ASSESSMENT REPORT:
Kurnell Ports and Berthing Facility
Prince Charles Parade
Kurnell and Botany Bay (SSD_5353)

Director General's
Environmental Assessment Report
Section 79C of the
Environmental Planning and Assessment Act 1979

August 2013

ABBREVIATIONS

Applicant	Caltex Refineries (NSW) Pty, or any other person or persons who rely on this consent to carry out the development that is subject to this consent
CIV	Capital Investment Value
Consent	A development consent granted for this development
DPI	Department of Primary Industries
Department	Department of Planning and Infrastructure
DGRs	Director-General's environmental assessment requirements
Director General	Director-General of the Department
EIS	Environmental Impact Statement titled *Kurnell Ports and Berthing Facility*, dated February 2013
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPI	Environmental Planning Instrument
Minister	Minister for Planning and Infrastructure
OEH	Office of Environment and Heritage
PAC	Planning Assessment Commission
PFM	Planning Focus Meeting
RMS	Roads and Maritime Services
RtS	Response to Submissions
SSD	State Significant Development

Cover Photograph: Caltex Port and Berthing Facility in Botany Bay, off Prince Charles Parade Kurnell with Caltex Refinery in the far ground

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EXECUTIVE SUMMARY

Caltex Refineries (NSW) Pty Ltd (Caltex) has operated an oil refinery and distribution terminal at Kurnell since 1956. In mid-2012, following a review of its future operations, Caltex determined that it would cease refining at Kurnell and convert the site into a major import terminal for refined fuels only. Changes to the existing port and berthing facility required to facilitate the berthing of shipping vessels are being progressed through the Development Application (SSD 5353) the subject of this report, while changes to land based refinery operations are subject to a separate Development Application.

On 13 June 2012, Caltex (the Applicant) lodged SSD 5353 to upgrade and modify the Kurnell port and berthing facility. The development, which is located north of Prince Charles Parade, Kurnell in Botany Bay, includes the following principal components:

- dredging berths, turning circle and approaches;
- reuse of a proportion of the dredged material to cover an exposed section of the subsea fuel pipelines and a former anchor point;
- disposal of the remaining dredged material offshore;
- upgrade of the fixed berths; and
- upgrade of the sub berth.

The Application and accompanying Environmental Impact Statement (EIS) were placed on public exhibition between 28 February 2013 to 5 April 2013. Six submissions were received from Government agencies (NSW Office of Environment and Heritage, Environment Protection Authority, Department of Primary Industries, Sutherland Shire Council, Randwick City Council and Sydney Ports Corporation) during the exhibition. No public submissions were received. The key issues raised in the agencies' submissions were:

- the dispersal and deposition of tributyltin (TBT) and impacts to water quality and aquatic ecology;
- potential impacts to recreational fishing and aquaculture within the Bay;
- changes to coastal processes and hydrodynamics within the Bay from dredging activities; and
- cumulative impacts to Botany Bay from the proposal and other major development in Botany Bay.

Following the public exhibition, the Department requested that the Proponent prepare a Response to Submissions (RtS) report. This was submitted in July 2012 and outlined changes to the development (in the form of additional or modified mitigation measures) that would be implemented to further minimise and manage impacts associated with the development and responding to the issues raised.

The development has been assessed in accordance with Section 79C of the EP&A Act, the objects of the Act and the principles of ecologically sustainable development. The Department considers the key assessment issues to be water quality, aquatic ecology, coastal processes and noise. Based on its assessment, the Department is satisfied that the likely impacts of the proposal would not be significant and can be appropriately mitigated and managed.

The proposal could pose a residual risk of dispersing TBT bound sediments during dredging to areas outside of the development footprint. However, predicted deposition levels would be less than 15 mm in key locations (the aquaculture site and northern portion of the sea grass beds immediately to the south of the Kurnell Wharf) and will not result in accumulated concentrations that exceed relevant trigger levels. A significant volume of TBT contaminated sediments would be removed from the bay as part of the proposal and therefore result in an overall reduction in contaminants and subsequent improved environmental outcome. The Department has recommended a conditions framework based on minimising the generation

of TBT bound suspended sediment at-source and monitoring deposition locations for any changes which may be attributable to the proposal.

With the implementation of the Applicant's management and mitigation measures, together with the imposition of conditions, the Department considers that impacts will be minimised, managed and appropriately mitigated whilst ensuring the continued operation of the refinery as a long term refined fuel import facility to maintain fuel supply demands for domestic, commercial, industrial, transport and other uses. On balance the Department considers the development to be justified and in the public's interest and should be approved, subject to conditions.

1. BACKGROUND

1.1. EXISTING OPERATIONS

Caltex Refineries (NSW) Pty Ltd (the Applicant), operates the Kurnell crude oil refinery, located on the Kurnell Peninsula in the Sutherland Shire Local Government Area (LGA), approximately 15 km south of the Sydney CBD (refer **Figure 1**). The refinery includes Kurnell Wharf and associated shipping berths (collectively referred to as the Kurnell port and berthing facility), located off Silver Beach on the Kurnell Peninsula, approximately one kilometre into Botany Bay.

The refinery was commissioned in 1956 and was used to receive and refine crude oil into refined petroleum products. The refinery also receives some refined petroleum products for blending and/ or on-sale. The refinery currently has the capacity to produce approximately 21.5 million litres of refined petroleum products per day, supplemented by approximately 650 million litres of imported refined petroleum products per annum. The refinery is entirely reliant on ship movements to transport crude oil and refined petroleum products to the refinery. Finished petroleum products are distributed via either ship, road or pipeline to service Australian and overseas markets. This includes a series of submarine pipelines distributing fuel under Botany Bay with connections to terminals at Banksmeadow and Silverwater, and servicing the Sydney (Kingsford Smith) Airport.

Following a review of its operations, Caltex announced in July 2012 its intention to cease refining operations in mid-2014 and to convert the refinery site into a finished fuel terminal. To facilitate this conversion, Caltex has submitted two State Significant Development (SSD) applications which cover:

- the conversion of its existing refinery to a finished petroleum product import terminal – land based activities focused on the inland refinery (SSD 5544); and
- upgrade of its port and berthing facilities to support the conversion of the refinery – marine based infrastructure upgrades (SSD 5353).

This report assesses SSD 5353, the application covering the marine based infrastructure upgrade, herein referred to as the Kurnell port and berthing facility upgrade (the development). The land based conversion of the refinery is being separately assessed by the Department.

1.2. SURROUNDING LAND USE

The Kurnell port and berthing facility is located largely within unincorporated land in Botany Bay, with the exception of a small component of the Kurnell Wharf which is located in the Sutherland Shire LGA and governed by *State Environmental Planning Policy (Kurnell Peninsula) 1989* (Kurnell Peninsula SEPP). The port and berthing facility comprises the following key elements as shown in **Figure 1**:

- the Kurnell Wharf (a one kilometre jetty structure);
- two fixed shipping berths (permanent structures into which ships are moored) located at the end of the Kurnell Wharf. The two fixed berths are located on either side of a 'breasting island', which comprises a structure located at the end of Kurnell Wharf containing the relevant loading/ unloading infrastructure for the ships;
- a sub berth (a designated area in which ships temporarily moor) to the north east of the two fixed berths;
- a turning circle area between the fixed and sub berths, in which ships manoeuvre and turn into the berths; and
- a crude oil submarine pipeline which connects the refinery's storage tanks to the fixed berths and the sub berths.

The site is surrounded by Botany Bay which is used for industrial and recreational purposes. The closest residential area is the suburb of Kurnell running along the northern shoreline of

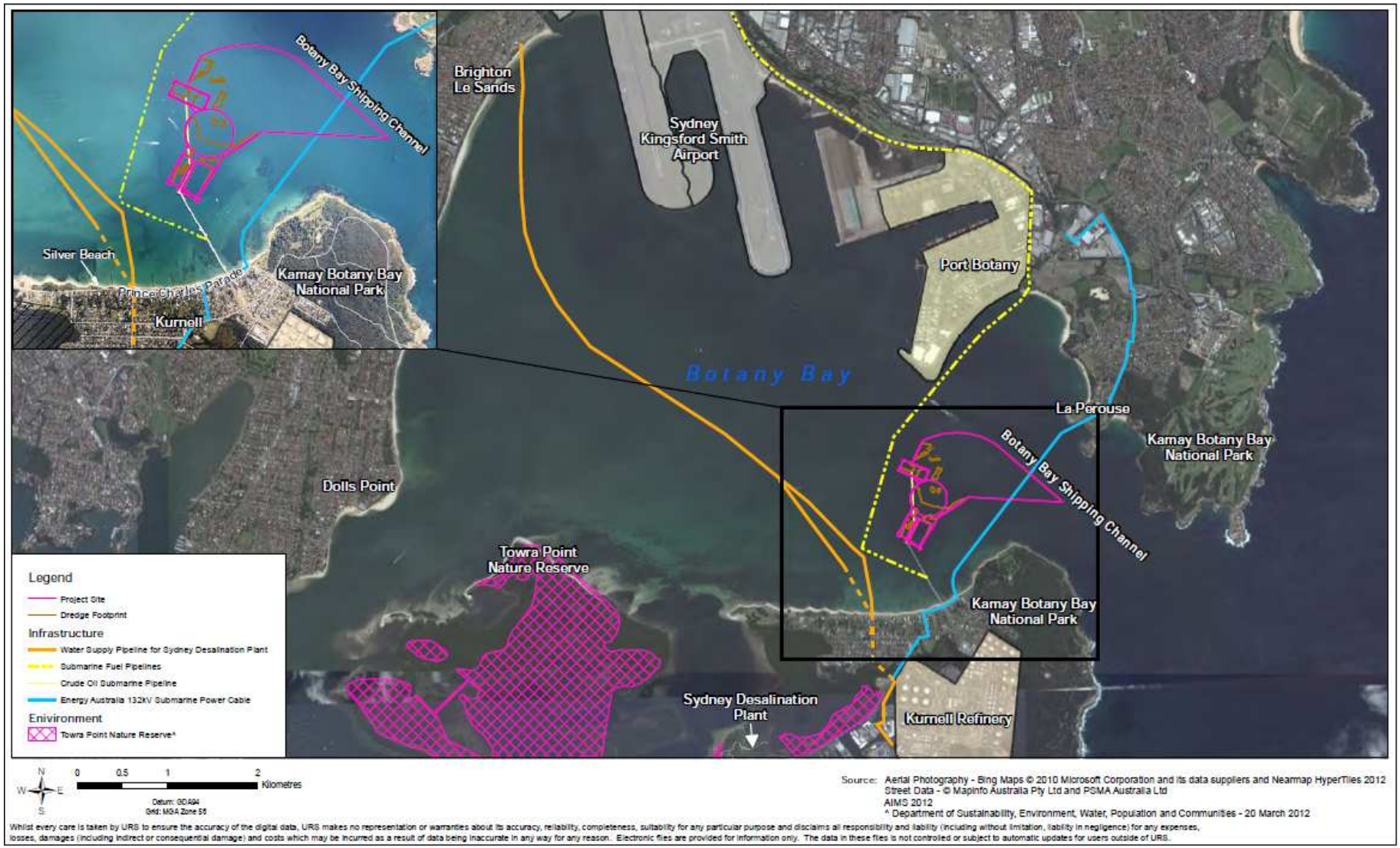
the Kurnell Peninsula. The nearest residential receivers are located approximately 800 m to the south of the development site along Prince Charles Parade, Kurnell. The Sydney Desalination Plant is located south west of the Kurnell refinery, south of the Kurnell residential area. Land on the northern side of Botany Bay includes Port Botany, Sydney Kingsford Smith Airport and the suburb of La Perouse.

Infrastructure within Botany Bay includes the water supply pipeline from the Sydney Desalination Plant and Energy Australia (now Ausgrid) 132 kV submarine cables.

Land uses west of the development site includes the Towra Aquatic Reserve and RAMSAR listed Towra Point Nature Reserve, located on the south-western foreshore of Botany Bay. The Kamay Botany Bay National Park, which includes the National Heritage listed landing site of Captain Cook, is located on the south-eastern foreshore of Botany Bay on the northern tip of the Kurnell Peninsula, approximately 800 m from the development site.

Aquaculture activities within Botany Bay include oyster farming at Quibray Bay, Woolooware Bay and the inlet to the west of Towra Point. The closest aquaculture site to the development area is a lease area approximately 100 m to the south west of Kurnell Wharf. This lease was previously used as a commercial fin fish farm and has recently been approved for pearl oyster farming. The site is currently inactive although the subject of an active lease. Recreational fishing is also a popular land use within the Bay.

Figure 1: Site Location and Surrounding Land Use (Source: URS, February 2013)



2. PROPOSAL

2.1. DESCRIPTION

The development involves the upgrade of the existing Kurnell port and berthing facility to:

- to allow larger vessel sizes required to support a full scale finished fuel import operation; and
- provide for a safer approach and access to berthing facilities for ships by removing accumulated sea-bed sediments and increasing navigable depths for the ships.

Currently, between 10 to 13 vessels arrive at the wharf each month to discharge crude oil. However, the current design and configuration of the existing berths constrain the size of vessel that can be received. By enabling larger ships to access the site, the upgrade is expected to reduce total ship numbers by approximately 40 per cent.

The development involves the following principal components, for which development consent is sought:

- dredging berths, turning circle and approaches;
- reuse of a proportion of the dredged material to cover an exposed section of the subsea fuel pipelines and a former anchor point;
- disposal of the remaining dredged material offshore;
- upgrade of the fixed berth infrastructure; and
- upgrade of the sub berth.

It is noted that the offshore disposal of dredged sediment (which is not otherwise re-used on site) would be undertaken outside of NSW maritime jurisdiction and is subject to separate Commonwealth approval under the *Environment Protection (Sea Dumping) Act 1981*. As such, the impacts associated with offshore sediment disposal (e.g. water quality, aquatic ecology etc) are not discussed in this report. The Applicant would need to secure a Commonwealth approval in order for the proposal to proceed.

Dredging operations and upgrade works would take place within Botany Bay over a two year period, with around 10 vessels operating at any one time. On land, there would be a temporary laydown area located within the existing sealed easement (right-of way) directly behind the Wharf at Nos. 36-46 Prince Charles Parade, Kurnell. Some storage of materials may also be required at the Caltex Refinery facility.

During this period, 30 personnel would be employed during dredging operations, 25 personnel during upgrade of the fixed berths and 12 personnel during the upgrade of the sub berth. Once complete, there would be no change to existing operational employees.

Key components of the development are listed in Table 1 and the development layout is shown in **Figure 1**. The location of the temporary lay down facility along Prince Charles Parade is shown in **Figure 2**. Full details of the development description are provided in the Applicant's Environmental Impact Statement (EIS) (refer Appendix A).

