYVIEW

Figure:	Rev: B
	A3

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N

Legend

- Viewshed Location
- Project Location
- Area Visable from Viewshed Location

0 0.5 1 2 3 4 km

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Client

INPEX

Project

ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

CHARLES DARWIN NATIONAL PARK LOOKOUT

Figure:	Rev: B
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Drawn: JD	Approved: IH	Date: 20/9/2009
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Project

ICHTHYS GAS FIELD
DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

NEW EAST ARM
PUBLIC BOAT RAMP

Figure:	Rev: B
	A3

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Job No: 42906736	File No: 42906736_Site13_VS.mxd	

Client

INPEX

Project

ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

PLANNED RESIDENTIAL SUBDIVISION IN BERRIMAH (HIGHEST GROUND)

Figure:	Rev: B
	A3

URS

N

Legend

- Viewshed Location
- Project Location
- Area Visable from Viewshed Location

0 0.5 1 2 3 4 km

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Job No: 42906736	File No: 42906736_Site10_VS.mxd	

Client

INPEX

Project

ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

PALMERSTON SUBURBAN AREA (HIGHEST GROUND)

Figure:	Rev: B
	A3

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Job No: 42906736	File No: 42906736_Site2_VS.mxd	

Client

INPEX

Project

ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

PLANNED RESIDENTIAL SUBDIVISION IN PALMERSTON (HIGHEST GROUND)

Figure:	Rev: B
	A3

URS

N

Legend

- Viewshed Location
- Project Location
- Area Visable from Viewshed Location

0 0.5 1 2 3 4 km

Drawn: JD	Approved: IH	Date: 20/9/2009
Job No: 42906736	File No: 42906736_Site11_VS.mxd	

Client

INPEX

Project

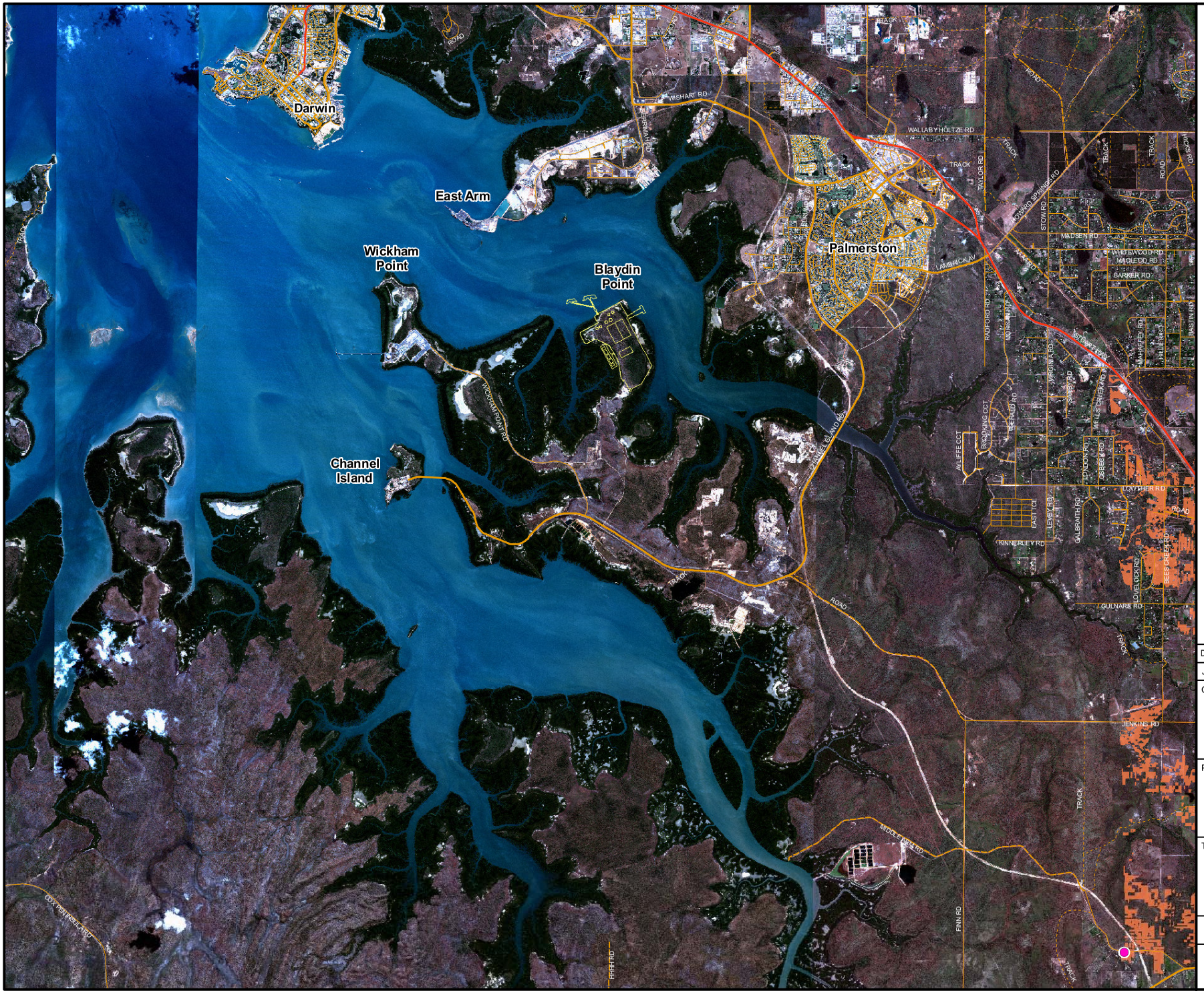
ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

