Responses to Submissions

Newcastle Coal
INFRASTRUCTURE GROUP

NEWCASTLE COAL INFRASTRUCTURE GROUP
COAL EXPORT TERMINAL

Rail Flyover Modification

October 2012

NEWCASTLE COAL INFRASTRUCTURE GROUP RAIL FLYOVER MODIFICATION ENVIRONMENTAL ASSESSMENT

RESPONSES TO SUBMISSIONS – PART A

No.	Subject	Issue	Response
A1	Swan Pond	Concerns were raised regarding the assessment of impacts of the Rail Flyover Modification on "Swan Pond", including: • the level of information presented on migratory species and recorded use by bird populations; • the impacts on migratory and threatened shorebird roosting and foraging habitat; • potential impacts on threatened migratory birds listed under the NSW *Threatened Species Conservation Act,* 1995 (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act,* 1999 (EPBC Act); • loss of recreational environment; • the amount of vegetation clearance including Endangered Ecological Communities (EECs) under the TSC Act; • recognition of local value of EECs and the importance to migratory and threatened bird species; • the high conservation values of "Swan Pond"; • quantification of the area of disturbance west of the Kooragang Island Main Line associated with the Rail Flyover Modification; and • consideration of avoidance or minimising impacts.	"Swan Pond" is the name given to an area of Coastal Saltmarsh EEC (Saltmarsh) to the west of the existing Kooragang Island Main Line. The Rail Flyover Modification Environmental Assessment (EA) describes the impacts on this Saltmarsh habitat (including Swan Pond) and the species that use or have the potential to use it. As stated in Section 1.2 of the Threatened Species Assessment (TSA), the assessment was prepared in accordance with the *Draft Guidelines for Threatened Species Assessment* (DEC and DPI, 2005). As described in the Rail Flyover Modification EA, a considerable portion of the proposed disturbance area is located on previously disturbed land. Existing power poles, wiring, lighting, signalling equipment and other minor infrastructure would need to be relocated for the realigned sections of the Kooragang Island Main Line. Despite the previously disturbed nature of the habitat within the footprint, the Rail Flyover Modification EA provided a conservative assessment of impacted area due to the small size of the modification components relative to the approved Newcastle Coal Infrastructure Group Coal Export Terminal (NCIG CET). Section 4.9 (of the Rail Flyover Modification EA) describes how a linear strip of Saltmarsh (1.32 hectares [ha]) on the west of the existing rail embankment would be removed by the Project. However, it should also be noted that much of this Saltmarsh occurs beneath an existing powerline. Based on the small amount of habitat disturbance and the availability of proximal habitat external to the disturbance areas, it is considered that the NCIG CET including the Rail Flyover Modification would not have a significant impact on the available habitat for waterbirds. Further to the above, a majority of the surrounding Saltmarsh is already protected within the Hunter Wetlands National Park (**Figure A-1**). The inbound (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification does not encroach upon the Hunter Wetlands National Park and is located wholly within land zoned as SP1 Special Activities within the Newcastle Port site under the *State Environmental Planning Policy (Major Development) 2005* (Major Development SEPP), as shown on Figure 6 of the Rail Flyover Modification EA.

No.	Subject	Issue	Response
A1 (Cont.)	Swan Pond		NCIG has existing Project Approval conditions requiring the establishment of compensatory shorebird habitat in a location agreed by the Director-General, equivalent to or no less than twice the area of habitat to be removed. Compensatory shorebird habitat would be established in accordance with the existing Project Approval (or as modified) conditions. Accordingly, the compensatory shorebird habitat would be described within the CHEMP (in accordance with Condition 2.20 of the Project Approval). Since exhibition of the Rail Flyover Modification EA, the ownership of land associated with the (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification has transferred from the Office of Environment and Heritage (OEH) to the Newcastle Port Corporation (NPC). The Minister administering the NSW *Crown Lands Act, 1989* (and signed by the delegate of the Minister administering the NSW *National Parks and Wildlife Act, 1974*) approved the determination of the mean high water mark (MHWM) boundary of Lot 1001 (**Figure A-2**) within which the inbound (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification is located. As a consequence, the OEH are no longer a landowner relevant to the lands which apply to the NCIG Rail Flyover Modification. In accordance with Condition 2.40 of Project Approval (06_0009), NCIG conducted a review of the need for the high capacity optional inlet rail spur and rail sidings in consultation with the Australian Rail Track Corporation Ltd (ARTC) and PWCS and the Director-General of the DP&I was notified of the outcomes of the review. Specifically, the review concluded that a flyover (i.e. grade separation) would be necessary to meet the requirements of the ARTC. Without the inbound (western) track of the Kooragang Island Main Line for the Rail Flyover Modification, significant loss of port capacity would be incurred on Kooragang Island for approximately 9 months of the anticipated 18 month construction period due to reduced train speeds and periodic shut downs of the tracks. Also refer to Part C (Additional Detail in Relation to Biodiversity Impacts).
A2	Swan Pond	Requests the assessment of impacts of the Rail Flyover Modification be based on detailed monthly monitoring data collected by the Hunter Bird Observers Club (HBOC) in “Swan Pond” since 1999.	The Rail Flyover Modification EA considers the potential impacts on all waterbirds potentially occurring on Kooragang Island. Multiple sources have been used including databases such as the OEH (2012), Australia Museum (2012) and Birds Australia (2012), and additional local survey data collected over the past nine years. The Rail Flyover Modification also considered the assessment findings presented in Umwelt (Australia) Pty Limited (2012) for the Terminal 4 Project. Part C provides additional detail relating to the monthly bird surveys that have been conducted by the Hunter Bird Observers Club in the areas known as Swan and Wader Ponds over the past 13 years. All threatened species recorded at Swan Pond and/or Wader Pond were already assessed in the TSA for the Rail Flyover Modification. Also refer to Part B (Detailed Responses to OEH Submission) Issues B2 and B14.

No.	Subject	Issue	Response
A3	Swan Pond	Concerns were raised that the habitats impacted by the Rail Flyover Modification do not extend further to the Hunter Wetlands National Park and do not occur more extensively across Kooragang Island.	Section 4.9 of the Rail Flyover Modification EA states: *These habitats extend further to the Hunter Wetlands National Park and occur more extensively across Kooragang Island (Figure 11).*
A4	Cumulative Impacts	Concerns were raised regarding the cumulative impacts (i.e. loss of ecological values) as a result of the continued expansion and modification of industrial projects on Kooragang Island into areas of Saltmarsh EECs, mud flats, mangrove areas and other key habitats within the Hunter Estuary.	While neither an existing operation nor currently approved project, the Port Waratah Coal Services (PWCS) Terminal 4 Project was considered in the Rail Flyover Modification EA. As shown on **Figure A-3**, the additional parcels of land the subject of disturbance for the Rail Flyover Modification are located wholly within the extent of the proposed PWCS Terminal 4 Project '*rail and utility corridor'*. Since exhibition of the Rail Flyover Modification EA, the ownership of land associated with the (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification has transferred from the OEH to the NPC. The Minister administering the NSW *Crown Lands Act, 1989* (and signed by the delegate of the Minister administering the NSW *National Parks and Wildlife Act, 1974*) approved the determination of the mean high water mark (MHWM) boundary of Lot 1001 (**Figure A-2**) within which the inbound (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification is located. As a consequence, the OEH are no longer a landowner relevant to the lands which apply to the NCIG Rail Flyover Modification.
A5	Cumulative Impacts	Concerns were raised regarding the consideration of cumulative impacts of disturbance to "Swan Pond" (i.e. additional relocation of powerlines).	The Rail Flyover Modification EA includes realignment of Ausgrid's 33 kilovolt (kV) electricity transmission lines within the corridor assessed in the EA. If additional relocation of powerlines were to occur in the future, this would be subject to separate assessment and approvals. As stated in Section 3.6 of the Rail Flyover Modification EA: *Existing power poles, wiring, lighting and signalling equipment and other minor infrastructure associated with realigned sections of the Kooragang Island Main Line, would be relocated and installed within the proposed rail realignment corridors or re-connected to existing/realigned linear infrastructure components (e.g. adjacent Ausgrid powerlines). Relocation of any sections of Ausgrid's 33 kV electricity transmission lines outside of the proposed realignment corridor for the Kooragang Island Main Line inbound track assessed in this EA, would be subject to separate assessment and approvals.*