Table 1: Key Components of Development

Aspect	*Description*
Dredging berths, turning circle and approaches	• "Spot dredge" locations within the turning circle, approaches and berths to leave a broadly flat, uniform area across the base of the footprint. The dredging would result in returning the turning circle and approaches to a design depth of 12.8 m below chart datum and the sub berth to 14 m below chart datum and expanding the fixed berths to 12.8 m below chart datum; • Dredge approximately 153,000 m^3 of material, of which approximately 6,000 m^3 of material would be re-used on site and the remainder disposed offshore; • Use of backhoe dredging technique to load the dredged sediments onto split hopper barges; • Materials to be transported to the disposal/reuse areas where they are unloaded from the bottom of the split hopper barge; and • Waste generated during the works (including waste diesel, oils, lubricants, hydraulic fluid, sewage, cooking oil ablutions and detergents) would be stored aboard the dredging vessel and collected for onshore disposal at an appropriate licensed facility.
Reuse of a proportion of the dredged material	• Reuse of approximately 6,000 m^3 of clean (uncontaminated) dredged material to fill a former anchoring hole at the centre of the turning circle and to cover two exposed sections of the submarine fuel supply pipelines behind the sub-berth. The remaining 147,000 m^3 of dredged material is to be disposed of offshore, and is subject to Commonwealth approval under the *Environment Protection (Sea Dumping) Act 1981* and is not subject to assessment under this report).
Upgrade of the sub berth	• Upgrade the mooring system; • Provide for a greater range of ship sizes from 60,000 Deadweight Tonnes (DWT) to 200,000 DWT and ship sizes between 185 – 245 m long; • Upgrade of the mooring system to comply with safety guidelines; • Replacement of the No.3 Buoy with a swamp mooring to allow safe mooring close to the submarine fuels pipelines that run behind the sub berth; • Replacement of the No.9 Buoy with a twin mooring buoy; • Addition of a swamp mooring line, forward of the swamp mooring line; • Replacement of the existing chains with higher quality and grade chains; • Replacement of the existing swamp mooring lines with high performance mooring lines; and • Replacement of No.1, No.2, No.4 and No.5 twin mooring buoys with new twin mooring buoys fitted with the twin remote operated quick release hooks.
Upgrade of the fixed berths	• Fixed berth 1 - Increase length from 233 m to 310 m; - Increase width from 35 m to 135 – 165 m; - Increase ships sizes from 180 m to 250 m; - Increase tonnage of ships from 50,000 DWT to 100,000 DWT; - Install hydraulic loading arms and supporting manifold; - Replace the bollards with quick release hooks; - Install two breasting dolphins to allow the berthing of larger ships; - Construct a rock revetment wall and sheet piled wall at the southern end of the berth to support the increased size of this berth; - Upgrade the existing fire safety system; and - Undertake a range of minor ancillary works. • Fixed Berth 2 - Decrease the length from berth 250 m to 245 m - Increase the width from 35 m to 100 m; - Accommodate a greater ship size from 180 m to 200 m; and - No change to tonnage of ships (DWT).

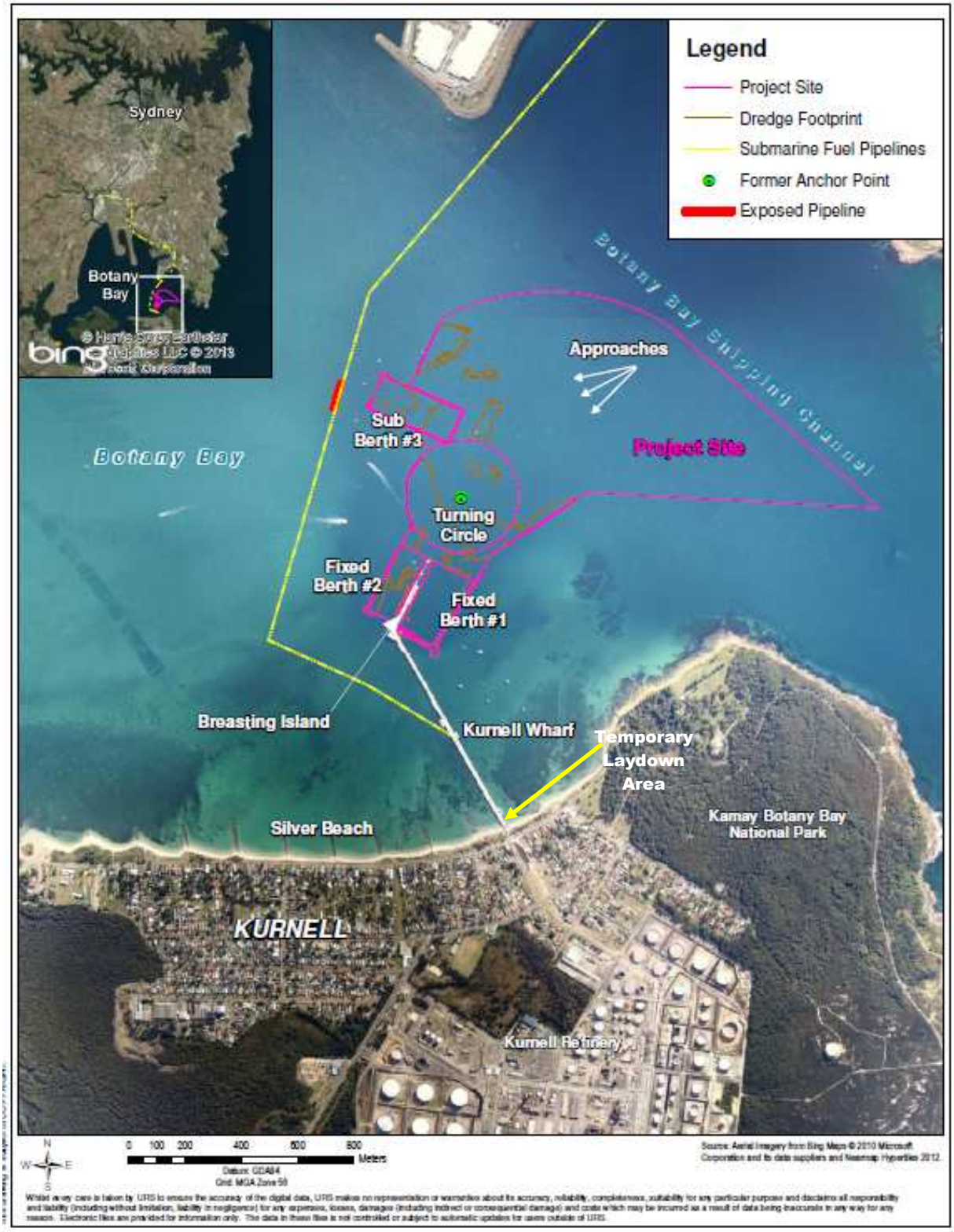


Figure 2: Development Layout (Source: URS, July 2013)

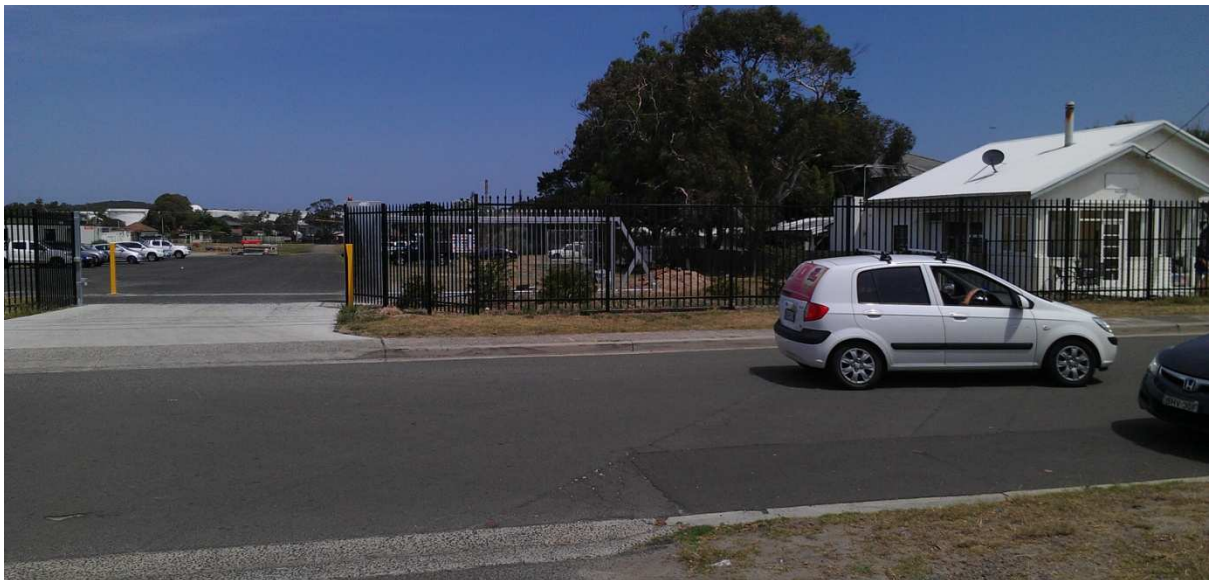


Figure 2: Construction Lay-down Area at No.36-46 Prince Charles Parade, Kurnell

2.2. PROJECT NEED AND JUSTIFICATION

Caltex has operated a refinery terminal at Kurnell since 1956. The Kurnell refinery is the largest refinery in NSW and the second largest of the seven operating oil refineries in Australia, supplying transport fuel and a range of other fuels and speciality products to domestic and international markets. The refinery is critical to the functioning of the NSW economy, supplying 40-50% of the overall fuel supplies to the NSW/ ACT markets, and is a leading supplier of jet fuel to the Sydney (Kingsford Smith) Airport.

In mid-2012, following a review of its future operations, Caltex determined that it would cease refining operations at Kurnell in mid 2014 and convert the site entirely to an import terminal for finished petroleum products. As an import terminal for petroleum products, Caltex would continue to fulfil its role of supplying fuel and refined petroleum products to Australian and overseas markets. In addition, the conversion and upgrade of the site would enable expansion of import operations to meet the expected growth in demand for petroleum products in NSW (up to 4-5% per annum, in line with predicted economic growth).

The Kurnell site is the hub of Caltex's supply chain in NSW and ACT, from which radiates an extensive network of pipelines that Caltex has invested in to supply bulk fuel to strategically located fuel distribution centres, including Banksmeadow (servicing Sydney and southern NSW), Silverwater (servicing Western Sydney and NSW) and Newcastle (servicing the Hunter and northern NSW). The Department accepts that given existing infrastructure investment, there are limited alternative locations available for a fuel terminal that would provide the same functionality as Kurnell. Without the Kurnell facility, extensive upgrades to existing oil terminal facilities in Brisbane and/or Melbourne would be required with associated significant increases to road transport deliveries to service NSW's ongoing and increasing demands for oil products. Alternatively an entirely new terminal would need to be constructed in Sydney or elsewhere in NSW. The upgrade and conversion of the existing Kurnell site is more cost effective and avoids potential environmental impacts associated with significant expansion of existing terminals interstate or construction of a new terminal in NSW.

The conversion of the Kurnell refinery into an import terminal would require changes to the land based facility (subject to separate assessment by the Department) and upgrade of its port and berthing facility within Botany Bay to cater for expanded operations (the current development). The proposed port and berthing facility upgrade would enable the transition of

the Caltex Refinery to an import terminal, suitable for the delivery of refined petroleum products via larger and a more diverse range of ocean-going tankers. The upgrade would provide a more modern port and berthing facility that can better accommodate vessels including during periods of inclement weather. Without upgrades to the port and berthing facility, access to the future terminal by a broad range of shipping vessels would be permanently constrained, meaning that the future terminal would not be able to function effectively or competitively, thereby constraining future fuel supply in NSW. In addition, without the upgrade including the removal of sea bed sediment accumulated over time along the shipping channels and turning circles, the existing port facility has the potential to pose a serious occupational safety hazard to ongoing shipping operations, which is untenable.

The Department accepts that the proposed port and berthing facility upgrade would help facilitate the continued operation of the site as a long term petroleum import terminal to meet current and future market demand in NSW and ACT. The Department considers the development to be strategically justified as it would help facilitate the ongoing operation of the Kurnell site, which is already established to supply and distribute fuel across NSW to meet current and future demand and thereby facilitate existing and long-term economic growth in the State. In this regard, the Department considers the development, which supports the ongoing industrial activity at the Kurnell site, to be consistent with the objectives of the draft *South Subregional Strategy* (Department of Planning, 2007) which recognises the importance of protecting employment lands around the Caltex refinery at Kurnell. In supporting the continued operation of the Kurnell site and continued supply of fuels to the NSW market, the proposal would help support future economic and population growth and the support the liveability of the global city of Sydney as envisaged in the *draft Metropolitan Strategy for Sydney* (NSW Government 2013). It would also contribute to meeting the goals in *NSW 2021* by improving the performance of the NSW economy, driving economic growth and increasing the competitiveness of doing business in NSW.

The Department notes that to facilitate the development as proposed, dredging of approximately 153,000m^3 of marine sediment would be required, of which approximately 147,000m^3 would be disposed to Commonwealth territorial waters (subject to separate Commonwealth approval). Notwithstanding, based on the information provided in the EIS, the Department is satisfied that the Applicant has given due regard to alternative disposal options (including onshore disposal within NSW) in determining offshore disposal as its preferred option. The Department notes that onshore disposal has been precluded as a viable alternative in consultation with Government agencies (NSW Department of Primary Industries (Fisheries) and Environment Protection Authority).

In consideration of the matters discussed above, the Department is satisfied that the Applicant has established the need for the development with due consideration to alternatives and considers the proposal to be justified.

3. STATUTORY CONTEXT

3.1. STATE SIGNIFICANT DEVELOPMENT

The development has a capital investment value of $66 million and meets the category of development identified in Schedule 1, clause 18 of *State Environmental Planning Policy (State and Regional Development) 2011*, that being "*development for the purpose of port facilities or wharf or boating facilities (not including marinas) that has a capital investment value of more than $30 million*". Consequently, the development is classified as State Significant Development (SSD) pursuant to clause 8(1)(b) of the SEPP and the Minister for Planning and Infrastructure is the consent authority for the development.

On 14 September 2011, the Minister delegated his approval functions under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to the Planning

Assessment Commission (PAC) for all SSD applications, where the Applicant is not a public authority and where:

- the relevant local council has made an objection,
- there are more than 25 public submissions objecting to the proposal,
- a political disclosure statement has been made in relation to the application.

There have been no public submissions objecting to the proposal and the submissions received from Sutherland Shire Council and Randwick City Council raised issues for assessment however did not express objection to the application. However, there has been a political disclosure statement made in relation to the application by the Applicant. Therefore the application is referred to the PAC for determination.

3.2. PERMISSIBILITY

The permissibility of the development is established under the provisions of *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP).

Clause 69(1) of Division 13 of the Infrastructure SEPP states that "*development on land within a port facility or within a public ferry wharf, being development:*

a) for the purposes of the erection, reconstruction, alteration or use of a structure associated with retail premises, business premises or industrial premises that are not directly related to the operation of the port, and
b) that is not development of a kind referred to in clause 68"

is permissible with consent on land in a prescribed zone or on unzoned land.

Division 13 of the Infrastructure SEPP defines a *port facility* as being "*facilities at, or on land in the vicinity of, a designated port",* where *"facilities"* is defined as including "*facilities for the loading or unloading of freight onto or from vessels and associated receival, land transport and storage facilities*". With the exception of dredging activities, the development would be located on land within existing *facilities* (the port and berthing facilities of the Caltex refinery which is used for the loading or unloading of freight onto and from vessels), *in the vicinity of a designated port* (the existing Kurnell port facility, and equally, nearby Port Botany). Consequently, the development (with the exception of dredging activities) is considered to comprise *development on land within a port facility.*

The proposed development (with the exception of dredging activities) would also comprise *the erection, reconstruction, alteration or use of a structure associated with….industrial premises that are not directly related to the operation of the port*, as it would involve upgrades and modifications to the port and berthing facility associated with the Caltex refinery which is not directly related to the operation of Port Botany.

The proposal does not comprise development specified in clause 68 of Division 13 of the Infrastructure SEPP, which relates to activities undertaken by on behalf of public authorities.