ELIZABETH RIVER BRIDGE

Figure:	Rev: B
	A3

URS



Drawn: JD	Approved: IH	Date: 20/9/2009
Job No: 42906736	File No: 42906736_Site15_VS.mxd	

Client

INPEX

Project

ICHTHYS GAS FIELD DEVELOPMENT
VISUAL IMPACT ASSESSMENT

Title

PLANNED RESIDENTIAL SUBDIVISION IN WEDDELL (HIGHEST GROUND)

Figure:	Rev: B
	A3

URS

Viewpoint photographs

Appendix B

Contents

Note: A photograph from the planned residential subdivision in Weddell (south of Palmerston) was considered unnecessary due to the very long distance between this viewpoint and the onshore development area, and the hills and vegetation obstructing the view in that direction.

Figure 1: View from Mandorah Jetty towards Blaydin Point

Figure 2: View from Darwin central business district (view from high-rise building) towards Blaydin Point

Figure 3: View from Survivors Lookout, Darwin Wharf precinct towards Blaydin Point

Figure 4: View from Stokes Hill Wharf, Darwin Wharf precinct towards Blaydin Point

Figure 5: View from hilly residential area in Stuart Park towards Blaydin Point

Figure 6: View from harbour foreshore at Tipperary Waters towards Blaydin Point

Figure 7: View from harbour foreshore at Bayview towards Blaydin Point

Figure 8: View from Charles Darwin National Park Lookout towards Blaydin Point

Figure 9: View from East Arm public boat ramp towards Blaydin Point

Figure 10: View from Planned residential subdivision in Berrimah (highest ground) towards Blaydin Point

Figure 11: View from Palmerston suburban area (highest ground) towards Blaydin Point

Figure 12: View from planned residential subdivision in Palmerston (highest ground) towards Blaydin Point