No.	Subject	Issue	Response
A6	Biodiversity	Concerns regarding the applicability of clause 7(3) of the *State Environmental Planning Policy No 14 (Coastal Wetlands)* (SEPP 14).	The inbound (western) track of the Kooragang Island Main Line for the Rail Flyover Modification would encroach upon the currently mapped extent of the wetlands by approximately 15 metres, with a total disturbance of 0.56 ha of SEPP 14 wetland. This is a portion of the linear strip of Saltmarsh (1.32 ha) on the west of the existing rail embankment that would be removed by the Project as described in Section 4.9 of the Rail Flyover Modification EA. Clause 7(3) of SEPP 14 states: *Pursuant to section 29 of the Act, development for which consent is required by subclause (1) is declared to be designated development for the purposes of the Act.* The original NCIG CET was declared to be a major project under Part 3A of the NSW *Environment Planning and Assessment Act 1979* (EP&A Act). The Rail Flyover Modification EA has been prepared by NCIG to support a request to modify the Project Approval (06_0009) under section 75W of Part 3A of the EP&A Act.
A7	Biodiversity	Concerns were raised regarding the potential impact of the Project on the Green and Golden Bell Frog (*Litoria aurea*) (GGBF) including: • the reduction of recognised wetlands which represent important habitat; • lack of specific on-site targeted searches to provide detailed baseline population data; • GGBF records on land immediately adjacent to the Kooragang Island Main Line; and • the acceptability of the proposal to establish additional compensatory measures.	A specific assessment on the potential impact of the Project on the GGBF is provided in Table 6 (Section 5.7) of the TSA of the Rail Flyover Modification EA. As described in Section 3.3.1 of the TSA, Biosphere Environmental Consultants Pty Ltd (Dr Arthur White) has undertaken monitoring for the GGBF since 2006. Dr Arthur White (a suitably qualified ecologist approved by the Director-General) has reviewed the TSA and considers the assessment adequate. Relevantly, the TSA states: *The Freshwater Wetland that would be cleared [0.13 ha] appears to be suitable habitat but there are no Green and Golden Bell Frogs records from this location and no evidence that it has ever been used as a breeding site.* To compensate for the additional clearance of approximately 1.45 ha of potential habitat for the GGBF, NCIG would establish additional compensatory habitat in a location agreed by the Director-General, equivalent to or no less than twice the area of habitat to be removed (i.e. 2.9 ha) in accordance with the *Compensatory Habitat and Ecological Monitoring Program* (CHEMP). Also refer to Part B (Detailed Responses to OEH Submission) Issues B1 and B13.

No.	Subject	Issue	Response
A8	Biodiversity	Concerns were raised regarding the adequacy of flora and fauna surveys and the level of detail provided.	The surveys are conducted in accordance with the NSW Department of Environment and Conservation (DEC) (2004) *Threatened Biodiversity Survey and Assessment Guidelines - Working Draft* and are less than five years old. Data sources less than five years old referenced in the Rail Flyover Modification Environmental Assessment (EA) include: • Umwelt (Australia) Pty Ltd (2012); • Biosphere Environmental Consultants Green and Golden Bell Frog Monitoring data (2006 – present); and • Hunter Bird Observers Club (HBOC) Bird Monitoring Records for Deep Pond (2008-2011). The survey work covered the proposed Rail Flyover Modification development area (i.e. the footprint of the proposed realignment of the Kooragang Island Main Line inbound track as part of the Rail Flyover Modification is located wholly within the T4 Project footprint). As stated in Section 3 of the Threatened Species Assessment (TSA), recent surveys (less than two years old) were undertaken by Umwelt (Australia) Pty Ltd (2012) in 2010, 2011 and 2012. In regard to flora, the OEH state in their submission to the T4 Project: *OEH assessed this surveying as generally being in accordance with the 'Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft' (DEC 2004), and determined that the survey effort and methodologies utilised for this baseline flora survey appeared to be adequate and conducted in accordance with these guidelines.* In regard to fauna, a reconciliation of the fauna surveys against the DEC (2004) *Threatened Biodiversity Survey and Assessment Guidelines - Working Draft* was provided by Umwelt (Australia) Pty Ltd (2012) and concludes that the surveys are adequate. Also refer to Part B (Detailed Responses to OEH Submission) Issue B1, **Figure B-1** and **Attachment B-A**. Further, the numerous past reports that exist are also useful for confirming the results of the more recent surveys. The amount of data gathered in past years on the species present on Kooragang Island far exceeds the data which would be gained from a single survey in accordance with DEC (2004) *Threatened Biodiversity Survey and Assessment Guidelines - Working Draft*.

No.	Subject	Issue	Response
A8 (Cont.)	Biodiversity		Relevant data sources referenced in the Rail Flyover Modification EA include (in chronological order): • Umwelt (Australia) Pty Limited (2012); • Biosphere Environmental Consultants Green and Golden Bell Frog Monitoring data (2006 – present); • OEH Threatened Species - Atlas Database Records (2012); • Birds Australia Database Records (2012); • Australian Museum Database Records (2012); • HBOC Bird Monitoring Records for Deep Pond (2008-2011); • EcoBiological (2011); • McConville (2011); • FloraSearch (2011); • Herbert (2007) in Umwelt (Australia) Pty Limited (2012); • Connell Hatch (2006a); • Connell Hatch (2006b); • Australia Rail Track Corporation (2005); • NSW Department of Commerce (2005); • Premier's Department (2003); • Regional Land Management Corporation (2003); • Umwelt (Australia) Pty Limited (2003); • Hamer (2002); • Protech Steel (2001); • Straw (2000); • Straw (1999); • Winning (1998); • Hamer (1998); • Hamer (1997); and • Port Waratah Coal Services Limited (1996). Also refer to Part C (Additional Detail in Relation to Biodiversity Impacts).

No.	Subject	Issue	Response
A9	Biodiversity	Copies of ecological reports used/cited in the EA and maps overlaying the survey details over the stratification units/vegetation types was requested by the OEH.	The ecology assessment by Umwelt (Australia) Pty Ltd (2012) is publicly available and the OEH reviewed it as part of the T4 Project (as noted in the OEH's submission). This report can be accessed on the NSW Department of Planning and Infrastructure (DP&I) website: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4399 Other reports are detailed in the approved Newcastle Coal Infrastructure Group (NCIG) Coal Export Terminal (CET) EA (NCIG, 2006a). This report can be accessed on the NCIG website: http://www.ncig.com.au/CommunityEnvironment/EnvironmentalDocumentation/tabid/93/Default.aspx Other specific documentation can be provided to the OEH upon request.
A10	Biodiversity	Specific details of the relevant surveys of the NCIG site were requested by the OEH in tabular format.	Refer to Part B (Detailed Responses to OEH Submission) Issues B1, B2 and B3 and Attachment B-A.
A11	Biodiversity	The OEH is of the opinion the Trailing Woodruff (*Asperula asthenes*) and Small Water-ribbons (*Maundia triglochinoides*) have potential to occur on the NCIG site and NCIG should therefore demonstrate that these species are not present on-site, including if necessary appropriately timed targeted surveys in accordance with OEH guidelines.	Neither the *Asperula asthenes* nor the *Maundia triglochinoides* are known to occur on Kooragang Island, based on the multiple sources used including databases such as the OEH (2012), and additional local survey data collected over the past nine years. The surveys conducted by Umwelt (Australia) Pty Ltd (2012) were adequate for these species. The *Asperula asthenes* can be found all year round according the OEH Threatened Species Database, and the *Maundia triglochinoides* can be found from November to March which is within the time that the Rail Flyover Modification area was surveyed by Umwelt (Australia) Pty Ltd (2012) (November).
A12	Biodiversity	Concerns were raised that the assessment on threatened species did not specifically assess impacts on several avian species that are known to occur on or within the general location of the Rail Flyover Modification components, including: • Australasian Bittern (*Botaurus poiciloptilus*); • Black-necked Stork (*Ephippiorhynchus asiaticus*); • Black-tailed Godwit (*Limosa limosa*); • Broad-billed Sandpiper (*Limicola falcinellus*);	As stated in Section 1.2 of the TSA, the assessment was prepared in accordance with the *Draft Guidelines for Threatened Species Assessment* (DEC and DPI, 2005). A specific assessment of impacts on Australasian Bitterns is provided in Table 8 (Section 5.8 of the TSA). The Black-necked Stork, Black-tailed Godwit, Broad-billed Sandpiper, Curlew Sandpiper and White-fronted Chat are all considered in the assessment of impacts. They are listed in Appendix A and assessed in Section 5.8 of the TSA. A typographical error has been noted in relation to the White-fronted Chat, however additional detail is provided in Part C. Refer to Part B (Detailed Responses to OEH Submission) Issue B14. Also refer to Part C (Additional Detail in Relation to Biodiversity Impacts).