Furthermore, the majority of the development site lies within unzoned or incorporated land within Botany Bay. A small portion of the development, comprising the south east corner of the extended fixed berth 1 and laydown and loading areas would be located on land subject to the Kurnell Peninsula SEPP and zoned as 7 (a) (Waterways zone) under this SEPP. Division 13 of the Infrastructure SEPP states that a zone equivalent to the land use of a prescribed zone is a prescribed zone. The 7 (a) (Waterways zone) is considered to be equivalent to the W2 (Recreational Waterway) and W3 (Working Waterway) prescribed zones identified in Division 13 of the Infrastructure SEPP, as the objectives of the 7 (a) (Waterways zone) of protecting the aquatic environment and maintaining fishing industries are considered to be consistent with similar objectives in the W2 and W3 zones. Consequently, the development is considered to be located on land in either a *prescribed zone* or *on unzoned land.*

Based on the above, the development (with the exception of dredging activities) is considered to meet the definition of development provided in clause 69(1) of Division 13 of the Infrastructure SEPP and is consequently permissible with consent.

Clause 69(3) of Division 13 of the Infrastructure SEPP states that "*development for the purpose of dredging (other than dredging referred to in clause 68) may be carried out by any person with consent on any land*". The dredging proposed as part of the development is **not** dredging referred to in clause 68, which refers to matters being undertaken by or on behalf of a public authority. Dredging proposed therefore meets the requirements of Clause 69(3) of Division 13 of the Infrastructure SEPP

3.3. EXHIBITION AND NOTIFICATION

The Development Application (DA) and accompanying EIS was made publicly available from 28 February to 5 April 2013 (37 days) in accordance with clause 89F(1) of the EP&A Act and clauses 83-85 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). (Note: the public exhibition period was extended to account for the Easter Holiday period). The DA and EIS were made available at the following locations:

- on the Department's website;
- at the Department's Information Centre;
- Sutherland Shire Council Administration Centre,
- Cronulla Library; and
- The Nature Conservation Council in Newtown.

Pursuant to clause 84(1) of the EP&A Regulation, notice of the exhibition was given on the Department's website and via advertisements published in local newspapers: Sydney Morning Herald, Daily Telegraph and St. George and Sutherland Shire Leader.

Pursuant to clause 84(2) of the EP&A Regulation, the Department also notified landowners in the vicinity of the site in writing about the exhibition period and notified relevant State Government authorities and Sutherland Shire Council.

3.4. OBJECTS OF THE EP&A ACT

Decisions made under the EP&A Act must have regard to the objects of the Act, as set out in section 5 of the Act. The relevant objects are:

a) to encourage:
  (i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,
  (ii) the promotion and co-ordination of the orderly and economic use and development of land,
  (iii) the protection, provision and co-ordination of communication and utility services,
  (iv) the provision of land for public purposes,
  (v) the provision and co-ordination of community services and facilities,
  (vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats,
  (vii) ecologically sustainable development,
  (viii) the provision and maintenance of affordable housing, and
b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and
c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

The objects of most relevance to the present application are those stated in sections 5 (a) (i), (ii), (vi), (vii), 5 (b) and 5 (c), noting that the application does not present significant issues in relation to communication and utility services, land for public purposes, community services and facilities or affordable housing. The Department has considered the need for the proper management of natural resources (in this case – marine hydrology and water quality) and the need to conserve ecological values (in this case marine flora and fauna and habitat) in its assessment of the development, consistent with objects under sections 5(a) (i) and (vi).

The Department has furthermore assessed the consistency of the development with controls and land use provisions provided in relevant environmental planning instruments and considered the economic benefits of the development as part of the need and justification for the development, consistent with the object under section 5(a) (ii). The Department publicly exhibited the development and notified surrounding landowners of the development consistent with the public participation objects of section 5(c). In addition, the Department has assessed the development in consultation with and giving due consideration to the technical expertise and comments provided by other Government agencies (including local Councils) on the development, consistent with the object of sharing of the responsibility for environmental planning between the different levels of government in the State, as provided in section 5(b).

The Department's consideration of the object under section 5(a) (vii) (the promotion of Ecologically Sustainable Development) is further detailed in **Section 3.5**.

3.5. ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

a) the precautionary principle,

b) inter-generational equity,

c) conservation of biological diversity and ecological integrity, and

d) improved valuation, pricing and incentive mechanisms.

The principles of ESD have been addressed in the EIS prepared by the Applicant. The Department considers that the detailed technical assessments prepared to assess the environmental impacts of the development based on conservative assumptions, contemporary assessment and compliance standards and detailed mitigation measures are consistent with the principle of the precautionary principle. Furthermore, the Department is satisfied based on its assessment of the ecological impacts of the development that the proposal would not result in significant impacts to marine ecology subject to the implementation of appropriate mitigation and monitoring measures consistent with the objective of conserving biological diversity and ecological integrity. Furthermore, the Department considers the development to be consistent with the principles of inter-generational equity and improved valuation, pricing and incentive mechanisms as:

- the proposal would ensure the continued secure supply of petroleum products to cater for existing and future development;
- the EIS for the proposal has included a conservative assessment of the range of environmental issues relevant to the proposal including detailed mitigation measures to manage residual impacts, to minimise the potential for significant or unintended residual impacts to future generations; and
- the proposal has been developed with consideration of feasible alternatives and determined as the option that would provide the best value for money and least potential

for impacts (in comparison to significant expansion or overhaul of other import terminal) to deliver a secure fuel supply to NSW in the long-term.

On the above basis, the Department is satisfied that the proposal as a whole is consistent with the objectives of ESD.

3.6. SECTION 79C EVALUATION

Pursuant to section 89H of the EP&A Act, a consent authority is required to consider the heads of consideration provided under section 79C of the EP&A Act in its assessment of SSD. The Department's consideration of the provisions of section 79C of the EP&A Act is provided in **Table 2** below.

Table 2: Section 79C Consideration

Heads of Consideration under Section 79C	*Department's Consideration*
Any environmental planning instrument.	The Department has considered Environmental Planning Instruments relevant to the proposal in **Appendix D.**
Any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Director-General has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved).	There are no proposed instruments that have been the subject of public consultation which are applicable to the proposal.
Any development control plan.	There are no development control plans (DCP) applicable to the proposal as it is located on unzoned land within Botany Bay or subject to the Kurnell Peninsula SEPP and therefore is not subject to any Local Environmental Plan or associated DCP.
Any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F.	The proposal is not subject to any planning agreement or proposed planning agreement under Section 93F of the EP&A Act.
The regulations (to the extent that they prescribe matters for the purposes of this paragraph).	The Department has undertaken all relevant exhibition and notification requirements as prescribed in the EP&A Regulation as detailed in **Section 3.3**. In addition, the Department has made available a copy of submissions received on the development application to the Applicant and made all relevant documentation prescribed under the Regulation available on the Department's website, in accordance with clauses 85A and 85B of the Regulation.
Any coastal zone management plans (within the meaning of the Coastal Protection Act 1979) that apply to the land to which the development application relates.	There are no coastal zone management plans development by local councils applying to land the subject of the development and therefore is not subject to the jurisdiction of a local council.
The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality.	The Department has assessed the environmental and amenity/ social impacts of the development in **Section 5** of this report. The economic benefits of the development have been considered in **Section 2.2**.

Heads of Consideration under Section 79C	*Department's Consideration*
The suitability of the site for the development.	The Department has considered the suitability of the site for the proposal throughout this report including in the consideration of available alternatives (**Section 2.2**), land use permissibility (**Section 3.2**) and in its assessment of land use and amenity impacts of the development in **Section 5** (e.g. noise and recreation impacts). The conclusions of the Department's assessment in relation to site suitability are provided in **Section 6**. The Department considers that the site is suitable for the proposed development.
Any submissions made in accordance with this Act or the regulations.	The Department's assessment has considered the issues raised in submissions in its assessment of the development as outlined in **Sections 4** and **5**.
The public interest.	The Department has considered the public interest in the need and justification section of the report (**Section 2.2**). The conclusions of the Department's assessment in relation to the public interest are provided in **Section 6**. The Department considers that the proposed development is in the public interest and should be approved.

3.7. STATE APPROVALS

The development would require an Environmental Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997*. This EPL must be approved in a manner that is consistent with any Part 4 consent for this development.

The Department has consulted with the Environment Protection Authority (EPA) and considered the relevant issues relating to the granting of an EPL in the assessment of the development (refer **Section 5**), including the incorporation of the EPA's recommended conditions. The EPA has determined that should development consent be granted, it would be able to issue an EPL for the development subject to conditions.

3.8. COMMONWEALTH APPROVALS

Environment Protection and Biodiversity Conservation Act 1999

The EIS prepared for the proposal has concluded that the development is unlikely to have a significant impact on Matters of National Significance and as such a referral has not been made to the Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act).

Environment Protection (Sea Dumping) Act 1981

In addition to development assessment and approval under the NSW EP&A Act, the development would also require approval from DSEWPaC under the Commonwealth *Environment Protection (Sea Dumping) Act 1981* for the disposal of dredged material offshore at the Sydney Offshore Disposal Ground (outside of the NSW marine waters). The Applicant has commenced the application and assessment process with the Commonwealth but at this stage approval has not been obtained.

Whilst the Department accepts that the development as currently proposed would not be able to proceed without obtaining Commonwealth approval, the Department considers that even though this approval has not been obtained it does not preclude the Department's own assessment and recommendation on the development subject to NSW jurisdiction. The Department considers the Commonwealth approval process to be a separate and parallel process similar to the separate assessment of EPBC approvals by the Commonwealth (which do not involve bilateral or accredited assessment). The Department has assessed the need, justification and impacts of the development subject to NSW jurisdiction on its own

merits without reference to the matters subject to the *Environment Protection (Sea Dumping) Act 1981.* Should a determination under the *Environment Protection (Sea Dumping) Act 1981* mean that a modification is required to any consent granted under the EP&A Act for the development as currently proposed, any such modification would be considered on its merits at that time.

3.9. STATEMENT OF COMPLIANCE

The Department is satisfied that the Director-Generals' environmental assessment requirements have been complied with.

4. CONSULTATION AND SUBMISSIONS

The Department exhibited the DA and EIS for the proposal between 28 February and 5 April 2013. A total of six submissions were received on the proposal, all from public authorities including: NSW Office of Environment and Heritage (OEH); NSW Environment Protection Authority (EPA); NSW Department of Primary Industries (DPI); Sutherland Shire Council; Randwick City Council; and Sydney Ports Corporation (SPC). The submission from SPC was received after the close of the exhibition period. Additional comments were also received from the Heritage Council of NSW (part of OEH), following the close of the exhibition period.

None of the public authority submissions objected to the proposal, however raised issues for the Department's consideration in its assessment.

There were no submissions from the general public. A copy of the submissions received can be found in Appendix B and a summary of the issues raised in submissions is provided below.

4.1 PUBLIC AUTHORITIES

NSW Office of Environment & Heritage (including Heritage Branch which supports the Heritage Council of NSW) **(OEH)** did not object to the proposal but raised the following issues for the Department's consideration:

- potential impacts to threatened pelagic species such as Humpback Whales between the dredge site and disposal area from additional ship movement and sediment plumes and recommended measures to avoid or minimise such impacts through a Flora and Fauna Management Plan for the development;
- potential impacts of changes to hydrodynamic processes at Silver Beach on intertidal habitat and associated wader birds at the beach;
- recommended that any approval include detailed conditions on the matters to be addressed as part of management plans;
- recommended that photographic archival records of the structures to be removed at Fixed berth 1 are submitted to the Heritage Council Library prior to demolition;
- potential cumulative impacts to heritage sites on the western foreshore of Botany Bay from the development and other major developments in the area; and
- need for side scan surveys to be undertaken of the development area sea bed by a qualified marine archaeologist to determine the potential for impacts to previously unidentified relics including ship wrecks.

NSW Environment Protection Authority (EPA) did not object to the proposal but raised the following issues for the Department's consideration:

- noted that the proposal would require a non-scheduled activity licence for the development under the Protection of the Environment Operational Act 1997 for regulating water pollution from dredging activities;

- requested clarification on a number of inconsistencies of information in the EIS including: dredging program shift times, location of the former anchor hole, requirement for clean up/ containment measures in the event of an emergency in addition to stop works, timing for the commencement of works, and inconsistencies in the value of tributyltin (TBT) and other soil quality parameters identified in the technical papers of the EIS;
- concerns in relation to soil and water quality including:
  - minimisation of TBT distribution within the water column and around the Bay during dredging operations including ANZECC water quality guidelines to be met at the edge of the near field mixing zone during overflow dredging;
  - restriction of overflow dredging in all contaminated areas not just near the fixed berths;
  - overflow dredging only to occur in confirmed uncontaminated areas based on ANZECC guidelines;
  - whether the sub berth location was covered by the sediment dispersion modelling undertaken;
  - confirmation that sediment bound TBT concentrations would be below thresholds outside of the development area particularly near the Kurnell Wharf aquaculture site and Kamay Botany Bay National Park;
  - confirmation that sediments within the dredged areas have the potential to generate TBT at higher than threshold levels; and
  - recommendation that pH and dissolved oxygen as well as turbidity be monitored at the aquaculture lease area and sea bed monitoring locations;
- in relation to dredging activities, recommended further consideration of options to capture sediment that would otherwise fall into the water across the slewing zones, use bucket head options that minimise the amount of water removed, modifying the method and rate of dredge head operation and use of outgoing tides to minimise TBT and fine sediment dispersal. In relation to other sediment disturbing activities recommended the use of silt curtains, including around sheet piling activities and berth works and around barges before the dumping of uncontaminated sediment for re-use;
- concerns in relation to noise including:
  - the duration of rock revetment works and associated noise impacts, noise impacts associated with rock piling and mobile crane works;
  - noise associated with a range of construction plant (including rig power pack, water jet pump etc);
  - confirmation if these were included in construction noise scenarios, requirement for Kamay Botany Bay National Park to be classified as a Passive Recreation Area with respect to noise goals; and
  - requirement for attended noise monitoring at Prince Charles Parade and Rangers House to confirm noise levels during out-of-hour works, requirement for all reasonable and feasible mitigation to be implemented as part of works rather than contingency measures when goals are exceeded and recommended construction and dredging work hours to be included in any recommended approval; and
- in relation to management plans recommended that:
  - all plans to be prepared prior to the commencement of construction and include review mechanisms for the life of the plan;
  - a community consultation plan (CCP), Sediment and Water Quality Monitoring Program (SWQMP) and noise management plan be prepared;
  - that the CCP be developed with consideration of the EPA's interim construction noise guideline (in relation to community consultation on noise management measures) and the SWQMP be prepared in consultation with the EPA and include a base line water monitoring program.

NSW Department of Primary Industries (DPI) did not object to the proposal but raised the following issues for the Department's consideration:

- concern raised regarding:
  - potential impacts of elevated turbidity and associated reduced light penetration for sea grasses and fish population including potential impacts of resuspended TBT on adult and juvenile fish and other species;
  - sediment deposition over an area of active seagrass remediation/research associated with an Ausgrid cable laying development;
  - compensation for the reduction of fishable waters from the expansion of the fixed berth area and maintenance of recreational fishing access within fishable sites; and
  - impacts to marine ecosystems at the offshore dredged sediment disposal site (not part of the current development).
- made recommendations in relation to:
  - investigating further options to minimise turbidity from overflow dredging (including silt curtains around the split hopper barges and release of overflow lower into the water column);
  - seagrass health to be monitored during live dredging operations at various locations including areas of the endangered Posidonia australis sea grass (including identifying a trigger for reducing or ceasing overflow dredging where decline of the species is identified);
  - monitoring to include turbidity as well as pH and dissolved oxygen, overflow dredging to cease where turbidity trigger levels are breached, turbidity mitigation responses to be implemented where turbidity trigger levels are breached rather than in response to persistent exceedances;
  - consultation with Ausgrid and Fisheries NSW regarding timing and potential impacts of dredging on its seagrass remediation/research site;
  - maintenance of access to fishing or compensation for the loss of fishing grounds; and
  - opportunity to comment on the construction environmental management plan and spoil disposal management plan for the proposal, maintenance of public communication strategy and complaints line to keep the recreational fishing community informed of potential disruptions to fishing from dredging activities.