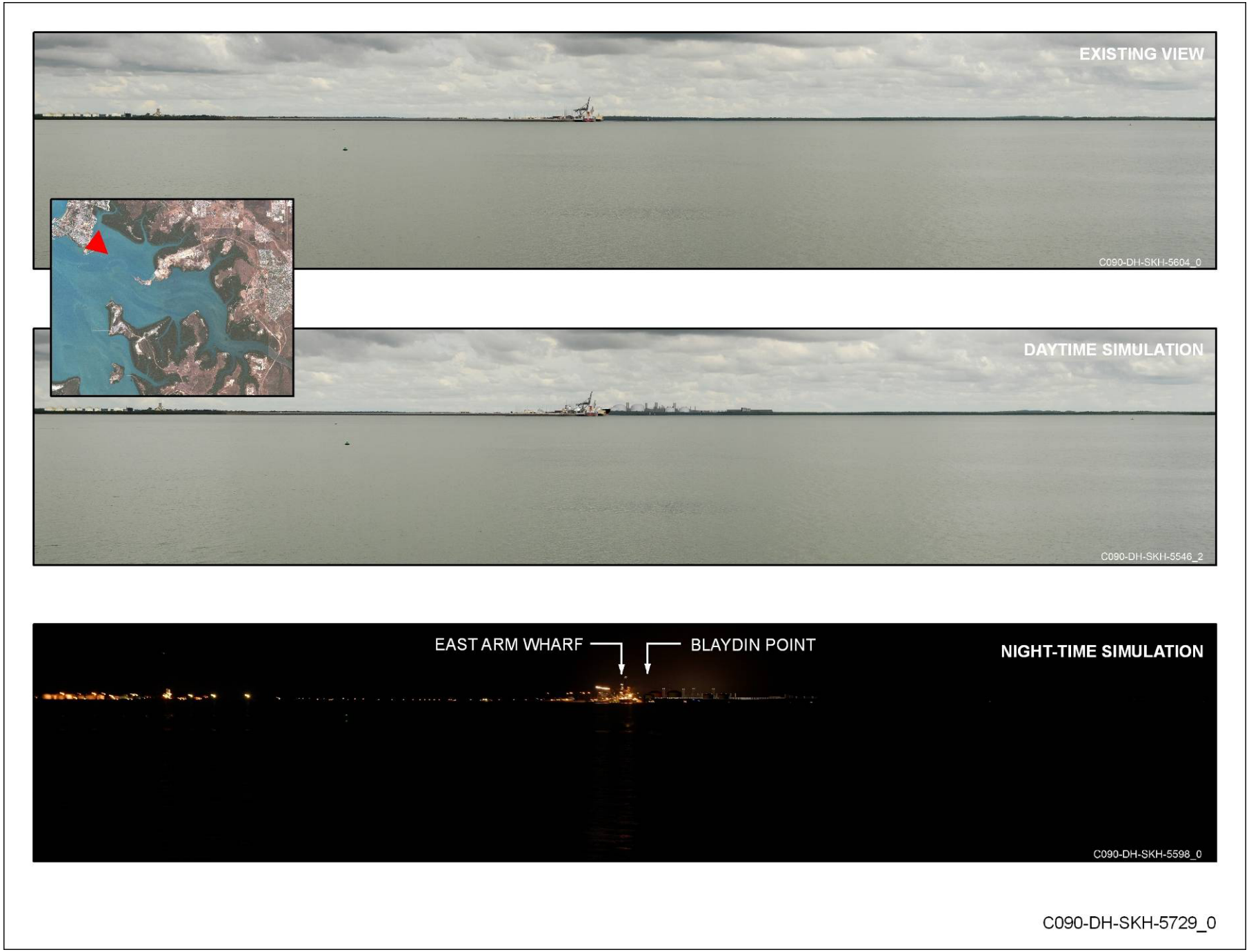
Figure 13: View from Elizabeth River Bridge towards Blaydin Point

Visual simulations Appendix C

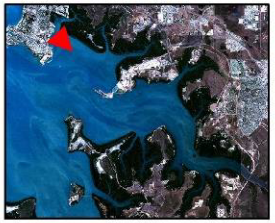
Contents

Potential changes to views of the Project area:

1: Visual simulations of the Project from Darwin central business district (high-rise building), showing daytime and night-time views



2: Visual simulations of the Project from Stokes Hill Wharf, showing daytime and night-time views



C090-DH-SKH-5590_1

3: Visual simulations of the Project from Tipperary Waters, showing daytime views

C090-DH-SKH-5591_1

4: Visual simulations of the Project from Bayview Estate, showing daytime views

C090-DH-SKH-5727_0

5: Visual simulations of the Project from East Arm public boat ramp, showing daytime views

C090-DH-SKH-5573_1

6: Visual simulations of the Project from Elizabeth River Bridge, showing daytime views