No.	Subject	Issue	Response
A12 (Cont.)	Biodiversity	• Curlew Sandpiper (*Calidris ferruginea*); and • White-fronted Chat (*Epthianura albifrons*).	
A13	Biodiversity	Concerns were raised that there may be contaminants liberated from existing contaminated land within the Kooragang Island Waste Emplacement Facility (KIWEF) during disturbance activities associated with the Rail Flyover Modification and that these contaminants may enter the adjacent ecological system.	Limited excavations would be required during the construction of the Rail Flyover Modification components. As part of the Construction Surface Water Plan (CEMP) required in accordance with Project Approval (06_0009) (available on the NCIG website), procedures are included for the sampling and analysis of soil prior to any excavations and subsequent handling of contaminated materials, if identified. As stated in Section 4.7 of the Rail Flyover Modification EA: *With continued implementation of the management measures for the NCIG CET site for the additional lands associated with the Rail Flyover Modification in accordance with SEPP 55* [State Environmental Planning Policy No. 55 (Remediation of Land)]*, the development site would be suitable.*
A14	Biodiversity	Concerns were raised that the EA does not address or reflect the impact of the proposed Project on matters of national significance including listed threatened species and ecological communities, listed migratory species and Ramsar wetlands of international significance.	Section 1.2.3 of the Rail Flyover Modification EA addresses the EPBC Act. The TSA was prepared in accordance with the *Draft Guidelines for Threatened Species Assessment* (DEC and DPI, 2005), which address NSW legislation.
A15	Biodiversity	Concerns were raised that the Project would reduce an area of internationally important wetlands (Ramsar Wetlands).	The NCIG CET including the Rail Flyover Modification is not proposed within a Ramsar Wetland. The Hunter Estuary Wetlands Ramsar Site is located approximately 900 m to the north (**Figure A-1**). The proposed modification would not impact the values of the Hunter Estuary Wetlands Ramsar Site. In accordance with Condition 11 of EPBC Particular Manner Decision 2006/2987: *11. A site water management plan, including a surface water monitoring program, will be developed in accordance with the measures outlined in the Site Water Management Plan (SWMP) (Construction and Operation) provided in Section 5 of the Draft Statement of Commitments, Environmental Assessment (Newcastle Coal Infrastructure Group, July 2006) and Sections 8 & 9 of the Land Contamination and Groundwater Assessment, Newcastle Coal Infrastructure Group Coal Export Terminal, Kooragang Island, Appendix D (RCA Australia, June 2006).*

No.	Subject	Issue	Response
A16	Biodiversity	Concerns were raised regarding the level of assessment, and that earthworks and drainage alteration will affect hydrology and therefore wetland habitat values, which may have implications for shorebird and waterbird habitat utilisation.	The Rail Flyover Modification is located on the boundary of the flood fringe and floodway as shown on the *Newcastle Floodplain Risk Management Study Map Series 5 – PMF Flood Impact Categories*. The Rail Flyover Modification would have a negligible impact on the floodway of the Hunter River and hydrology on Kooragang Island.
A17	Biodiversity	Concerns were raised regarding the absence of topographic features presented in the EA (i.e. shallow shoreline with intermittent mudflats) which are used by waterfowl and migratory shorebirds.	Section 5.1.1 of the TSA in the Rail Flyover Modification EA describes the impacts on this Saltmarsh habitat and the species that use or have the potential to use it.
A18	Biodiversity	The EA is not aware that Australia is signatory to several international agreements to protect migratory birds and their habitats (i.e. Bonn Convention on the Conservation of Migratory Species, JAMBA, CAMBA, ROKAMBA ect.).	Noted. These international agreements are integrated into the EPBC Act. Section 1.2.3 of the Rail Flyover Modification EA addresses the EPBC Act.
A19	Biodiversity	Concerns were raised regarding level of shorebirds mentioned in EPBC Particular Manner Decision 2006/2987.	Section 1.2.3 of the Rail Flyover Modification EA addresses the EPBC Act and includes a copy of Particular Manner Decision (2006/2987) in Attachment 3 of the Rail Flyover Modification.
A20	Biodiversity	Concerns were raised regarding the incremental loss of habitat, including EECs, in the Kooragang Island area.	The Hunter Wetlands National Park was established in 2007 (and extended in 2011) which protects extensive areas of Kooragang Island and habitats within the Hunter Estuary (**Figure A-1**) outside of the proposed disturbance area associated with the Rail Flyover Modification. NCIG has existing Project Approval conditions requiring the establishment of compensatory shorebird habitat in a location agreed by the Director-General, equivalent to or no less than twice the area of habitat to be removed. Compensatory shorebird habitat would be established in accordance with the existing Project Approval (or as modified) conditions. Accordingly, the compensatory shorebird habitat would be described within the CHEMP.

No.	Subject	Issue	Response
A21	Biodiversity	Concerns were raised regarding any additional impacts on National Parks and Wildlife Services Reserve System, and recommended infrastructure, utilities and associated services remain within the Major Development SEPP land.	The NPWS reserve system would not be impacted. The Rail Flyover Modification is located wholly within land zoned as SP1 Special Activities within the Newcastle Port site under the Major Development SEPP, as shown on Figure 6 of the Rail Flyover Modification EA. Since exhibition of the Rail Flyover Modification EA, the ownership of land associated with the (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification has transferred from the OEH to the NPC. The Minister administering the NSW *Crown Lands Act, 1989* (and signed by the delegate of the Minister administering the NSW *National Parks and Wildlife Act, 1974*) approved the determination of the mean high water mark (MHWM) boundary of Lot 1001 (**Figure A-2**) within which the inbound (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification is located. As a consequence, the OEH are no longer a landowner relevant to the lands which apply to the NCIG Rail Flyover Modification. The footprint of the inbound (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification does not encroach upon the Hunter Wetlands National Park.
A22	Biodiversity	Concerns were raised regarding the relocation of Ausgrid powerlines to the middle of Kooragang Island and that consideration of alternatives (i.e. underground powerlines or mitigation [i.e. deflectors]) are not addressed.	The relocation of powerlines would be undertaken in consultation with and to the satisfaction of Ausgrid. The Rail Flyover Modification EA includes realignment of Ausgrid's 33 kV electricity transmission lines within the corridor assessed in the EA. If additional relocation of powerlines were to occur in the future, this would be subject to a separate assessment and approvals. As stated in Section 3.6 of the Rail Flyover Modification EA: *Existing power poles, wiring, lighting and signalling equipment and other minor infrastructure associated with realigned sections of the Kooragang Island Main Line, would be relocated and installed within the proposed rail realignment corridors or re-connected to existing/realigned linear infrastructure components (e.g. adjacent Ausgrid powerlines). Relocation of any sections of Ausgrid's 33 kV electricity transmission lines outside of the proposed realignment corridor for the Kooragang Island Main Line inbound track assessed in this EA, would be subject to separate assessment and approvals.*