Sutherland Shire Council did not object to the proposal but raised the following issues for the Department's consideration:

- environmental sensitivity and significance of surrounding receivers to the development site including the Towra Point Nature and Aquatic Reserve and Posidonia australis seagrass beds;
- concern regarding the identification of elevated levels of TBT at the dredge site and recommendation that an independent expert review be undertaken of the TBT findings;
- potential for cumulative changes to the hydrodynamic processes in Botany Bay from the development and other major developments;
- requirement for silt curtains to be implemented during dredging activities to minimise potential for sedimentation impacts on seagrass beds;
- recommended that approval for offshore sea dumping be obtained prior to any consent being granted for the current application; and
- recommended a review of all management and monitoring including contingency plans for the proposal prior to any consent being granted for the development, consistent with the precautionary principle.

Randwick City Council did not object to the proposal but raised the following issues for the Department's consideration:

- the potential for cumulative impacts on seagrass beds, which have already been impacted by dredging activities and changes to hydrodynamic processes from other major development in the Bay. Council recommended monitoring to occur prior, during and at the completion of dredging activities and pre and post-dredging mapping of seagrass distribution to determine any impacts to seagrass;

- further details of measures to be implemented during dredging activities to minimise the spread of the aquatic weed Caulerpa taxifolia;
- potential dispersal of contaminated sediments into other parts of the Bay including potential for impacts to seagrass and other aquatic species. Recommendation for silt curtains to be utilised to minimise the dispersal of such sediments during dredging operations.
- potential impacts on the protected Weedy Sea Dragon species; and
- the need to provide user friendly information on the proposal to the public in the implementation stages of the development.

Sydney Ports Corporation (SPC) did not object to the proposal but recommended that the Applicant be required to undertake monitoring of hydrodynamic and coastal processes to confirm the conclusions of its assessment, with consideration the potential cumulative changes from the Port Botany Expansion.

4.2 RESPONSE TO SUBMISSIONS

In July 2013, the Applicant submitted a Response to Submissions report to the Department, providing detailed responses to issues raised in submissions and outlining changes to the development (in the form of additional or modified mitigation measures) that would be implemented to further minimise and manage impacts associated with the development. A copy of the Response to Submissions report including list of final revised mitigation measures is provided in **Appendix C**.

The Response to Submissions Report was circulated to key public authorities (the OEH, EPA and DPI). The Department received updated submissions from these agencies indicating that the key concerns raised had been generally addressed by the Response to Submissions Report. The Department considers that the residual issues identified can be addressed through the imposition of appropriate conditions and the Department has recommended conditions with consideration to the comments provided by these agencies.

It is noted that the EPA has determined that should development consent be granted, it would be able to issue an EPL for the development subject to conditions.

5. ASSESSMENT

In assessing the merits of the development, the Department considers the key issues to be:

- water quality (turbidity and contaminated sediments);
- aquatic ecology;
- hydrodynamics and coastal processes; and
- noise.

These issues have been considered in **Sections 5.1-5.4** of this report. Other issues associated with the development including heritage, construction traffic, air quality and amenity, navigation and recreational values have been addressed in **Section 5.5**.

5.1 WATER QUALITY

Marine sediments in and around the development area have been exposed to contaminants over time as a result of industrial and port related uses within Botany Bay. This includes tributyltin (TBT), an anti-fouling paint, which was extensively used in the shipping industry prior to its international ban in 2003 due to its potential human health and environmental effects, and its tendency to bio-accumulate.

The proposal involves the dredging of sea bed sediments to enable the upgrade of berthing facilities and to provide navigable depths for ship movements. Dredging (including operation of the dredger, overflow dredging and reuse of the dredged material) may impact on the

water quality of the Bay (with consequent risks to marine life, aquaculture, fishing and recreational use) as a result of the:

- disturbance of the seabed and release of sediment into the water column;
- sediment deposition; and
- disturbance, dispersion and release of contaminants into the water column.

Contaminants
Sediment sampling found that:

- concentrations of BTEX pesticides (benzene, toluene, ethyl benzene and xylene), polychlorinated biphenyls (PCBs) and volatile organic compounds are below the analytical limits of reporting;
- heavy metals, hydrocarbons and their derivatives are below the guideline limits for waste classification, site contamination and toxicity; and
- TBT occurs in varying concentrations across the development site (in either sediment bound or bioavailable form), with the highest concentrations in sediments in the southern parts of the fixed berths, the central portion of the sub berth, the northern end of the turning circle and the southern part of the approach channel.

Existing concentrations of TBT in sediments and in simulation of dredging are sufficiently elevated to exceed the high threshold limit for ecological protection[*] and to exceed water quality limits for ecological protection and aquaculture[†].

Sediment Dispersion and Deposition
Sediment dispersion modelling indicates that the suspended sediment guideline trigger value (10 mg/L) would be met approximately 90 m from the dredge footprint and at surrounding sensitive receivers, including the aquaculture site and sea grass communities along Silver Beach. Suspended sediment concentrations would fall below background levels of 5 mg/L within approximately 250 m of the dredging site. The extent of predicted sediment dispersion is presented in **Figure 4**.

Expected sediment deposition in and around the development site by the end of the 23 week dredging program (refer Figure 5) is as follows:

- 10-35 mm within the dredge area;
- 10-15 mm along the northern edge of the DPI mapped extent of Halophila seagrass beds directly south of the site[‡] and the north-western tip of the aquaculture lease area;
- 5-10 mm over 50 per cent of the aquaculture lease area and the remainder of the DPI mapped Halophila seagrass beds[‡] and the northern limit of the seagrass beds[§] which were confirmed to be on site during site surveys;
- 1-5 mm over northern sections of the seagrass beds which were confirmed to be on site during site surveys and the southern headland of Kamay Botany Bay National Park; and
- no discernible deposition (<1 mm) in other parts of the Bay including the Towra Point Aquatic or Nature Reserve.

Dispersion of Dissolved TBT
TBT is moderately hydrophobic[**] which is demonstrated by the high concentrations of TBT recorded in marine sediments but not reflected in the water column. However it can be present and disperse within the water column as dissolved or as sediment-bound TBT.

[*] Interim sediment quality guidelines (ISQG) to provide ecological protection in *Guidelines for Fresh and Marine Water Quality 2000* (ANZECC and ARMCANZ, 2000)
[†] Water quality trigger limits for toxicants to provide ecological protection and for the protection of aquaculture (*Guidelines for Fresh and Marine Water Quality 2000* (ANZECC and ARMCANZ, 2000)). Guideline trigger values are concentrations that, if exceeded, will indicate a potential environmental problem, and so 'trigger' further investigation.
[‡] Note confirmation of the extent of seagrass beds was not undertaken
[§] extent confirmed
[**] repelling or tending not to combine or dissolve in water

Notwithstanding, the EIS identifies that TBT could be released from sediments into the water columns where agitated or disturbance occurs.

Sediment sampling indicates that sediments from various locations within the development site could generate dissolved TBT concentrations in the water column above relevant trigger values for aquatic ecology (0.006 µg/L) and aquaculture protection (0.01 µg/L). However, hydrodynamic modelling[††] indicates that dissolved TBT in the water column would instantaneously dissipate/dilute to below detectable limits at the dredge site and well away from surrounding aquatic and aquaculture sensitive receivers.

Dispersion of Sediment-Bound TBT

The EIS states that once TBT-bound sediments are suspended in the water column there is limited potential for release in soluble form. TBT concentrations in dispersed and deposited sediments across the bay are predicted to meet the ISQG-low trigger value of 5 $\mu gSn.kg^{-1}$, at sediment deposition levels of 15 mm or less, which applies to all areas outside of the development site at which deposition is likely to occur. At these levels, the bioavailable concentrations of TBT would likely be considerably lower and below the water concentration TBT trigger levels of 0.006 µg/L for aquatic ecology and 0.01 µg/L for aquaculture protection.

Submissions

Each of the submissions, with the exception of that from Sydney Ports Corporation, raised the potential for water quality impacts (and consequent risk to the Bay) associated with the proposal. Additional mitigation measures (such as silt curtains) and alternative dredging methods were recommended to minimise the potential for and extent of sediment dispersal (including contaminant-laden sediment) across the Bay. Sutherland Shire Council also recommended an independent review of the assessment and proposed management of TBT-contaminated sediment.

Consideration

The Department considers the key risks to water quality from the development to be increased turbidity and disturbance and dispersal of sediment bound contaminants during dredging. Impacts regarding sediment deposition and contaminants as they relate to aquatic ecology are addressed in **Section 5.2**.

The Department is satisfied that TBT is the single contaminant of concern on the basis that other contaminants identified in the marine sediments (including heavy metals, hydrocarbons, BTEX pesticides, PCPs, and volatile and semi-volatile organic compounds) were recorded below the guideline limits for waste classification, site contamination and toxicity. Consequently, the Department has focused its assessment on the potential elevation of dissolved and sediment-bound concentrations of TBT resulting from dredging.

Sediment Dispersion and Deposition

In its submission on the proposal, the EPA questioned whether the modelling of suspended sediments in the water column had underestimated the volume of sediment likely to be released as open-bucket dredging is proposed but modelling assumed closed bucket dredging. The Applicant responded indicating that conservative assumptions were used including:

- more sediment being released than would be expected using either technique; and
- the release of sediment at a continuous rate during dredging, which in practice would occur intermittently (mainly during the pick-up and release of material into the hopper rather than the lowering of the empty bucket back to the sea bed).

The Department is satisfied that the modelling was sufficiently conservative and representative of development-related impacts to enable the general impacts to be assessed.

[††] using conservative assumptions that all available TBT is released during initial agitation

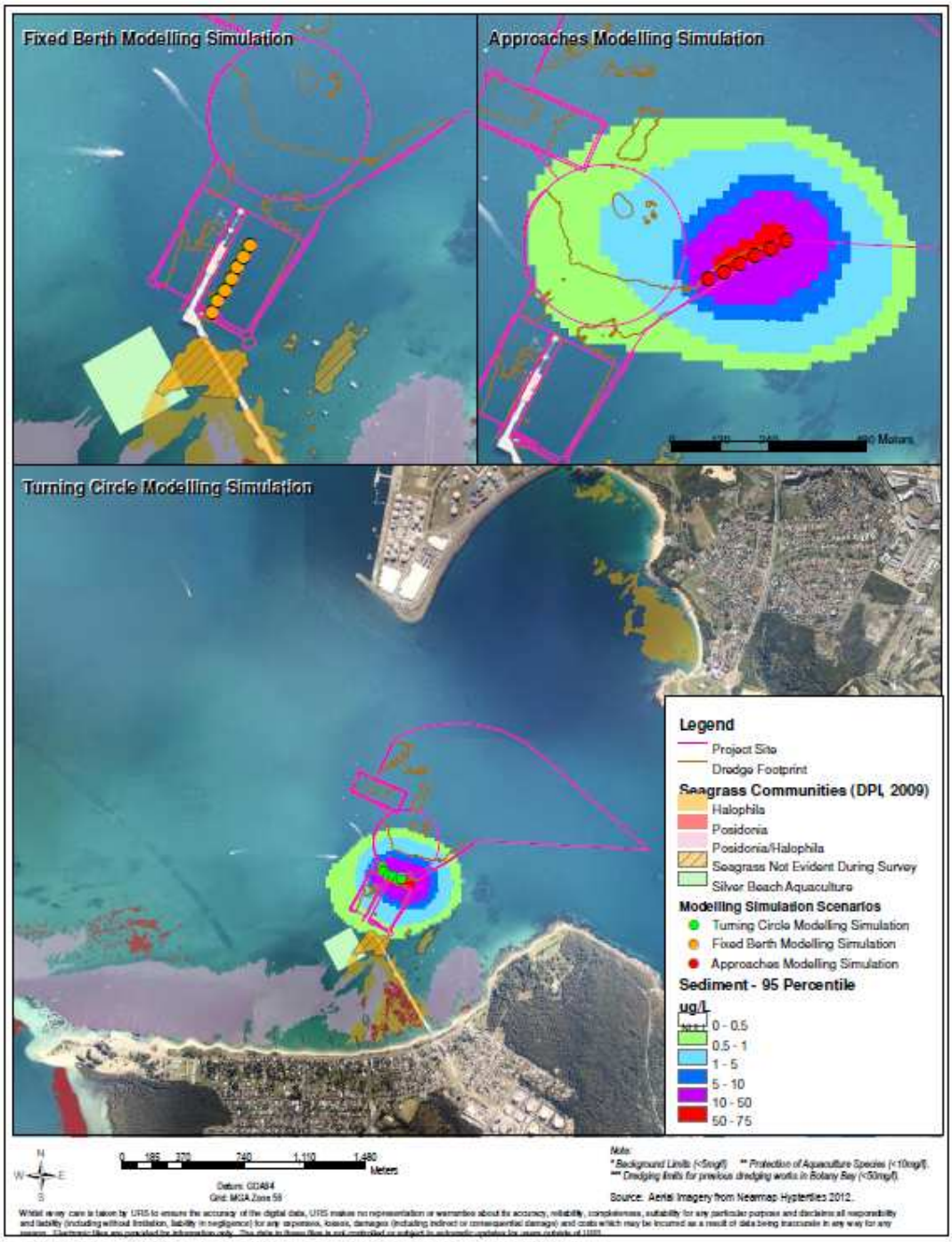


Figure 4: Extent of Suspended Sediment Dispersion (Source: URS, July 2013)

The modelling indicates compliance with the trigger limits for suspended sediment (10 mg/L) in the *Guidelines for Fresh and Marine Water Quality 2000* in areas more than 90 m from the dredge area. This includes at the seagrass beds and aquaculture lease area to the south of the site (the closest marine sensitive receivers), the foreshores of Silver Beach and Kamay Botany Bay National Park, and the Towra Point Nature and Aquatic Reserves. In particular, the Department notes that the modelling indicates that suspended sediment levels would fall well below background levels (<5 mg/L), before reaching any of the above sensitive locations and at around 250 m from dredging.

Based on the above, the Department is satisfied that dredging would not lead to suspended sediment levels which would exceed relevant trigger levels or significantly affect the water quality of Botany Bay, including at sensitive receivers. Turbidity, resulting from suspended sediment would be localised to the dredge area and would be short term (no more than 12 hours).

Sediment deposition would be greatest (up to 35 mm) in the area between Fixed Berth No. 1 and the turning circle and would taper off to one millimetre at the furthest point of dispersion up to 1300 m to the east as shown on **Figure 5**. Deposition at sensitive receiver locations would be up to 15 mm (at the northern boundary of the unconfirmed seagrass beds and the north-western tip of the aquaculture lease area). No deposition attributable to the project is predicted at Towra Point Aquatic or Nature Reserve. The vast majority of the sensitive areas outside of the development site would be subject to deposition levels less than 10 mm, with the majority of confirmed seagrass beds and 50 per cent of the aquaculture site subject to deposition levels of less than 5 mm.

Whilst taken in isolation the suspended sediment impacts of the development would achieve the relevant water quality trigger level and deposition levels are considered acceptable, sediment dispersal for the proposal is closely linked to risks associated with TBT concentrations in sediments (discussed further below) to be dredged. Notwithstanding that the suspended sediment levels are expected to remain below relevant trigger levels, detailed mitigation measures are considered necessary to minimise offsite sediment dispersal (and subsequent deposition) levels as far as possible to minimise associated TBT dispersion risks.

The Department considers that dredging should be implemented in a manner that minimises the potential for sediment dispersion (and therefore TBT dispersion) as far as possible, consistent with the precautionary principle. In this regard, the Applicant has proposed a range of mitigation measures to minimise the potential to generate and disperse suspended sediment. These include:

- the preparation and implementation of a Dredge and Spoil Disposal Management Plan including a Sediment and Water Quality Management Plan and Spill Control Plan (to manage the potential for accidental spills during the dredging operation);
- ensuring that overflow dredging (which has the potential for increased suspended solids generation due to the action of releasing surplus water with the dredged sediment from the dredge hopper), is not undertaken in the fixed berth and northern section of the turning circle areas where high levels of TBT are identified;
- implementation of a comprehensive 'live' water quality monitoring program including threshold criteria, at which the spill rate of overflow dredging would be reduced and overflow dredging operations would cease; and
- use of a silt boom around the dredger to capture and allow suspended sediment to generally settle within the area enclosed by the boom rather than dispersing offsite.

The Department notes the requests in submissions for all dredging to only use a closed bucket system and for no overflow dredging in any area identified to contain elevated levels of TBT to reduce the potential for TBT-bound suspended sediment generation. The Applicant's Submissions Report indicates that the proposed dredge methods and areas for overflow dredging have been based on optimising the efficiency of dredging operations (including reducing the overall dredging program) balanced with minimising potential dispersion impacts, based on the modelling. Closed bucket dredging would impose additional operational restrictions (including inability to dredge in slopes between 2:1-6:1 or undertake high precision dredging around the wharf; and increasing the dredge program by nine weeks). This conclusion is supported by modelling which indicates:

- no substantial difference between sediment dispersion between the two techniques; and

- suspended sediment concentrations in the northern and eastern areas of the dredge footprint (including in areas of TBT concentrations would reach background levels well before reaching any sensitive receivers (refer **Figure 4**)).

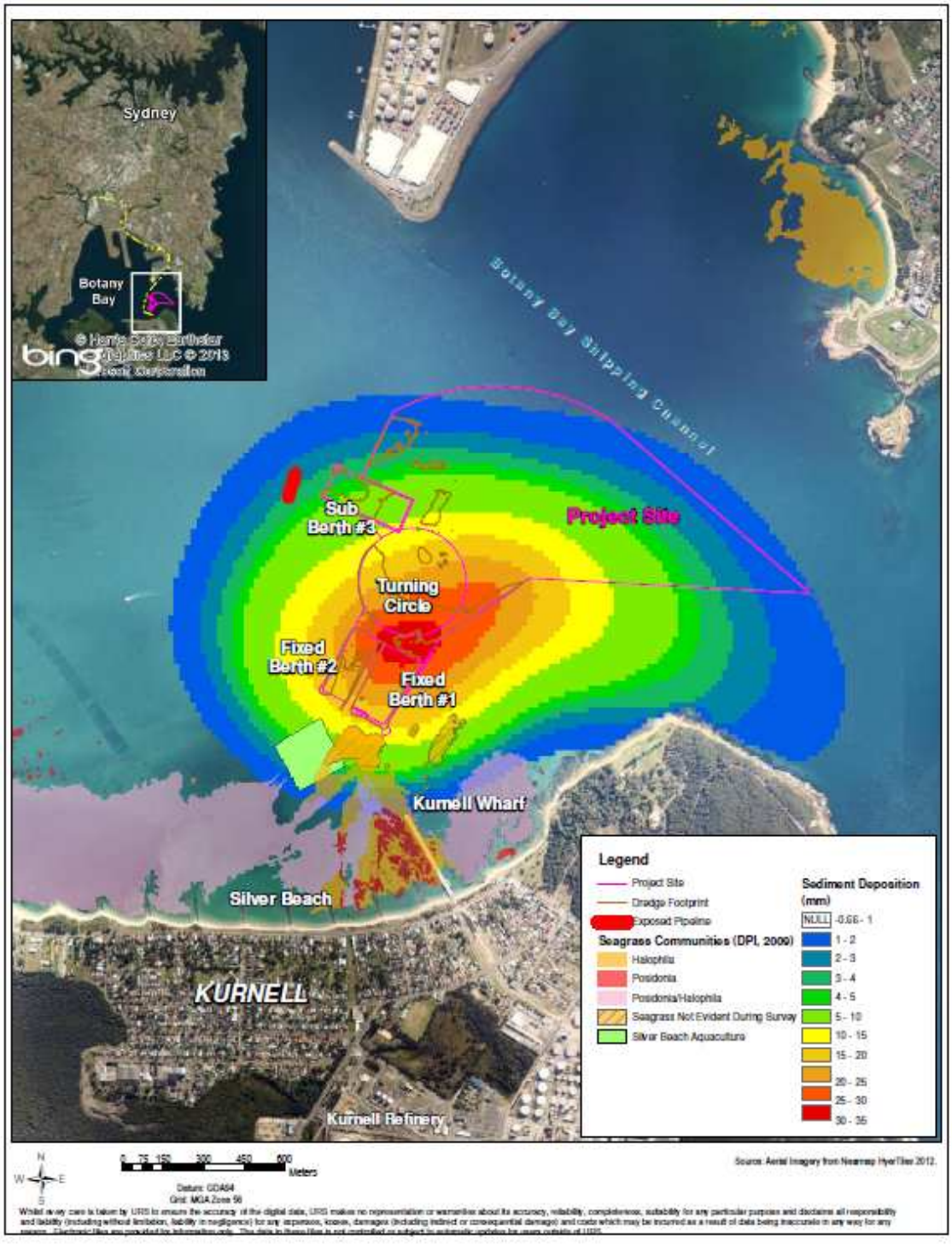


Figure 5: Extent of Sediment Deposition (Source: URS, July 2013)

Notwithstanding, to further minimise the impacts of the proposal, the Applicant has proposed the installation of a silt boom and more stringent water quality thresholds (than proposed in the EIS) to be applied which when reached would trigger the reduction in rate and/or cessation of overflow dredging as required to ensure acceptable water quality outcomes. The silt boom has been proposed in preference to silt curtains as suggested in submissions,

due to problems with the use of silt curtains in a marine context, which could preclude their effectiveness. This includes the requirement for routinely removing and redeploying silt curtains to account for tanker and dredger movements and the impracticality of managing a large silt curtain in the dynamic and energetic marine environment of the Bay including accounting for heavy seas and storm surges and lost curtains posing a risk of fauna entrainment.

The Department is satisfied that the mitigation framework proposed by the Applicant provides a robust basis for the management of water quality during dredging operations in the context of the operational realities of dredging operations. It is noted that the proposed framework provides a risk-based and adaptive management approach to mitigation, where modification to work methods would occur in response to 'real time' water quality monitoring and the triggering (although unlikely) of water quality threshold limits. The Department supports this approach and has recommended conditions of consent which reinforce this requirement including:

- establishing a maximum suspended sediment criterion that should not be exceeded during dredging activities as per the *Guidelines for Fresh and Marine Water Quality 2000*; and
- requiring a detailed Sediment and Water Quality Management Plan to be prepared and implemented during dredging activities which would identify threshold criteria above which additional mitigation measures or modification to work methods would need to be applied.

TBT Toxicity

The impacts of TBT relate to its short and long term toxicity, bioaccumulation and biomagnification properties. As stated previously it is moderately hydrophobic and its toxicity persistence is greater when sediment bound compared to when free in the water column. Dredging could result in dispersal of sediment bound TBT or release and dispersion of TBT in the water column (bioavailable)[‡‡].

The Department notes that dredging and offshore disposal of the dredge material, which is the subject of a separate approval process under Commonwealth legislation, would reduce the total volume of TBT contaminated material in Botany Bay. In the absence of the development, contaminated sediments would remain and pose an ongoing long-term risk of dispersal (in heavy storms) including to surrounding receivers. Consequently, the proposal as a whole would result in a long-term reduction in available contaminated materials, which will benefit the bay environment.

The Department accepts that at sediment deposition levels of 15 mm or less the trigger level for sediment-bound concentrations (ISQG-low threshold limit of 5 µgSn/kg) would not be exceeded. Deposition at sensitive receiver locations will generally be below 15mm with the exception of the northern-most tip of the aquaculture lease area and the northern boundary of the seagrass beds, though this is the area where presence/extent of seagrass has not been confirmed. At this concentration, it was also indicated that the bioavailability of TBT in the water column would be considerably lower and below the trigger value for the protection of ecology and aquaculture. Consequently, the development would be unlikely to pose a significant risk of TBT toxicity (sediment-bound or dissolved concentrations) to sensitive offsite locations.

The EPA's submission noted that as contaminant testing was not undertaken at offsite locations, extant concentrations of sediment-bound TBT are not known and therefore it cannot be stated with any certainty that sediment bound trigger levels of TBT would not be exceeded with further deposit of contaminated material. Whilst the Department

‡‡ It should be noted that dredging will not increase the amount of TBT present in either the water column or sediments in the bay, but could facilitate redistribution of dormant sediments.

acknowledges the lack of offsite testing, previous studies (as presented in the EIS) identified that bioavailable TBT (in the water column) was greater at sites close to Port Botany Container Terminals compared to other parts of the Bay. Other studies have shown that sediment-bound TBT in the aquaculture lease area was below detectable limits. Given this, the Department considers it unlikely that dispersed and deposited material is unlikely to result in accumulated concentrations of TBT in sediment that would exceed the trigger levels for protection of ecology or aquaculture.

Dissolved TBT

The key risk to water quality is the high level of TBT identified in the sediments proposed to be dredged as part of the development, which could be mobilised into the water column or dispersed to other parts of the Bay as sediment-bound concentrations during dredging activities.

Given the hydrophobic nature of TBT, significant concentrations of TBT are not expected to be naturally released (dissolved) into the water column from sediment-bound TBT, apart from during initial dredging activities when the marine sediment is agitated and disturbed. The Applicant's assessment indicates that sediment disturbance and agitation from dredging activities could release TBT concentrations into the water column in exceedance of water quality criteria for ecology and aquaculture under the *Guidelines for Fresh and Marine Water Quality 2000*. However, based on the hydrodynamic modelling undertaken as part of the assessment, the Department is satisfied that these elevated concentrations would be limited to the dredging site only (at-source), which is not identified to contain significant aquatic habitats. The hydrodynamic modelling shows that these concentrations would be diluted almost instantaneously in the water within the near-field mixing zone of the development site, such as to be well below criteria levels as water disperses outside of the development site and at surrounding sensitive receivers, including sensitive sea grass beds and the aquatic lease area.

The Department is satisfied that the assessment has been based on conservative elutriate testing of the likely concentrations of TBT to be released into the water column during dredging activities. This is because elutriate testing is based on agitating of sediment samples in a centrifuge, designed to maximise the chance for TBT release into solution, whereas onsite dredging activities are unlikely to cause as much agitation of the sediments (noting that much of the sediment picked up by a dredging bucket would not be exposed to the seawater). Consequently, hydrodynamic dispersion modelling based on the full elutriate release of TBT into the water column, is considered to be conservative and representative of worse case impact. Given that the hydrodynamic modelling based on these conservative elutriate concentrations indicates compliance with water quality criteria, the Department is satisfied that dredging operations would not result in unacceptable levels of dissolved TBT being released into the water column, such as to pose a risk to surrounding receivers.

Independent Review

Sutherland Shire Council requested an independent review of the assessment and proposed management of TBT contaminated sediment. The Department notes that the proposal (including TBT assessment and management) has been subject to review and assessment by the EPA, OEH and DPI as part of the exhibition and consultation process for the development and that the Applicant has undertaken detailed consultation with the EPA during the preparation of its Submissions Report in developing mitigation measures for the development. On this basis, the Department is satisfied that the assessment prepared by the Applicant has been subject to appropriate technical review and that further review of the assessment is not warranted. The approach to conditions adopted by the Department is consistent with that recommended by the EPA and other key agencies.

5.2 AQUATIC ECOLOGY

The development has the potential to affect aquatic ecology as follows:

- disturbance to and reduction of benthic habitat as a result of dredging activities;
- changes to habitat from altered hydrodynamic and coastal processes and spread of aquatic weeds;
- sediment deposition at sensitive receivers (conservation areas, seagrass beds, aquaculture lease area);
- TBT-related toxicity;
- collisions between marine fauna and ships (construction and operation); and
- impacts to fauna from underwater noise generation during construction.

Aquatic surveys of the study site were undertaken to:

- describe ecological values and to determine the potential impacts of the proposal; and
- toxicity assessments to determine potential impacts of TBT on marine species.

In addition, a specialist acoustic assessment was undertaken to assess the extent of underwater noise generation during construction activities and potential impacts to marine fauna.

The ecology assessment identified that the development site including dredge footprint consists of largely un-vegetated soft sediment habitat lacking in a high abundance or diversity of habitat resources. Benthic organisms which could be supported by the development site were identified to include: sea pens, sponges, barnacles, anemone, sea urchins, soft coral and common fish species. One seagrass plant (*Halophila ovalis*) with an estimated coverage of <1% was identified in the southern portion of the site, near the turning circle (refer **Figure 6**).

Sensitive ecological receivers identified in close proximity to the development site are shown in **Figure 6** and comprise:

- seagrass beds off Silver Beach and the south western foreshores of Botany Bay, including *Halophila ovalis* seagrass beds directly to the south of the development site and the endangered *Posidonia australis* seagrass beds located to the south of the *Halophila* beds;
- an aquaculture lease area approximately 100 m to the south west of Kurnell Wharf (currently inactive although with development approval for oyster farming);
- Ramsar listed Towra Point Nature Reserve located approximately 1.5 km to the south west;
- Towra Point Aquatic Reserve including the Towra Point Nature Reserve and areas within Quibray Bay;
- the foreshores of Kamay Botany Bay National Park, located 800 m to the south west on the Kurnell Peninsula;
- Taren Point and Dolls Point, located 6.5-7 km to the west of the development site which provide important habitat for shorebird communities; and
- recreational fishing habitat resources across the Bay including the Silver Beach seagrass habitat, and four artificial reefs created in Yarra Bay, Bare Island and Congwong Bay.

Submissions

Key concerns raised in submissions included:

- changes to available intertidal habitat off Silver Beach from alterations to hydrodynamic and coastal processes;
- cumulative impacts to seagrass habitat from alterations to hydrodynamic and coastal processes;
- elevated turbidity and associated reduced light penetration for sea grasses and fish populations;
- potential impacts of resuspended TBT on adult and juvenile fish and other species;
- sediment deposition over an area of active seagrass rehabilitation associated with the Ausgrid cable laying development;

- impacts to seagrass beds and the Weedy Dragon species; and
- potential impacts to threatened pelagic species such as Humpback Whales from additional ship movement and sediment plumes.

Department's Consideration

Habitat Disturbance and Removal

Based on site surveys undertaken of the development site (including dredge footprint), the Department is satisfied that the proposed development would not result in the direct disturbance or loss of significant marine habitat, including any threatened species or communities. The low habitat values of the site reflect its historical use as a working port and wharf area affected by up to 60 years of ship movements and associated disturbance of seabed sediments. The benthic habitat (soft substrate) and organisms (sea pens, sponges, barnacles, anemone, sea urchins, soft coral and common fish species) likely to be impacted within the development area are widespread across the Bay and would not lead to a significant loss of habitat or marine values.