No.	Subject	Issue	Response
A23	Offsets	Concerns have been raised regarding the nature of offsets for the modification, including: • lack of appropriate offsets/compensatory habitat in accordance with current OEH policy; • compensatory Saltmarsh habitat should be provided in the EA; • offsets should be in place before the habitat that is being compensated is removed; • the EA does not indicate whether a management plan will be developed for the offsets; and • the EA does not indicate how offset/compensatory land will be managed and conserved in perpetuity.	The Rail Flyover Modification EA is a modification to an existing Project Approval (06_0009). NCIG has existing Project Approval conditions requiring the establishment of compensatory shorebird habitat in a location agreed by the Director-General, equivalent to or no less than twice the area of habitat to be removed. Compensatory shorebird habitat would be established in accordance with the existing Project Approval (or as modified) conditions. Accordingly, the compensatory shorebird habitat would be described within the CHEMP. NCIG has existing Project Approval conditions requiring the establishment of compensatory GGBF habitat in a location agreed by the Director-General, equivalent to or no less than twice the area of habitat to be removed. Compensatory GGBF habitat would be established in accordance with the existing Project Approval (or as modified) conditions. Accordingly, the compensatory GGBF habitat would be described within the CHEMP. Refer to Part B (Detailed Responses to OEH Submission) Issues B22, B23 and B25.
A24	Offsets	The OEH does not concur with the EA that migratory and threatened shorebird and waterbird habitat is not being impacted upon and would expect suitable offsets to be provided as compensatory measure, using: • OEH “offsetting principles”; or • a biodiversity assessment using BioBanking Assessment Methodology.	Consistent with the requirements of Condition 2.20 of Project Approval (06_0009), NCIG will update the existing CHEMP, in consultation with the OEH, and submit for approval of the Director-General to reflect the additional compensatory habitat to be established as a result of the habitat lost due to the Rail Flyover Modification. Refer to Part B (Detailed Responses to OEH Submission) Issue B23.

No.	Subject	Issue	Response
A25	Offsets	Concerns were raised regarding the ongoing compliance with the requirements of Project Approval (06_0009) for the CHEMP and current progress of implementation of the existing approved CHEMP.	Since Project Approval (06_0009) was granted in April 2007, the CHEMP related works have been progressed as follows by NCIG: • **April 2007** - The Director-General approved Professor David Goldney as a qualified ecologist to advise on mitigation and management of potential impacts to listed threatened species. • **April-May 2007** - Professor David Goldney conducted ecological surveys on 24 and 25 April 2007 and 2 and 3 May 2007 to identify and quantify the extent and types of habitat that will be lost or degraded as a result of the project. • **July 2007** - Professor David Goldney prepared a report quantifying the GGBF habitat (8.4 ha) (excluding the northern rail spur). • **October 2007** - The Director-General approved Dr Arthur White as a qualified ecologist to also advise on mitigation and management of potential impacts to listed threatened species. • **April 2008** - NCIG prepare CHEMP documentation. • **September 2008** - OEH (then NSW Department of Environment, Climate Change and Water [DECCW]) provide the '*Kooragang Island – Threatened Species Offset Framework*' for consideration in further developing the CHEMP. • **September 2008** - DP&I (then NSW Department of Planning [DoP]) agreed to defer commencement of compensatory habitat works until no later than 1 March 2009, as a result of the delayed finalisation of DECCW's strategic framework. • **January 2009** - NCIG commence compensatory habitat works (Stage 1a) in January 2009. • **February-March 2009** - NCIG submit CHEMP to DECCW (for purposes of consultation) and DoP for approval. • **June 2009** - DECCW provide review comments on the CHEMP. • **July 2009** - DoP provide review comments on the CHEMP. • **August 2009** - NCIG prepare revised CHEMP addressing DoP and DECCW review comments and re-submit for the approval of DoP. • **September 2009 to April 2010 –** GGBF seasonal monitoring of Kooragang Island and Ash Island. • **September 2009 to April 2010 –** GGBF seasonal monitoring of Kooragang Island and Ash Island. • **October 2009** - NCIG provide a briefing to DoP including further details regarding methodology for quantification of GGBF habitat determination and Funding Deed.

No.	Subject	Issue	Response
A25 (Cont.)	Offsets		• **January 2010** - DoP provide initial comments on Funding Deed. • **March 2010** - DoP provide additional review comments on CHEMP. • **July-August 2010** - NCIG prepare revised CHEMP addressing DoP review comments and re-submit for the approval of DoP. • **August 2010 –** Commencement of discussions with NPWS in relation to land availability. • **August 2010** - CHEMP approved by the NSW Department of Planning and Infrastructure (DP&I). • **September 2010 to April 2011 –** GGBF seasonal monitoring of Kooragang Island and Ash Island. • **December 2010 –** Meeting with NPWS Local Manager to define land on Ash Island available for compensatory works. • **January 2011** – On site assessment with NPWS of opportunities and constraints of available Ash Island land. • **February 2011 –** Detailed discussion with University of Newcastle academic staff in relation to potential research topics. • **February 2011** – Discussion and site assessment with HCRCMA of opportunities and constraints of available Ash Island land. • **February 2011 –** Access approval provided by NPWS to Ash Island lands to conduct non-disturbance activities. • **March 2011 –** Agreement with NPWS in relation to scope of due diligence work to access land on Ash Island. • **April 2011 –** Formation of the Compensatory Habitat Consultative Board. • **April 2011 –** Completion of fauna assessment of Ash Island by project approved ecologist (Dr Arthur White). • **April 2011 –** Review of available monitoring data by statistician (Gilbert & Associates Pty Ltd) to define population modelling options. • **June 2011 –** Completion of flora assessment of Ash Island by specialist consultant (Flora Search). • **July 2011** – Inaugural meeting of the Compensatory Habitat Consultative Board. • **July 2011 –** Research direction recommendation by Compensatory Habitat Consultative Board.

No.	Subject	Issue	Response
A25 (Cont.)	Offsets		• **July 2011 –** Approval sought from NPWS to collect vegetation from Ash Island for future propagation on compensatory works. • **August 2011 –** Detailed research proposal received from University of Newcastle. • **September 2011 to April 2012 –** GGBF seasonal monitoring of Kooragang Island and Ash Island. • **October 2011 –** REF submitted to NPWS to conducted disturbance activities on Ash Island. • **November 2011 -** Compensatory Habitat Consultative Board meeting. • **November 2011 –** Completion of consultation with service providers in relation to construction works on Ash Island. • **November 2011 -** Access approval provided by NPWS to Ash Island lands to collect wetland vegetation. • **December 2011 -** Access approval provided by NPWS to Ash Island lands to conduct disturbance activities. • **December 2011 –** Commencement of behavioural based research by University of Newcastle. • **March 2012 –** Completion of detailed survey of compensatory habitat area by specialist surveyor (Monteath & Powys). • **March 2012 –** Commitment to GGBF breeding program to be conducted by University of Newcastle. • **March 2012 –** Forum conducted involving NCIG, NPWS and University of Newcastle and approved ecologist to define compensatory pond design and overall habitat layout. • **April 2012 –** Completion of water and geotechnical assessment o Ash Island by specialist consultant (RCA Pty Ltd). • **April 2012 –** REF submitted to NPWS to allow commencement of pond construction activities. • **May 2012 –** Compensatory Habitat Consultative Board meeting. • **June 2012 –** A licence to undertake pond construction on Ash Island executed by NCIG and NPWS. • **June 2012 –** Work commenced on pond construction Ash Island. • **August 2012 –** Full mobilisation of contractor to Ash Island and commencement of pond construction activities.