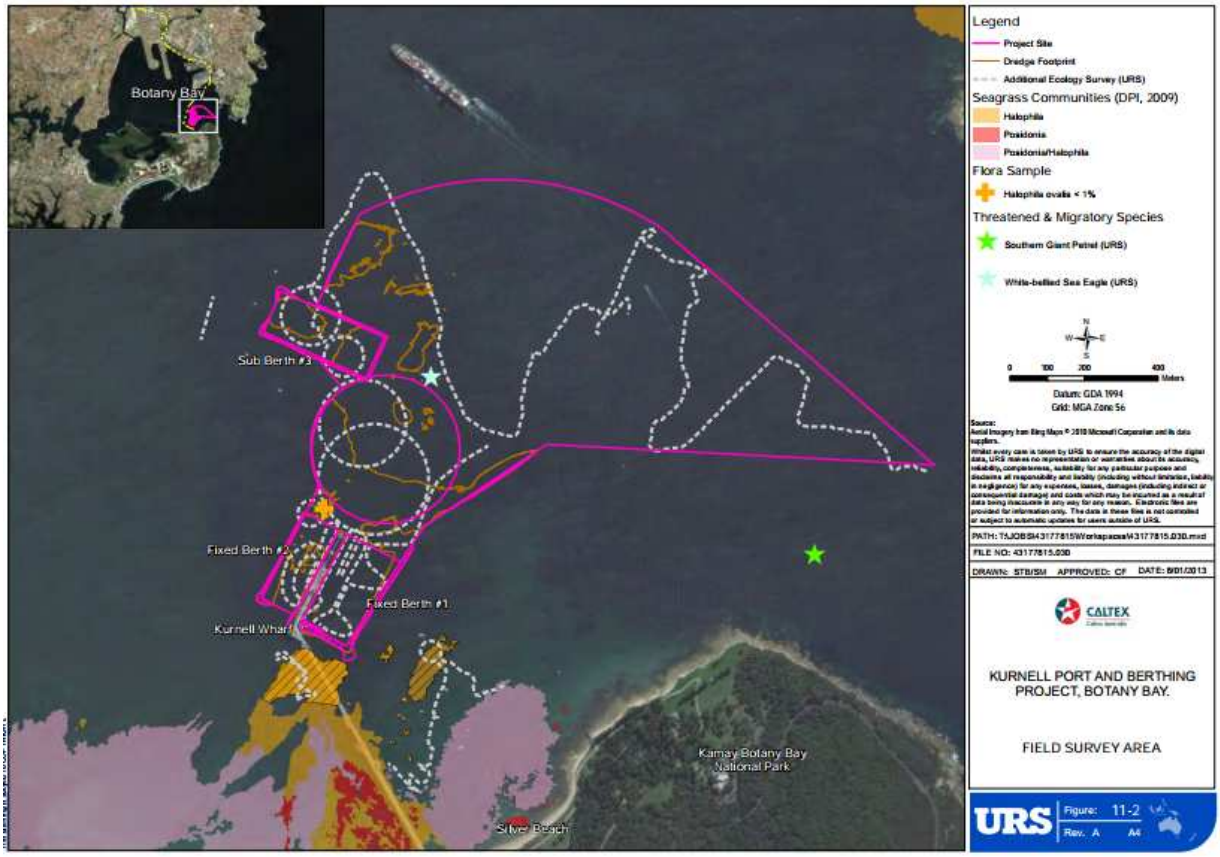


Figure 6: Sensitive Ecological Habitat (Source: URS, February 2013)

Randwick City Council raised concerns regarding potential impacts of the proposal to the Weedy Sea Dragon, which has been recorded in the Bay and may occur in the development site. This species is not listed as threatened or endangered under the *Environmental Protection and Biodiversity Conservation Act* (EPBC), the *Fisheries Management* Act (FM) or the *Threatened Species Conservation Act* (TSC), however it is protected under the FM Act whereby it is an offence to *"possess, collect or harvest"* any seahorse, sea dragon, pipefish, pipe horse, ghost fish or sea moth species without a permit. Habitat for this species, as with other sea dragon and similar species is expected to occur across the Bay and any habitat loss resulting from the proposal is not expected to be significant.

Alterations to Hydrodynamic and Coastal Processes

The Department has assessed the hydrodynamic and coastal process impacts of the development (refer **Section 5.3**) and considers that the development would not significantly alter existing processes, such that available marine habitat, including inter-tidal and seagrass habitat within Silver Beach, would be affected.

Sediment Dispersion and Deposition

Based on the dispersion modelling undertaken (Refer **Section 5.1**), the Department is satisfied that dredging would not lead to suspended sediment levels that exceed the applicable water quality trigger level (10 mg/L) at surrounding sensitive ecological receivers (including the sea grass beds and aquaculture lease area to the south). The modelling indicates that suspended sediment levels, while exceeding the trigger levels in the immediate vicinity of dredging, would fall well below background levels (<5 mg/L), before reaching any of the sensitive locations. Given this, the Department accepts that:

- dredging would not affect light penetration or pose significant turbidity impacts to ecological receivers;
- turbidity would be within the range generated by normal variation within the Bay (5-25 mg/L); and
- as such unlikely to exceed the tolerance limits of the sensitive receivers (including the aquaculture lease area).

Modelling also indicates that suspended sediments would be largely generated near the surface and would fall out of the water column in a relatively short length of time (up to 12 hours). On this basis, and given that suspended sediment concentrations exceeding 10 mg/L are only predicted to occur in the immediate vicinity of dredging activities, the Department does not consider that the proposal would pose a significant turbidity risk to pelagic species movements.

The assessment indicates that by the end of dredging (23 weeks), up to 15 mm of sediment deposition would occur at the northern-most extent of the seagrass beds and the aquaculture lease site. The Department notes that the higher end of deposition (10-15 mm) is only predicted to affect the very northern edge of the *Halophila* seagrass beds, the presence or extent of which the Applicant has not confirmed but did not appear to be present as mapped by DPI previously. If it is assumed that this is the case, the majority of the seagrass beds would be subject to sediment deposition of less than 10 mm and the confirmed areas of *Halophila* and endangered *Posidonia* seagrass beds likely to be affected would be subject to deposition of less than 5 mm. In addition, no discernible deposition (<1 mm) is predicted for the majority of seagrass beds which occur along the southern foreshores of the Bay (comprising mainly *Posidonia sp*) off Silver Beach, the Kurnell Peninsula and around Towra Point Aquatic Reserve. Modelling also predicts no discernible deposition (<1 mm) to other parts of the bay including the Towra Point Nature and Aquatic Reserves and to the *Posidonia* seagrass rehabilitation site referred to in DPI's submission, associated with the Ausgrid cable laying development (located off Silver Beach on the eastern side of the Kurnell Wharf).

Whilst deposition at the northern extent of the seagrass beds may result in localised smothering, it is unlikely that this would lead to significant die-off in the long-term given that the dredging will be temporary and the sea grass beds are likely to recolonise at completion as no direct disturbance of the underlying seagrass rhizomes would occur. To ensure that deposition associated with the proposal does not lead to a long-term contraction of the sea-grass beds immediately to the south of the site, the Department has recommended conditions of approval requiring the preparation and implementation of a seagrass monitoring program to:

- confirm the baseline location and health of seagrass communities through site surveys prior to the commencement of construction (including consideration of the seasonal extent and variation of the sea grass beds);

- monitor the health of the sea grass communities (at representative locations) during dredging and confirm deposition at these locations at its completion;
- assess the health of the sea beds compared to baseline conditions at the completion of dredging; and
- if necessary, identify mitigation or rehabilitation measures to offset any die-back attributable to the development and ongoing monitoring requirements to monitor the recovery of the seagrass beds.

The Department considers that the implementation of the above measures will ensure that impacts to seagrass beds are minimised and identified early, where they occur. This will enable appropriate action to be taken as soon as possible to prevent further impact and identify measures to rehabilitate or offset the impacts.

As requested by DPI, the Department has also incorporated the requirement for notification of DPI (Fisheries) personnel working on the seagrass rehabilitation site off Silver Beach before the commencement of dredging activities. As discussed above, no discernible deposition is predicted to occur at this site and it is expected that water quality monitoring measures committed to (refer 'Sediment Dispersion' discussion above and **Section 5.1**) would identify water quality issues early and close to the development site, to enable management actions to be implemented before dispersion to this location.

The Department considers that whilst deposition levels of 1-15 mg/L are predicted at the aquaculture lease area, deposition is unlikely to affect pearl oyster farming operations should they commence in this location, as mesh panels in which the oysters are held would be suspended in the water column, rather than located on the sea bed. Dispersion modelling indicates that dredging associated with the proposal would not exceed suspended sediment water quality trigger levels at any offsite receiver including the aquaculture site and would fall to below background levels (<5mg/L), before reaching any of the sensitive locations. Increases in suspended sediment concentrations are also considered within the natural variability currently experienced in the Bay. Consequently, it is considered unlikely that aquaculture would be affected by suspended sediment dispersion and deposition over and above that which would naturally occur. Potential TBT toxicity risks associated with predicted sediment deposition levels are discussed below.

TBT Related Bioavailability and Toxicity

As stated previously, TBT can bioaccumulate in marine organisms and is particularly toxic to marine molluscs and has been shown to affect shell deposition of growing oysters, effects to reproduction, growth and mortality in larval oysters and other bivalves. It has low water solubility, is lipophilic (adsorbs to fat) and readily adsorbs to particles. The degree of adsorption is dependent on salinity, nature and size of particles in suspension, volume of suspended matter, temperature and the presence of organic matter. Toxicology studies undertaken for the proposal found:

- non toxicity of larval samples of rock oyster (*Saccostrea commercialis*) larval development at elutriate[§§] TBT concentrations of 0.16, 1.03 and 3.34 µg/L from sediment samples with sediment-bound concentrations greater than the 70µgSN.kg-1 (the ISQG-high trigger level for ecological protection) and significantly greater than predicted in deposited sediment in ecologically sensitive areas; and
- non toxicity in reproduction tests on amphipod (*Melita plumulosa*) reproduction in sediment samples with greater than 70 µg/L TBT concentrations.

These indicate that there is a high threshold for TBT toxicity in certain species. Notwithstanding, the Department accepts that these studies may not necessarily be representative of toxicological effects in all species known from the Bay and considers that a

§§ Elutriate testing involves the agitation of sediments to release bound TBT into solution. This is considered to be a more vigorous process than either natural hydrodynamics or dredging and is therefore a conservative estimate of TBT that could be released into the water column.

precautionary approach should be implemented to minimise the generation of TBT-bound sediment in the first instance.

The Applicant's assessment indicates that the initial release of TBT into the water column from agitation/disturbance of TBT-laden sediments during dredging would almost instantaneously dilute and dissipate such that TBT trigger levels for the protection of ecology and aquaculture (<0.006 μgL^{-1} and 0.01 μgL^{-1} respectively) would be achieved within and outside of the development area. Consequently, the risk of toxicity to marine ecology or aquaculture areas is considered to be negligible.

Notwithstanding, TBT likely to be present in suspended sediments which could disperse and deposit across the bay with hydrodynamic processes. The Applicant's assessment indicates that at deposition levels of 15 mm or less (the levels predicted at surrounding ecological receivers):

- the TBT concentration in suspended sediments would meet the trigger level for sediment-bound TBT (ISQG-low threshold limit of 5 $\mu gSn.kg^{-1}$); and
- at a sediment-bound TBT concentration of 5 $\mu gSn.kg^{-1}$ or less, the release of TBT into solution would be small, given its hydrophobic characteristics and based on the result of the elutriate testing would not exceed the trigger levels for dissolved TBT (0.006 µg/L for aquatic ecology and 0.01 µg/L for aquaculture protection).

Previous TBT surveys of the Bay (refer **Section 5.1**) indicate that areas to the south of the site, including the aquaculture lease area, are unlikely to be characterised by high levels of TBT. The Department accepts that TBT levels in contaminated sediments deposited as a result of the proposal (15 mm or less) would not pose a significant risk of exceeding relevant sediment or water quality trigger levels, the viability of the aquaculture lease area or seagrass beds or other parts of the Bay. In addition, the Department notes that the development as a whole would result in an overall reduction in the available volumes of TBT (and therefore the level of bio-available TBT) within the Bay through dredging and removal.

Based on the above assessment, the Department recommends a range of conditions be imposed that aim to minimise suspended sediment generation during dredging. These measures are outlined in detail in **Section 5.1** and include monitoring of dissolved TBT levels both prior to and following dredging (as recommended by OEH) to confirm modelled predictions of dissolved TBT levels at sensitive receivers. Where the monitoring indicates higher TBT levels than predicted (in exceedance of trigger levels), the Department has recommended conditions of approval requiring the Applicant to provide appropriate compensation for aquaculture activities and any affected sea grass beds.

Aquatic Weeds

The noxious marine species, *Caulerpa taxifolia,* was not recorded in the area during surveys for the proposal; however it is known to occur in the Bay. To minimise the potential for this species to be introduced or spread around the site during construction (including the risk of spreading to surrounding sensitive seagrass beds), the Department has recommended a condition of approval requiring the preparation of an aquatic weed management protocol which is consistent with the *Control Plan for the Noxious Marine Alga Caulerpa taxifolia* (2009) to detail measures to be implemented.

During the operation of the proposal, ship movements entering the site would be subject to standard Port and site protocols in relation to the management of ballast waters to avoid the introduction of exotic species into the Bay.

Collision Risks

There is the potential during construction for collision of large marine species such as whales, with dredge equipment (spilt hopper barges and backhoes). Risk of collision exists with current operations in the Bay, both at Kurnell and Port Botany and will remain once the dredging and berth upgrades are complete, although there would be fewer ship movements compared to construction and existing operations (fewer but larger vessels servicing the

Caltex facility). Appropriate marine vessel operating protocols (including appropriate speed limits and safety protocols to avoid vessel accidents) would be in place during construction and operation to minimise the risk of such collisions. The Applicant has further proposed to:

- undertake observations for marine turtles, dugongs and cetaceans during construction;
- temporarily cease operations where these fauna approach the dredge location; and
- reduce the speed of the dredge tug boat where fauna comes within 420 m of the works and temporarily stopping the tug boat where the fauna comes within 150 m of the dredge hopper.

The Department supports these measures and has recommended conditions of approval to reinforce these measures.

Underwater Noise Intrusion

The specialist noise impact assessment undertaken as part of the EIS predicted the following levels of underwater noise generation during construction:

- dredging: continuous broad band noise of up to 180 dB (re: 1 µPa) for approximately 23 weeks, with noise levels attenuating to ambient noise levels at approximately 150 m from active dredge locations;
- piling: short bursts of intermittent noise of up to a peak of 225 dB (re: 1 µPa) over a few weeks (three to five) attenuating to ambient noise levels at approximately 420 m from the site of active piling; and
- rock placement: intermittent noise associated with the movement, placement and settling of rocks.

The noise assessment identified that impacts to fish species, cetaceans and pinnipeds (such as acute damage to fish, temporary/ permanent loss of hearing) may occur if fauna comes within a few metres of dredging. A threshold distance of 30 m for fish species and 250 m with exposure times >30 minutes with respect to cetaceans and pinnipeds was recommended during piling. Notwithstanding, given the mobile nature of these species it is considered likely that the reaction of most species would be to avoid or retreat from these areas to a distance where noise attenuates to ambient levels.

Whilst there is potential for short-term effects to some individuals, impacts are considered unlikely to be significant given the finite and temporary nature of the noise generated during construction. As discussed above, the Applicant has proposed to undertake observation for marine turtles, dugongs and cetaceans within 420 m of dredging, piling and revetment works and to temporarily cease operations where these fauna approach too close. The Department supports this measure and has recommended conditions of approval to reinforce this requirement.

Noise related to berthing of ships once the upgrade is operational is anticipated to be no worse than existing operational noise impacts, however given that fewer larger ships will service Caltex, operational noise impacts are expected to be less frequent.

Other Impacts to Aquatic Ecology

Other potential impacts to marine ecology that could result from the proposal include light intrusion and impacts from accidental spills. The Department considers that the additional light intrusion resulting from dredging activities within the Bay during night time hours would not significantly impact on marine fauna given:

- existing night time operations within the Bay at Port Botany and the airport;
- the temporary (finite) nature of dredging and that light intrusion attributable to the proposal would be limited to only a small area as the dredging vessel moves across the dredge footprint; and
- during operation, no significant additional light intrusion is expected from the upgraded port and berthing facilities compared to the existing situation.

The risk of accidental spills into the Bay is present however the Department considers that with the incorporation of appropriate mitigation measures, including the appropriate storage of all chemicals in bunded areas and the maintenance of spill kits and emergency response procedures – as proposed by the Applicant, these risks can be appropriated managed. The Department has recommended conditions of approval to reinforce the Applicant's commitments in this regard.

Summary

In summary, the Department considers that the proposal would not result in unacceptable aquatic ecology impacts subject to the implementation of a range of mitigation measures. These include measures to minimise the generation and dispersion of TBT-bound suspended sediment, monitoring measures to assess seagrass heath during and following dredging and surveillance to minimise the risk of fauna collision with construction equipment.

5.3 HYDRODYNAMICS AND COASTAL PROCESSES

Dredging operations and physical changes to structures at the port and berthing facility have the potential to affect coastal processes in Botany Bay, including changes to current speed and wave dynamics. These changes could, in turn, influence storm surge levels, scouring and erosion, tidal range and saline intrusion at surrounding coastlines. This issue was raised by Sutherland Shire Council and Randwick City Council in their submissions. In addition, SPC recommended post completion monitoring of the Bay to confirm hydrodynamic predictions.

The Applicant's EIS included a technical assessment by Cardno of how the proposal could affect existing hydrodynamic and coastal processes. 2D and 3D modelling was carried out to determine the extent to which the proposal would affect existing baseline conditions within the Bay, including consideration of the Port Botany Expansion and the Ausgrid cable laying development. The assessment focused on surrounding environmental features and land uses including Silver Beach, Towra Beach and Lady Robinson's Beach, as well as recreational boat user facilities and infrastructure at Port Botany and Sydney Airport. The assessment found that:

- the proposal would have no noticeable effect on existing tidal currents (direction or speed);
- the proposal would result in a minor change to the wave height of significant waves at Silver Beach within the groyne field of +/-0.05%;
- the proposal would result in a minor change to significant wave height at Silver Beach outside of the groyne field of +/-0.4%;
- the proposal would not result in any changes to wave direction to the west of the entrance to Quibray Bay. However, it would result in changes to the east of the Quibray Bay entrance, comprising a 0.1 degree change in wave direction at Silver Beach within the groyne field; and
- the proposal would not affect wave dynamics (compared to the existing situation) at Port Botany, Sydney Airport runways or at significant recreational fishing sites to the north.

The Applicant's assessment concluded that wave parameters post-dredging would be very similar to the existing situation such as to not result in significant changes to existing erosion/deposition rates or coastal processes along the Botany Bay shoreline.

Department's Consideration

The Department is satisfied that the Applicant's EIS included an assessment of coastal process and hydrodynamics based on conservative numerical modelling, including the consideration of other existing developments that have been carried out within Botany Bay.

Based on the modelling undertaken, the Department is satisfied that the proposal would not result in significant changes to existing coastal processes within Botany Bay and would not therefore lead to significant changes in storm surge, tidal range, saline intrusion or scouring

and erosion on surrounding environmental features or land uses compared to existing baseline conditions. Whilst some changes to wave parameters are predicted at Silver Beach, no significant change to existing hydrodynamic or coastal process are predicted in other parts of the Bay, and the proposed development is therefore unlikely to impact on other sensitive land uses including at Towra Beach, Lady Robinson's Beach or to infrastructure at the Sydney Airport or Port Botany.

With respect to Silver Beach, given the minor changes to wave height predicted, the Department is satisfied that the proposal would not significantly change storm surge levels, tidal range/water levels or saline intrusions experienced at Silver Beach compared to existing conditions. The Applicant's assessment identifies that wave direction influences longshore sediment transport processes at Silver Beach and Towra Beach. Given the minor change in wave direction predicted at Silver Beach (with no changes at Towra Beach) and the fact that the changes would be confined to that part of Silver Beach already protected by groyne structures (to minimise sediment depletion by longshore drift processes), the Department is satisfied that the proposal would not significantly alter sediment transport processes or levels at Silver Beach compared to existing conditions.

In addition, the Department considers that the scale of change predicted (0.05-0.4 per cent change in significant wave height and 0.1 degree change in wind direction) would not significantly contribute to or worsen changes in coastal hydrodynamics predicted to result along the NSW coast line from climate change: -15 per cent to +32 per cent change in significant wave height and negligible change in wave direction by 2070 (CSIRO, 2007).

The Applicant's assessment indicates that the proposed modifications to structures at the Kurnell port and berthing facility may result in localised changes to current action around the development site, which could result in localised changes to scour effects around the existing and new structures. The EIS indicates that whilst the reduction in ship numbers would likely reduce overall scouring and erosion caused by actions such as propeller wash; changes around the fixed berths to accommodate larger ships may result in very localised increases to scour effects at these structures. These impacts would however be limited to the development area and would not affect other sensitive receivers around the Bay. The EIS also indicates that the new upgraded facilities have been designed to take into account climate change predictions including sufficient freeboard to accommodate sea level rise predictions.

The Department considers that the changes predicted to result from the proposal as a whole are relatively minor compared to historical modifications to the Bay and previous major developments, including the Port Botany Expansion. In comparison, the proposal would result in the dredging of approximately 153,000 m^3 of sediment compared to 7,500,000 m^3 of sediment by the Port Botany Expansion and would maintain broadly the same sea bed profile of the proposed development area compared to significant alterations of the profile and depth of sea bed by the Port expansion. Based on the scale of impacts predicted, the Department is satisfied that no mitigation measures are warranted to manage the hydrodynamic impacts of the proposal.

Notwithstanding, the Department accepts that historical changes to Botany Bay have resulted in ongoing and incremental changes to coastal process within the Bay which has led to increased vulnerability of beaches such as Silver Beach to sediment transport, requiring the installation of specific protection measures (i.e. groynes) to minimise sediment depletion. In this context, it is considered that the Applicant should be required to monitor Silver Beach pre, during and post dredging and submit a report to the Department to confirm that the coastal and hydrodynamic impacts of the proposal are no greater than those predicted and involve no significant ongoing residual impacts to the beach. Where development-related impacts are identified to be significantly higher than those predicted, the Applicant would be required to identify measures to counteract any beach depletion

impacts at Silver Beach and if required, monitor and remediate impacts at this and other locations within the Bay.

5.4 NOISE

This assessment focused on construction noise impacts of the proposal because once the port and berthing facilities have been upgraded, the operational noise profile is not expected to substantially change compared with existing operations (as there would be no change to existing land use or function) and would continue to be regulated under Caltex's existing land based EPL for the facility.

Construction associated with the proposal includes:

- dredging activities: 24 hours a day, seven days a week (a six day working week with seventh day used for re-fuelling, servicing and maintenance);
- berthing upgrade: 7am to 6pm, seven days a week; and
- piling works: 7am to 6pm Monday to Friday and 8am to 1pm Saturdays, with no works on Sundays or public holidays.

A construction noise assessment was carried out in accordance with the NSW *Interim Construction Noise Guidelines 2009* (ICING). Noise Management Levels (NM's) were established for standard and non-standard construction hours.

The noise assessment identified the following sensitive receivers in close proximity to the development site as shown in **Figure 7**:

- residences along Prince Charles Parade, Kurnell, approximately 800-850 m away (2-174 Prince Charles Parade was used as a representative receiver of these residences);
- park ranger's residence located in Kamay Botany Bay National Park, approximately 700 m away;
- the users of Silver Beach (identified as a passive recreational area), approximately 600 m away;
- the users of the Kamay Botany Bay National Park Recreational Park (identified as an active recreational area), approximately 800 m away; and
- the users of the Botany Bay Educational Centre (educational institution), located within Kamay Botany Bay National Park, approximately 900 m away.

The construction noise assessment predicted noise generation associated with eight representative (and worst case) construction noise scenarios, comprising:

- Scenario 1: dredging operations;
- Scenario 2: dredging operations coinciding with the installation of quick release hooks, loading arms and a new manifold and rock revetment;
- Scenario 3: dredging operations coinciding with the installation of loading arms and a new bollard replacement, sub berth upgrades and rock revetment;
- Scenario 4: sub berth upgrade works;
- Scenario 5: installation of new mooring dolphins, platform foundations, and new fire system;
- Scenario 6: installation of new bowing dolphins, fire system, decommissioning of hydraulic loading arms;
- Scenario 7: installation of new bowing dolphins and decommissioning of hydraulic loading arms; and
- Scenario 8: Installation of new bowing dolphins.

Noise impacts predicted to result from the eight modelled scenarios at each identified receiver during standard construction hours are presented in Table 3. No exceedance of noise management levels are expected at any sensitive receivers during non-standard construction hours.

Figure 7: Surrounding Sensitive Receivers (Source: URS, February 2013)

Table 3: Predicted Construction Noise Impacts During Standard Construction Hours

Receiver	***ICNG Criteria (dB(A))***	***Exceedance of Noise Management Levels (dB(A) $L_{Aeq\ (15\ min)}$) for each of the Eight Construction Noise Scenario Modelled***							
		1	***2***	***3***	***4***	***5***	***6***	***7***	***8***
Residences on Prince Charles Parade	51	2-4	0-3	0-3	-	1-2	0-1	0-1	0-1
Park Ranger's residence	51	-	-	-	-	-	-	-	-
Silver Beach	60	-	-	-		-	-	-	-
Kamay Botany Bay National Park Recreational Park	65	-	-	-	-	-	-	-	-
Botany Bay Educational Centre	55	-	-	-	-	-	-	-	-

Notes:
- "-" indicates where no exceedances are predicted.

Department's Consideration

The construction noise impacts of the proposal can be summarised as follows:

- up to 4 dB(A) exceedance during standard construction hours of NMLs at residences along Prince Charles Parade under construction scenario 1 when sheet pilling works are being undertaken, lasting approximately three weeks;
- up to 3 dB(A) exceedance during standard construction hours of NMLs at residences along Prince Charles Parade under construction scenarios 2 and 3 when rock revetment works are being undertaken, lasting approximately six weeks;
- 1-2 dB(A) exceedance during standard construction hours of NMLs at residences along Prince Charles Parade under construction scenarios 5-8 when tubular pilling works are being undertaken, lasting approximately five weeks;
- no exceedance during non-standard construction hours of NMLs at residences along Prince Charles Parade under any construction scenario; and
- no exceedance during standard or non-standard construction hours of NMLs at any of the other receivers assessed under any construction scenario.

Construction works associated with the development would only result in minor exceedances of 1-4 dB(A) above NMLs at some receivers along Prince Charles Parade during standard day time construction hours. These exceedances would not be continuous for the duration of the two year construction period but would be limited to discrete periods (lasting up to six weeks) when specific high noise generating activities such as piling and rock revetment works are undertaken. No exceedances of the NMLs are predicted to occur during works outside of standard day time hours at any receivers and no works which have the potential to generate impulsive noise which could result in sleep disturbance. Dredging operations are not expected to be audible at sensitive receives.

Based on the above, the Department considers that construction of the proposal would not have adverse noise impacts at surrounding sensitive receivers. The Department considers that the noise exceedances predicted to occur during specific periods of high noise generating activities (such as pilling and rock revetment) can be managed and minimised through the implementation of reasonable and feasible mitigation measures, including the implementation of appropriate respite periods.

Based on the results of the noise assessment, the Department and the EPA consider that the non-standard work hours proposed by the Applicant can be supported as all high noise-generating works (such as piling) would be confined to standard (day time) construction hours and no exceedances of noise criteria (including sleep disturbance) are predicted to occur during non-standard construction hours. Furthermore, the Department accepts that the non-standard work hours proposed by the Applicant would pose significant advantages with respect to the efficient scheduling of the construction program and would avoid unnecessary delays and lengthening of the overall program, if works were restricted to standard construction hours only. Notwithstanding and as recommended by the EPA, the Department has included conditions of consent requiring the Applicant to undertake attended monitoring at the two sensitive residential locations (Prince Charles Parade and the Park Rangers' residence) during non-standard construction works, to confirm (and where required mitigate) noise impacts from the proposal during non-standard construction hours.

The EPA in its submission queried a number of aspects of the noise assessment largely relating to apparent inconsistencies between information on modelled scenarios and equipment presented in the main body of the EIS compared to the appended acoustic assessment (relating to piling works and mobile cranes) and inconsistencies relating to the stated duration of activities between information presented in the development description and noise impact assessment sections of the EIS (relating to rock revetment works). The Applicant's Submissions Report provided clarification on these matters, acknowledging inconsistencies in the information presented in the EIS, however noting that the noise modelling was based on the full complement of representative construction equipment and maximum noise generation for each construction scenario, such that the conclusions of the noise assessment with respect to predicted noise levels remained unchanged. The Applicant's Submissions Report also confirmed the duration of various activities (including rock revetment works) at which noise exceedances are predicted (refer discussion above).

Whilst noting that a number of receivers within Kamay Bay National Park had been considered in the Applicant's noise assessment, the EPA's submission also required noise impacts to Kamay Botany Bay National Park in general to be considered, based on passive recreational criteria. The Applicant's Submissions Report clarified that the maximum noise levels likely to be experienced at Kamay Botany Bay National Park (at the closest point to the development works) would be approximately 53dB(A) during standard construction hours and 42dB(A) in non-standard construction hours and therefore compliant with the 60dB(A) noise management level for a passive recreational area. Based on this the Department is satisfied that the proposal would not pose a significant risk to the acoustic amenity of the National Park.

The EPA's submission also made recommendations in relation to construction work hours for the proposal, attended noise monitoring at Prince Charles Parade and Rangers House to confirm noise levels during non-standard construction hours and the requirement for all reasonable and feasible mitigation to be implemented during construction works. The Department has incorporated these requirements into its recommended conditions of consent, together with a requirement for the Applicant to prepare and implement a Construction Noise and Vibration Management Plan.

5.5 OTHER ISSUES

The Department's consideration of other issues associated with the development is presented in **Table 4** below.