No.	Subject	Issue	Response
A25 (Cont.)	Offsets		Consistent with the requirements of Condition 2.20 of Project Approval (06_0009), NCIG will update the existing CHEMP, in consultation with the OEH, and submit for approval of the Director-General to reflect the additional compensatory habitat to be established as a result of the habitat lost due to the Rail Flyover Modification.
A26	Offsets	Concerns were raised regarding the conflicts with funding spent by the NSW Government over a period of more than 10 years on restoration projects on Swan and Wader Ponds on Kooragang Island.	The Rail Flyover Modification is located wholly within land zoned as SP1 Special Activities within the Newcastle Port site under the Major Development SEPP, as shown on Figure 6 of the Rail Flyover Modification EA. Since exhibition of the Rail Flyover Modification EA, the ownership of land associated with the (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification has transferred from the OEH to the NPC. The Minister administering the NSW *Crown Lands Act, 1989* (and signed by the delegate of the Minister administering the NSW *National Parks and Wildlife Act, 1974*) approved the determination of the mean high water mark (MHWM) boundary of Lot 1001 (**Figure A-2**) within which the inbound (western) track (including ancillary infrastructure) of the Kooragang Island Main Line for the Rail Flyover Modification is located. As a consequence, the OEH are no longer a landowner relevant to the lands which apply to the NCIG Rail Flyover Modification. Consistent with the requirements of Condition 2.20 of Project Approval (06_0009), NCIG will update the existing CHEMP, in consultation with the OEH, and submit for approval of the Director-General to reflect the additional compensatory habitat to be established as a result of the habitat lost due to the Rail Flyover Modification.
A27	Traffic	Requests submission of a revised Construction Traffic Management Protocol (CTMP) for approval of the RMS and NCC to reflect the Rail Flyover Modification.	Consistent with the statements made in Section 5.2 of the Rail Flyover Modification EA, and Project Approval (06_0009) Condition 7.3(d), NCIG will update the existing CTMP and submit for approval of the RMS and NCC (e.g. to reflect the changes to construction vehicle movements).
A28	Land Contamination	Concerns regarding the management of contaminated land within the KIWEF.	Limited excavations would be required during the construction of the Rail Flyover Modification components. As part of the CEMP required in accordance with Project Approval (06_0009) (available on the NCIG website), procedures are included for the sampling and analysis of soil prior to any excavations and subsequent handling of contaminated materials, if identified. As stated in Section 4.7 of the Rail Flyover Modification EA: *With continued implementation of the management measures for the NCIG CET site for the additional lands associated with the Rail Flyover Modification in accordance with SEPP 55, the development site would be suitable.*

No.	Subject	Issue	Response
A29	Flooding	Concerns were raised regarding the potential effects on the floodway of the Hunter River.	The Rail Flyover Modification is located on the boundary of the flood fringe and floodway as shown on the *Newcastle Floodplain Risk Management Study Map Series 5 – PMF Flood Impact Categories*. The Rail Flyover Modification would have a negligible impact on the floodway of the Hunter River.
A30	Air Quality	Concerns were raised regarding dust management associated with coal trains including: • coal dust blowing from trains; • wagon hopper leaks; • derailment spillage; • dust from train turbulence; and • carcinogenic fumes from locomotive exhausts.	NCIG will continue to operate in accordance with the approved Operation Dust Management Plan (available on the NCIG website) as required by Project Approval (06_0009) Condition 7.6(a). As stated in Section 4.4 of the Rail Flyover Modification EA: *Dust emissions during construction of the NCIG CET including the Rail Flyover Modification would continue to be controlled in accordance with the requirements of Project Approval (06_0009)*. *Air quality monitoring (dust deposition) would continue to be undertaken in accordance with the existing environmental monitoring program for the NCIG CET, and consistent with the requirements of EPL* [Environment Protection Licence] *12693.* In addition, NCIG will also participate in any cumulative dust study that may be commissioned by the DP&I, and in consultation with the NSW Environment Protection Authority (EPA), in accordance with Project Approval (06_0009) Condition 4.3.
A31	Noise	Concerns were raised regarding the noise assessment predictions for the Rail Flyover Modification and the requirement for operational noise levels to be monitored and form part of the EPL.	The Noise Assessment Review undertaken by SLR Consulting Australia Pty Ltd (2012) and presented in Appendix B for the Rail Flyover Modification EA concluded: *…that although there are minor increases in the extent and elevation of the rail infrastructure associated with the Rail Flyover Modification, no additional operational plant or equipment would be introduced as a result of the Rail Flyover Modification and the on-site operating sound powers levels would remain unaltered.* *Therefore, any potential variation in the off-site intrusive noise level at the nearest receivers would be negligible as a result of the Rail Flyover Modification …* These conclusions were confirmed by the prediction results from the updated NCIG CET noise model presented in Appendix B of the Rail Flyover Modification EA. NCIG will continue to operate in accordance with the approved Operation Noise Management Plan (available on the NCIG website) as required by Project Approval (06_0009) Condition 7.6(b), and consistent with the requirements of EPL 12693.

No.	Subject	Issue	Response
A32	Groundwater	The EPA requests a groundwater monitoring program to identify and manage existing contamination effectively to minimise impact on the surrounding environment.	Consistent with the statements made in Section 5.2 of the Rail Flyover Modification EA, NCIG will: • vary EPL 12693 in consultation with the EPA (e.g. to reflect the changes to premises and monitoring requirements); • update the existing CEMP; and • continue to prepare and distribute an Annual Environmental Management Report to review environmental performance. As stated in Section 2.1.1 of the Rail Flyover Modification EA, the approved NCIG rail infrastructure corridors traverse portions of the existing KIWEF. EPL 6437 was held by the Hunter Development Corporation for the KIWEF, but was surrendered on 8 December 2010 and is currently subject to the Conditions of Notice 1111840 (including groundwater monitoring). A copy of the Notice is provided in Attachment 5 of the Rail Flyover Modification EA. Based on historical land use information and the land contamination assessment conducted for the original EA, the land subject to the Rail Flyover Modification is considered to be low contamination potential.
A33	Aboriginal Heritage	Requested a copy of the Preliminary Aboriginal Heritage Assessment (PAHA) be provided to the OEH.	A copy of the PAHA was provided to the OEH during the consultation process for the original NCIG Project EA (NCIG, 2006a). An additional copy of the original NCIG Project PAHA has been provided to the OEH.
A34	Aboriginal Heritage	Requests submission of a revised CEMP to reflect the Aboriginal cultural heritage commitments and amend OEH's Archaeologists' responsibilities in determining appropriateness of Aboriginal heritage management decisions.	The PAHA completed for the original NCIG Project concluded: *The Project is located in the Kooragang Port and Industrial Area. The Port and Industrial Area has been subject to agricultural development since European settlement, and over a period of more than 50 years, dredge spoil disposal, land reclamation and waste disposal activities.* *Previous surveys within the Project area and Kooragang Port and Industrial Area for recent development proposals have not identified any remaining archaeological evidence of Aboriginal occupation.* *Consultation with the Aboriginal community for this proposal and previous development proposals has not identified any significant cultural heritage values in the Kooragang Port and Industrial Area.* *…* Figure 3 from the PAHA is attached at the back of this response document (**Figure A-4**).

No.	Subject	Issue	Response
A34 (Cont.)			These findings have since been reinforced by the recent PWCS Terminal 4 Project inspection of the proposed Terminal 4 Project *rail and utility corridor* (that adjoins the western side of the existing rail corridor and incorporates the western extent of the Rail Flyover Modification realignment of inbound rail line and ancillary infrastructure) and the Terminal 4 Project assessment findings with respect to Aboriginal heritage values (Section 16.2.2 of the Terminal 4 Project EA): *The lack of archaeological evidence within the T4 project area is a reflection of the highly modified landscape associated with past alterations to channel boundaries, channel filling with dredged material, covering of land surfaces with industrial waste and alternations to the drainage regime from industrial development. Although the wetland environment may have offered food resources, the impact of flooding and changing land morphology within the Hunter River delta may not have been conducive to the formation or persistence of archaeological sites.* *... the heritage inspections and assessment did not identify any specific socio-cultural heritage values relating to the T4 project area. The T4 project area has no scientific value given the lack of Aboriginal sites, lack of archaeological potential, significant landform modification and industrial disturbance... On this basis, the T4 Project area is of low cultural significance and there will be no impact to Aboriginal cultural heritage as a result of the T4 Project.* Notwithstanding, consistent with the statements made in Section 5.2 of the Rail Flyover Modification EA, and Project Approval (06_0009) Condition 7.2, NCIG will update the existing CEMP and submit it for the approval of the Director-General. Such updates would include amending Aboriginal cultural heritage management commitments regarding any Aboriginal objects that may be identified during construction earthworks for the Rail Flyover Modification.
A35	Aboriginal Heritage	Concerns were raised regarding the level of local Aboriginal community consultation.	Consultation was undertaken with the Awabakal Local Aboriginal Land Council (LALC), the Worimi LALC and the Maaiangal Aboriginal Heritage Co-operative during preparation of the original NCIG Project PAHA. As discussed in Section 16.2.1 of the Terminal 4 Project EA, Aboriginal consultation was undertaken by PWCS for the Terminal 4 Project with the following parties: • Awabakal Decedents Traditional Owners Aboriginal Corporation; • Awabakal LALC; • Awabakal Traditional Owners Aboriginal Corporation; • Cacatua Culture Consultants; • Maaiangal Aboriginal Heritage Cooperative; • Mur-Moo-Ma Inc; • Nur-Run-Gee Pty Limited; • Worimi LALC; and • Gimbay Gatigaan Aboriginal Corporation.

No.	Subject	Issue	Response
A35 (Cont.)			This consultation included consideration of potential development within the Terminal 4 Project *rail and utility corridor* that adjoins the western side of the existing rail corridor and incorporates the western extent of the Rail Flyover Modification realignment of inbound rail line and ancillary infrastructure. Based on the findings of the PAHA conducted for the original NCIG Project and the Heritage Assessment conducted for the Terminal 4 Project there is very low likelihood that any archaeological material would be uncovered during the Rail Flyover Modification earthworks, as the development areas have been subject to extensive historical land disturbance and alteration of drainage regimes. Notwithstanding, NCIG would involve the Aboriginal community in the following aspects of the Rail Flyover Modification: • consultation regarding the development of the Aboriginal Cultural components of the Induction Programme for the construction workforce that is involved in direct earthworks; and • consultation regarding the management of any new Aboriginal objects, in the event that such objects are identified during construction earthworks.
A36	Economics	Concerns were raised regarding the potential for job losses as a result of the operational efficiencies due to the Rail Flyover Modification.	Consistent with the statements made in Section 3.7 of the Rail Flyover Modification EA, works associated with the Rail Flyover Modification would be conducted during Stage 2F construction of the NCIG CET, over a period of approximately 18 months. During this time, approximately 50 people would be employed. Consistent with statements made in Section 4.13.2 of the NCIG Project EA (NCIG, 2006a), during the construction phase of the NCIG CET there would be direct employment of up to 400 people and indirect employment of 187 people. It is estimated that for the 66 million tonnes per annum (Mtpa) Project, 100 people would be directly employed during the operational phase, with an estimated 251 indirect employment opportunities. No changes to the NCIG operational workforce would be required for the Rail Flyover Modification.
A37	Lighting and Visual Impacts	Concerns were raised regarding lighting impacts and the proposed mitigation measures.	In accordance with Condition 2.59 of Project Approval (06_0009), NCIG will mount, screen and direct all external lighting installed as part of the Project so as not to create a nuisance to surrounding land uses. The lighting is in accordance with *AS 4282 – 1997 Control of the Obtrusive Effects of Outdoor Lighting*. A Visual Assessment Review was conducted as a component of the Rail Flyover Modification and concluded that the Rail Flyover Modification would not include any additional night-lighting sources to those assessed in the NCIG Project EA (Urbis, 2012). Consistent with the statements made in Section 4.5 of the Rail Flyover Modification EA, in accordance with Condition 7 of Particular Manner Decision (EPBC 2006/2987), NCIG would place screens, comprising timber paling fences or similar structures, at intervals along the rail infrastructure (including the Rail Flyover Modification) to minimise lighting impacts from trains and rail corridor lighting.

No.	Subject	Issue	Response
A38	Other	Concerns were raised regarding the need for the Rail Flyover Modification.	In accordance with Condition 2.40 of Project Approval (06_0009), NCIG conducted a review of the need for the high capacity optional inlet rail spur and rail sidings in consultation with the Australian Rail Track Corporation Ltd (ARTC) and PWCS and the Director-General of the DP&I was notified of the outcomes of the review. Specifically, the review concluded that a flyover (i.e. grade separation) would be necessary to meet the requirements of the ARTC. Without the inbound (western) track of the Kooragang Island Main Line for the Rail Flyover Modification, significant loss of port capacity would be incurred on Kooragang Island for approximately 9 months of the anticipated 18 month construction period due to reduced train speeds and periodic shut downs of the tracks.
A39	Other	Concerns have been raised that alternative options to avoid the need to increase the footprint for the Rail Flyover Modification have not been fully investigated.	The inbound (western) track of the Kooragang Island Main Line for the Rail Flyover Modification has been designed to minimise its disturbance footprint (i.e. it is a linear disturbance located adjacent to the existing rail embankment). Without the inbound (western) track of the Kooragang Island Main Line for the Rail Flyover Modification, significant loss of port capacity would be incurred on Kooragang Island for approximately 9 months of the anticipated 18 month construction period due to reduced train speeds and periodic shut downs of the tracks. There are not considered to be any other feasible alternatives available for NCIG's Rail Flyover Modification which would not result in a significant loss of port capacity for approximately 9 months of the anticipated 18 month construction period.
A40	Other	Concerns were raised that the Rail Flyover Modification would contribute to additional coal exports and as a consequence greenhouse gas emissions and climate change.	The Rail Flyover Modification would not result in additional coal exports from the NCIG CET (approved capacity up to 66 Mtpa).
A41	Other	Concerns were raised that the Rail Flyover Modification should be considered a "controlled action" under the EPBC Act.	The EA concludes that the Rail Flyover Modification would not have a significant impact on any threatened flora or fauna species or communities listed under the Schedules of the EPBC Act. The Rail Flyover Modification has therefore not been referred to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities for consideration under the EPBC Act, as the 'Action' would continue to be conducted in a manner consistent with that described in the NCIG Kooragang Island Coal Export Terminal Referral (NCIG, 2006b) and in accordance with the conditions of EPBC Particular Manner Decision 2006/2987.

REFERENCES

Australian Museum (2012) *Database Records for the Search Area -31.9563, 151.6151; -32.7760, 151.6179; -32.7782, 151.8314; -32.9585, 151.8290*.
Date Received: May 2012.

Birds Australia (2012) *Database Records for the Search Area -31.9563, 151.6151; -32.7760, 151.6179; -32.7782, 151.8314; -32.9585, 151.8290*.
Date Received: 24 May 2012.

Department of Environment and Conservation and Department of Primary Industries (2005) *Draft Guidelines for Threatened Species Assessment*.

Newcastle Coal Infrastructure Group (2006a) *Newcastle Coal Infrastructure Group Coal Export Terminal Environmental Assessment*. July 2006.

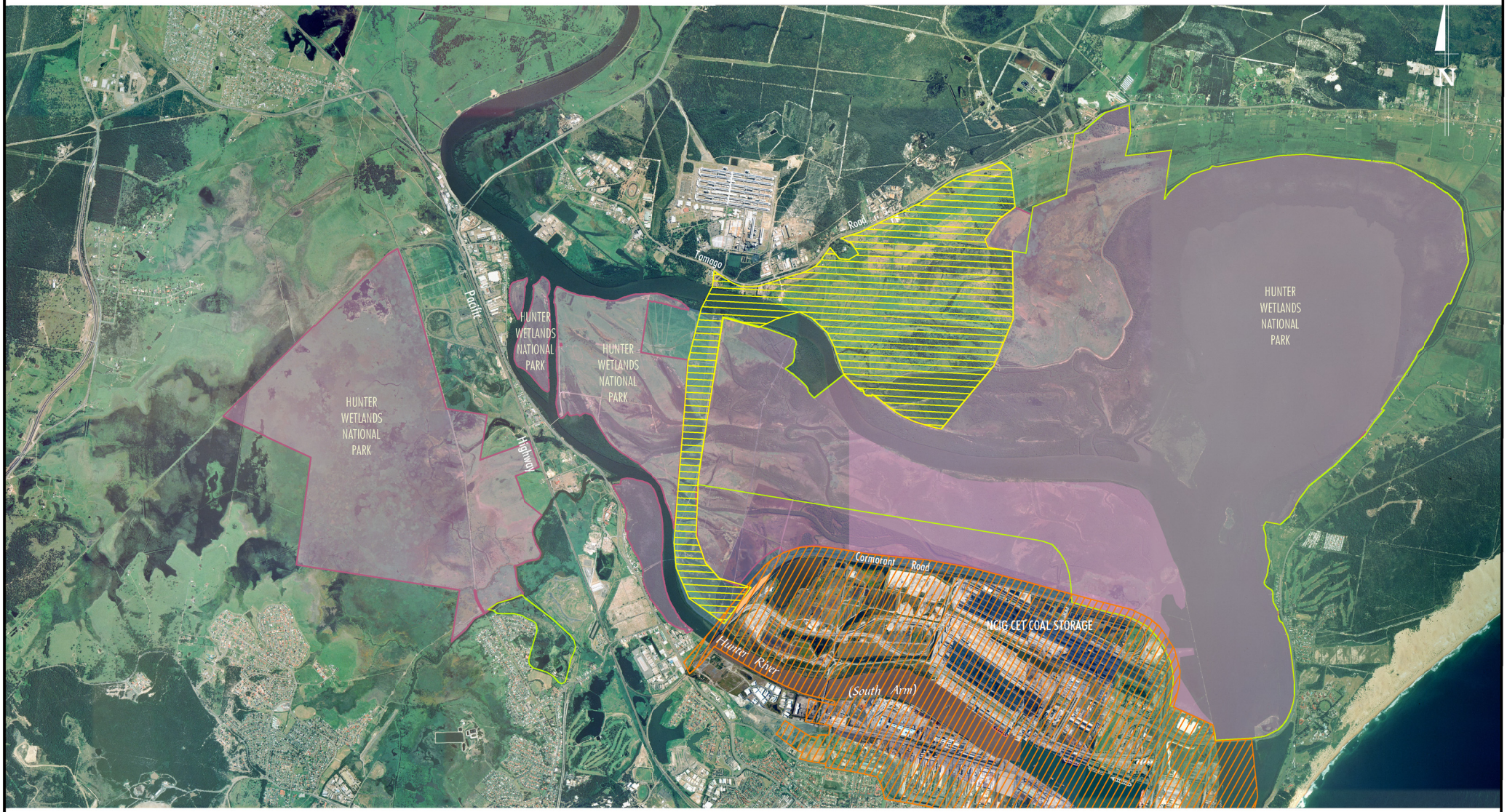
Newcastle Coal Infrastructure Group (2006b) *Newcastle Coal Infrastructure Group Kooragang Island Coal Export Terminal Referral*. August 2006.

Office of Environment and Heritage (2012) *Atlas of NSW Wildlife Records for the Search Area -32.82, 151.78, -32.92, 151.68.*
Date Received: 25 May 2012.

SLR Consulting Australia Pty Ltd (2012) *NCIG Coal Export Terminal Rail Flyover Modification – Noise Prediction and Assessment Review.*

Urbis (2012) *NCIG Coal Export Terminal Project Approval (06_09009) – Rail Flyover Modification Visual Assessment Review*.

FIGURES



Source: RPS (2010), NPWS (2012), KWRP (2007) and NCIG (2012)

FIGURE A-1

Rail Flyover Modification - Realignment of Kooragang Island Main Line Inbound Track

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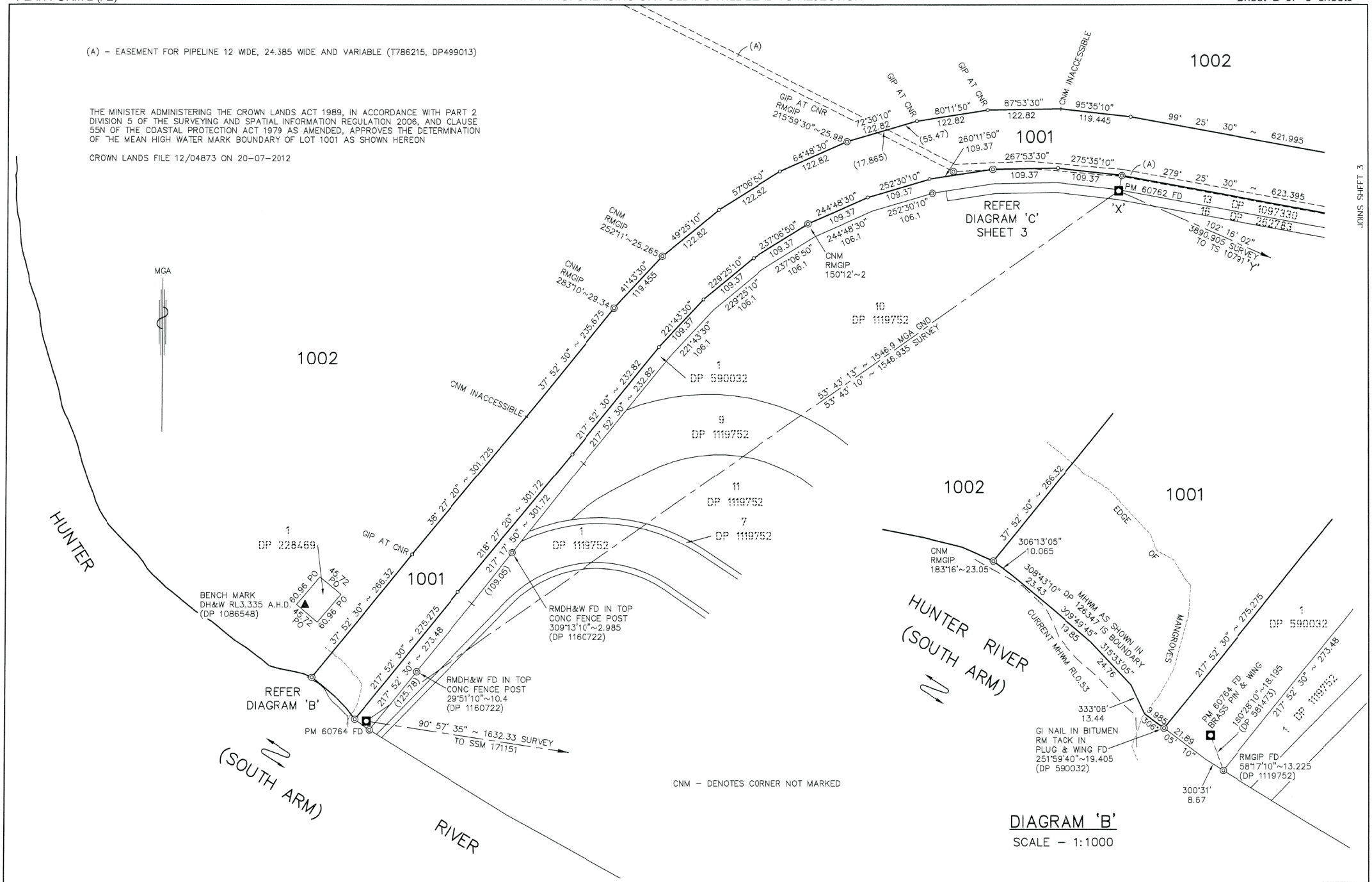
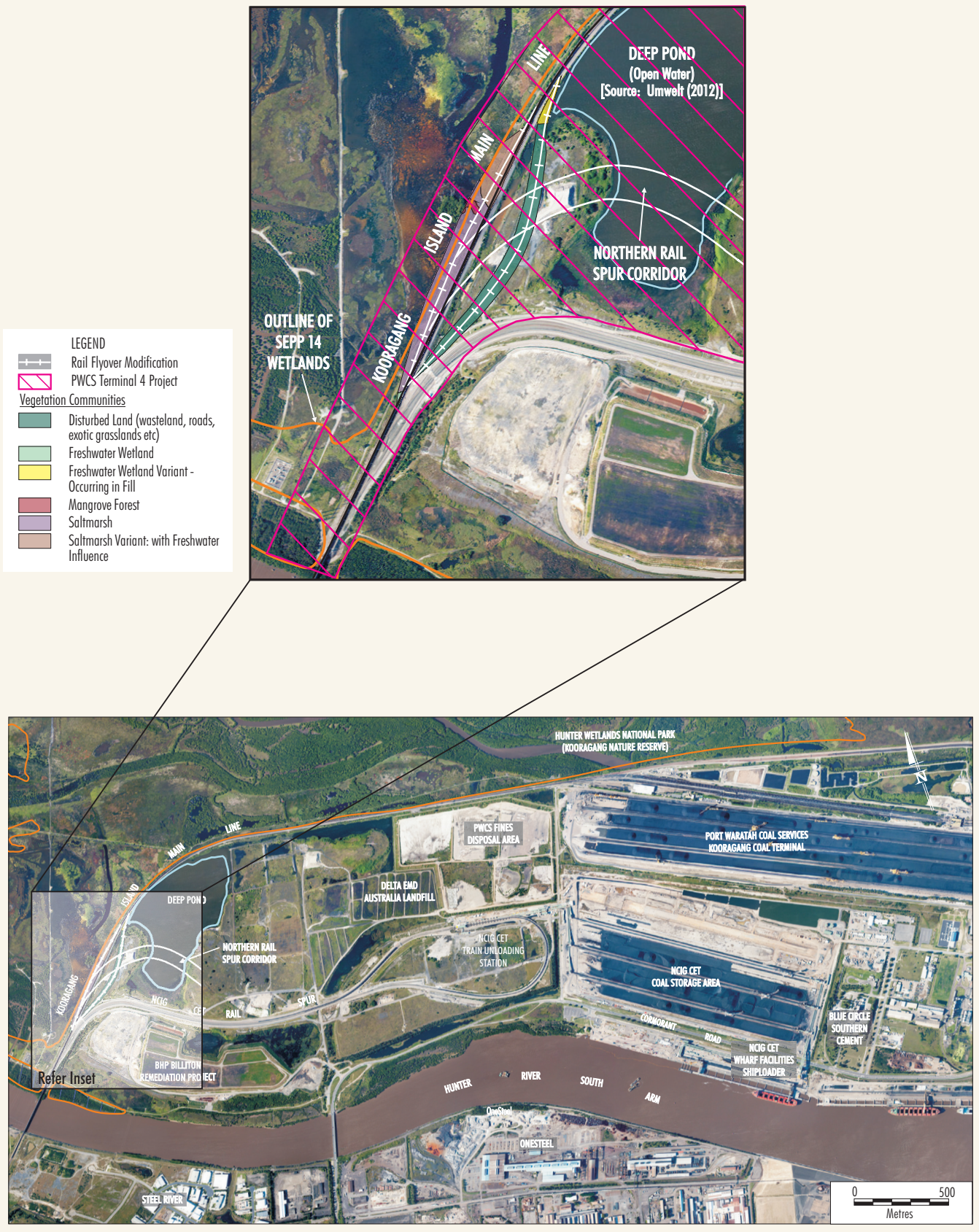
NCIG-07-02 RS Sep12_101C



Surveyor: JOHN WILSON Date of Survey: 26/06/2012 Surveyor's Ref: 120100DPA 2012M°100 (1124) ADDITIONAL SHEETS 2012M°100 (543) PARTIAL SURVEY E. No. °2/062 - CLAUSE 30(1) & (2)	PLAN OF SUBDIVISION OF LOT 1 DP 126347	LGA: NEWCASTLE Locality: KOORAGANG ISLAND Subdivision No: - Lengths are in metres. Reduction Ratio 1: 4000	Registered	DP

Figure A-2

10 20 30 40 50 60 Table of mm 90 100 110 120 130 140



Source: Aerial Photo NCIG (February 2012)(Not Orthocorrected) and Umwelt (2012)

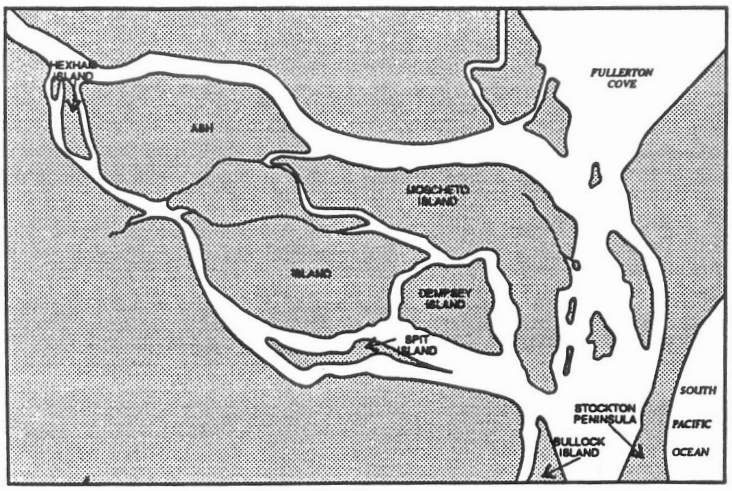
RAIL FLYOVER MODIFICATION

FIGURE A-3

Vegetation Mapping

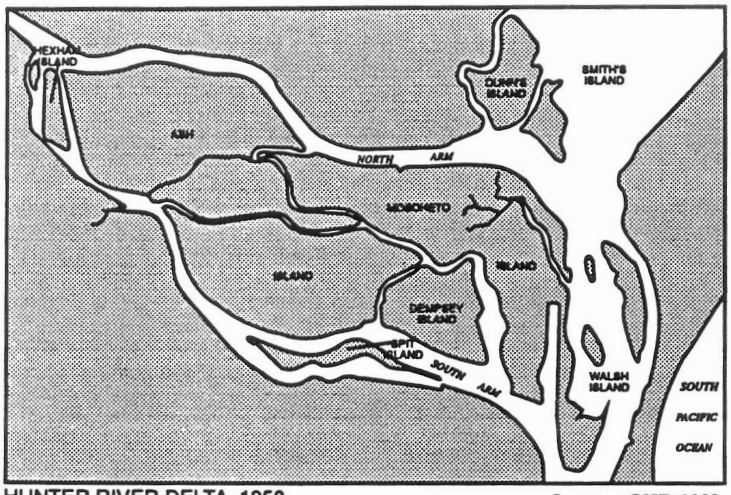
Newcastle Coal INFRASTRUCTURE GROUP

NCIG-07-02 RS_003A



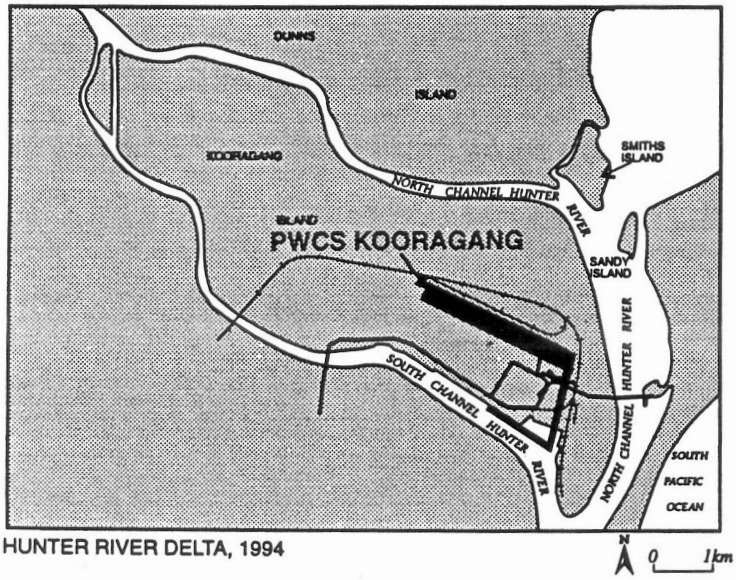
PROBABLE ARRANGEMENT OF THE HUNTER RIVER DELTA, CIRCA 1800

Source: GHD,1993



HUNTER RIVER DELTA, 1950

Source: GHD,1993



HUNTER RIVER DELTA, 1994

Source: Port Waratah Coal Services (1996)

PRELIMINARY ABORIGINAL HERITAGE ASSESSMENT

FIGURE 3
Historical Development of Kooragang Island

ResourceStrategies

Newcastle Coal INFRASTRUCTURE GROUP

NCIG-05-01PAHA_002A

FIGURE A-4