Table 4: Other Issues associated with the Development

Issue	*Department's Consideration*
European Heritage	The specialist European heritage assessment identified six items of European heritage significance at or in the vicinity of the development site. This included the National heritage listed Kurnell peninsula headland (the original landing site of Captain Cook) and the following local heritage items listed in the Kurnell Peninsula SEPP: the Australian (Caltex) Oil Refinery, Bonna Point Reserve, Crown Land Boat Shed, Silver Beach and roadway. Of these listed items, the proposal would impact on infrastructure associated with the Caltex's Oil Refinery. In particular, the installation of the new hydraulic loading arm infrastructure would involve the permanent removal of the existing 1960's loading arm at Fixed Berth 1. This impact was considered to be minor particularly since the overall upgrade of the port and berthing facilities would support the ongoing function of the refinery site and the associated industrial heritage significance of the overall site. Similarly, the installation of new infrastructure (such as breasting dolphins) was considered unlikely to significantly impact on the original fabric of the wharf infrastructure and would also continue to support the ongoing operation (and associated heritage significance) of the site into the future. The Department generally agrees with the findings of the European heritage assessment and notes that these impacts can be mitigated through archival recording of items prior to their removal. The Heritage Council of NSW considered this to be an appropriate mitigation measure in this instance. The Department has included this requirement into its recommended conditions. The assessment also included consideration of potential impacts to maritime heritage. The assessment identified that no ship wrecks or other elements of maritime heritage had been identified or previously recorded within the port and berthing area or its immediate surrounds, but noted that nine ship wrecks have been previously recorded within Botany Bay. The Heritage Council of NSW recommended additional marine surveys using side sonar scans be carried out to confirm whether there are indeed any marine relics or ships wrecks in the area, prior to the commencement of construction. In its response, the Applicant identified that a number of marine surveys of the area had already been undertaken including diver inspections of the fixed berth, turning circle, and sub berth in 2013 and that ongoing operational dives in the berths to connect mooring lines and hoses to berthing ships had not identified any marine relics. Based on the information provided by the Applicant, the Department accepts that recent surveys have been undertaken of certain sections of the development site (fixed berth, turning circle, and sub berth), however considers that other areas of the proposal (approaches) have not been subject to recent survey. Further, the Department considers that due to the burial of relics within the sea bed, items may not be easily identified with dive surveys compared to sonar surveys. Consequently, the Department considers that the Applicant should be required to undertake magnetic or sonar surveys across the port and berthing area, prior to the commencement of construction and has included this requirement in its recommended conditions of approval, and, should any heritage items be found, prepare and implement a management strategy to the satisfaction of the Department and the NSW Heritage Council. In its submission on the proposal, the NSW Heritage Council also raised issue regarding potential cumulative impacts to heritage items along the western foreshore of Botany Bay. The Department is satisfied that the proposal would not contribute to cumulative heritage impacts along the western foreshore of the Bay, subject to the imposition of recommended conditions above.
Aboriginal Heritage	The EIS included a specialist Aboriginal heritage assessment prepared in consultation with the La Perouse Local Aboriginal Land Council. The assessment identified no previously recorded items of Aboriginal heritage value within the port and berthing area with all previously identified items in being located above the high water mark. As the works

Issue	*Department's Consideration*
	associated with the proposal would be confined to within Botany Bay and the existing cleared right of way between the Caltex Refinery site and Kurnell Wharf (for minor construction lay-down only), no direct impacts to previously recorded items are expected, the closest of which are located at the Kurnell Peninsula headland. Indirect impacts from suspended sediment dispersion and alterations to coastal processes are not expected pose significant changes to the surrounding Kurnell peninsula headland or foreshores of Silver Beach such as to impact on any intrinsic Aboriginal heritage values in these areas. A standard condition is recommended to address the possibility of unexpected discovering previously unidentified Aboriginal heritage objects.
Land Use	Key land uses within Botany Bay that have the potential to be impacted by the proposal include aquaculture, recreational fishing, shipping and navigation and general marine based recreational activities such as swimming and sailing. The impacts of the proposal to water quality, ecology and coastal processes on these land uses within the Bay have been assessed in detail in **Sections 5.1** to **5.3**. The proposal is unlikely to have a significant adverse or long-term impact on water quality, ecology or coastal processes of the Bay such as to affect existing land use in the Bay including recreational fishing, aquaculture and general recreational uses (such as swimming, boating or diving). Whilst dredging activities associated with the proposal would result in some short term, residual dispersion of TBT-laden sediments, the proposal as a whole would lead to an overall reduction in available TBT-contaminated material within the Bay. Furthermore, suspended sediment generation during dredging activities would be largely localised and unlikely to affect the water quality of the Bay as a whole or limit recreational use of the Bay. DPI requested a comprehensive communications and consultation program to be implemented (including a complaints line) to keep the general public, recreational users of the Bay and the recreational fishing community informed of potential disruptions to fishing from dredging activities. The Applicant has made a commitment to do this and the Department has recommended conditions of consent to reinforce this commitment. Since 2002, Botany Bay has been a recreational fishing haven (RFH) with commercial fishing banned within its limits since this time. Recreational fishing restrictions only apply to certain areas of the Bay including protected areas under the Towra Point Aquatic Reserve and areas subject to the 'Marine Security Zone' which covers the operational areas of the port and berthing facility and Port Botany. The Applicant originally proposed in the EIS that the site's existing Marine Security Zone would need to be expanded to accommodate dredging for the proposal, which would have resulted in the loss of approximately 35 x 10 metre (10,850 m^2) area within the RFH area being lost for recreational fishing. DPI (Fisheries) requested that fishing rights in the area be maintained or be compensated for the loss. Since exhibiting the EIS, the Applicant reviewed this element of the proposal and subsequently determined that it could carry out the proposed works without having to permanently expand the Marine Security Zone. As such, no long term reduction to existing fishing areas would result from the proposal, apart from some temporary restrictions during dredging operations. Increased ship movements during construction would add to existing container traffic in the Bay. Vessel movements would be subject to Harbour Master control and existing Caltex procedures on shipping movements. Subject to these existing procedures, the Department is satisfied that the additional shipping traffic associated with the proposal can be appropriately managed during this period. During the operational phase, the existing volumes of container traffic would likely be replaced by a fewer number of larger vessels, which would also be subject to these existing procedures on vessel movements. Further, the upgraded facilities are expected to provide for safer and more efficient shipping operations on site compared to the existing situation.
Construction Traffic	Traffic volumes generated during construction period would comprise: • 60-100 truck movements for equipment deliveries across the two year construction period (equating to one or two truck movements per day in certain periods, with long periods of no truck deliveries); • 100 concrete trucks over nine days across a six to eight week period – with eight to

Issue	*Department's Consideration*
	nine trucks (16-18 movements) expected per day for the majority of the nine day period and 25 trucks (50 movements) required on a single day to cover the largest concrete pour; • 30 personnel (60 light vehicle movements) per day during the dredging works; • 25 personnel (50 light vehicle movements) per day during the upgrade of the fixed berths; and • 12 personnel (24 light vehicle movements) per day during the upgrade of the sub berth. Construction vehicles would access the construction lay down area off the Kurnell Wharf from Prince Charles Parade and storage areas within the refinery itself via Solander Street. Given that the vast majority of construction traffic associated with the development would be limited to light vehicle traffic and that the heavy vehicle traffic generated would be fairly minimal, and spread across the two year construction period, the Department is satisfied that the construction traffic volumes generated by the proposal would not significantly affect the safe and efficient operation of the surrounding road network. The Applicant has committed to preparing and implementing a traffic management plan to direct and manage traffic during the peak period of heavy vehicle movements (being the period of the concrete pours). The Department recommends further traffic management measures be imposed to minimise potential disruptions to local streets (such as ensuring adequate onsite parking to avoid the need for on street parking) and should also be incorporated into a wider construction traffic and access management plan for the proposal which would apply for the entire construction period, and has incorporated conditions of approval in this regard.
Air Quality	The EIS included an air quality impact assessment which assessed the potential for odour generation from the development, as a result of the dredging of decayed organic material sediments. The assessment indicated that odour impacts from the proposal would achieve conservative odour criteria (2 odour units) within 300-400 m of the dredging activities, which would be at least 200 m from the nearest sensitive on-shore residential receiver. Whilst odour generation within 400 m of the dredging area has the potential to affect recreational users of the Bay in close proximity to the development site, these impacts are considered unlikely to be significant as the impacts would be temporary (dissipating with distance) and finite (limited to the construction phase only). The Applicant has proposed mitigation measures to manage the generation of odorous emissions from the site including the screening of sediments for odour and undertaking odour monitoring where required. The Department agrees with this and has recommended conditions of consent requiring the Applicant to implement all reasonable and feasible measures to ensure that the odour limit of 2 odour units is not exceeded at nearest sensitive receivers during construction works.
Hazard and Risk	*State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* identifies industrial development that could be classified as potentially hazardous or offensive. As the proposal works relate to the upgrade of refinery infrastructure involving the on-going handling of flammable and combustible liquids, it qualifies as a potentially hazardous industry and under the SEPP requires a Preliminary Hazard Analysis (PHA) to be prepared in relation to the proposal. The EIS includes a PHA prepared in accordance with the NSW Hazardous Industry Planning Advisory Papers. The PHA has been assessed by the Department's hazard assessment branch and found to be technically adequate. The Department is therefore satisfied that subject to the recommendations of the PHA being implemented the proposal would not impose unacceptable risks to surrounding land use.
Acid Sulfate Soils	Marine sediment within Botany Bay (land below the mean high water mark) contains naturally occurring Potential Acid Sulfate Soil (PASS), which if disturbed and exposed to oxygen has the potential to oxidise and generate acid leachate (becoming actual Acid Sulfate Soils (ASS). Sediment testing undertaken confirms the presence of PASS with acid generation potential. During dredging operations, sediments would be exposed to oxygen between the excavation of material and their transit to the final re-use or disposal location back below water. The spoil and contamination assessment undertaken as part of the EIS indicates that the proposal is unlikely to generate ASS as dredged sediment would remain saturated during the period of transport between the excavation location and the re-use or disposal

Issue	Department's Consideration
	location particularly since the transit times to re-use locations would be minimal. Further, transit times to the offshore disposal location (for sediments not re-used on site) would also be of short duration (five to six hours) and there would be limited potential for the PASS to dry out and oxidise during this transit. The Applicant has proposed mitigation measures including the monitoring of sediments during transit and where required spraying of material to prevent drying out (particularly during the summer months and if there are delays in the transfer of material to the offshore site) to avoid the generation of ASS during transit. The Department is satisfied that with the implementation of these measures ASS risks associated with dredged sediment can be appropriately managed. The Department has recommended conditions of approval to reinforce these measures including a requirement for the Applicant to prepare and implement a Dredging and Spoil Management Plan to manage and monitor PASS during dredging operations, including contingency measures to be implemented in case of acid generation.
Groundwater	Groundwater occurs in Quaternary deposits below the Bay range from depths of 20 metres along the outer edges of the Bay to depths of 100 metres within the central part of the Bay. Bore hole records have confirmed that groundwater at the development site is absent at the depth at which dredging would be undertaken (approximately 14 metres). As such it is considered that the development would pose a low risk of groundwater interception or interference.
Cumulative	The construction of the proposal is not expected to coincide with any major development within the Bay, with major developments such as the Port Botany Expansion and the Botany Bay Cable Laying Project either nearing completion or already complete. The proposed conversion of the land based Caltex refinery to an import terminal is currently undergoing assessment and if approved would constitute the closest land based development to the proposal, which may coincide with respect to construction timing. Notwithstanding, given the separation with respect to the location and nature of works (marine versus land based), it is considered unlikely that the proposal would pose significant contributions to cumulative impacts. Where the proposal is considered likely to add to cumulative impacts within the Bay (including coastal process changes and contributions to shipping movements within the Bay), these impacts have been assessed in relevant sections of the report (refer Sections 5.4 and 5.5).

6. CONCLUSION AND RECOMMENDATION

The existing Caltex Kurnell refinery is critical to the functioning of the NSW economy supplying 40-50% of the overall fuel supplies to the NSW/ACT markets, including being a leading supplier of jet fuel to the Sydney (Kingsford Smith) Airport. The proposed development involves the upgrade of the existing port and berthing facility associated with the Kurnell refinery to support the conversion of the Caltex facility from a refinery into an import terminal for finished petroleum products. The Department considers the development to be justified as it would support and facilitate the continued operation of the Kurnell site to meet current and future demand for petroleum products in NSW and the ACT, which is consistent with objectives in the draft *South Subregional Strategy* (Department of Planning, 2007), the *Draft Metropolitan Strategy for Sydney* (NSW Government 2013) and *NSW 2021* (NSW Government 2011) and critical for continued economic growth in NSW. The Department considers the proposal site to be suitable for the development as the Kurnell site is already established to supply and distribute fuel across NSW. Consequently, upgrade of the existing site to facilitate the conversion of the existing refinery into an import terminal to better meet future demand provides the most efficient and environmentally sustainable option compared to alternative terminal options or locations which would require significant capital investment on additional infrastructure and associated environmental and social impacts. Consequently the Department considers the proposal to be justified and the site to be suitable for the development.

The Department has assessed the EIS submissions on the proposal and the Submissions Report and considers the key issues associated with the proposal to be water quality, aquatic ecology, coastal processes and noise. Other issues also considered in relation to the proposal include heritage, land use, traffic, air quality and cumulative impacts. Based on its assessment the Department is satisfied that the majority of issues associated with the proposal would not lead to unacceptable impacts during construction or operation and residual impacts can be managed and mitigated with the implementation of a range of mitigation and management measures.

The Department notes however, that the proposal would pose a residual risk of increasing TBT concentrations in areas outside of the development footprint as a result of TBT-bound sediment dispersion during dredging activities. The Department notes that the deposition levels would be very minor and the ongoing risk posed by the additional concentrations of TBT deposited in off site locations (the aquaculture site and northern portion of the sea grass beds immediately to the south of the Kurnell Wharf) is likely to be low. The Department notes that the proposal as a whole would result in the removal of a significant volume of TBT-contaminated sediments and would therefore result in an overall reduction in bio-available contaminants within the Bay. The Department has recommended a conditions frame work based on minimising the generation of TBT-bound suspended sediment at-source and monitoring deposition locations to assess residual risks, including the health of sea grass beds.

The Department's conditions framework has also focused on managing and minimising construction related impacts in general, noting that this would be the main source of impacts associated with the development (with the operation of the development not expected to significantly change from existing operations, with the exceptions of the upgraded facilities providing for more efficient and safer operations). In this regard, the Department has recommended conditions in relation to the management of shipping collision risks to marine fauna, noise, odour management and community consultation and notification (to keep recreational users of the Bay notified of works within the Bay).

The Department considers that with the implementation of these measures impacts can be appropriately minimised, mitigated and managed. On balance, the Department considers the development to be justified as it would help supply petroleum products to the markets of

NSW and the ACT into the future. Consequently, the Department considers the development is in the public's interest and should be approved, subject to conditions.

It is recommended that the Planning Assessment Commission, as delegate to the Minister for Planning & Infrastructure:

a) **consider** all relevant matters under Section 79C of the *Environmental Planning and Assessment Act 1979*, including those contained in the findings and recommendations of this report and appended documentation;

b) **grant consent** to the development application, subject to conditions, under section 89E of the *Environmental Planning and Assessment Act 1979*; and

c) **sign** the attached development consent (Appendix F).

Prepared by:

Karen Jones 13/8/13
A/Director
Infrastructure Projects

13.8.13
Chris Wilson
Executive Director
Development Assessment Systems and Approvals

APPENDIX A ENVIRONMENTAL IMPACT STATEMENT

See the Department's website at:
http://majordevelopments.planning.nsw.gov.au/index.pl?action=view_job&job_id=5353

APPENDIX B SUBMISSIONS

See the Department's website at:
http://majordevelopments.planning.nsw.gov.au/index.pl?action=view_job&job_id=5353

APPENDIX C APPLICANT'S RESPONSE TO SUBMISSIONS

See the Department's website at:
http://majordevelopments.planning.nsw.gov.au/index.pl?action=view_job&job_id=5353

APPENDIX D CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

The Department's consideration of Environmental Planning Instruments (EPI) applicable to the proposal is discussed below.

State Environmental Planning Policy (State and Regional Development) 2011

This SEPP identifies the categories of development classified as State Significant Development and State Significant Infrastructure and would therefore require State approval under EP&A Act. The proposal is classified as SSD pursuant to the provision of this SEPP as further detailed in section 3.1 of this report.

State Environmental Planning Policy (Infrastructure) 2011

The permissibility of the development is established by the provisions of this SEPP as further detailed in section 3.2 of this report.

State Environmental Planning Policy (Port Botany and Port Kembla) 2013

This SEPP applies to designated areas within Port Botany and Port Kembla as identified in the SEPP. The proposal site falls partly within the area classified as 'unzoned land' within the Port Botany area subject to the SEPP. Under cause 15 (1) of the SEPP any development is permissible with consent in unzoned land. However, pursuant to clause 15 (2), the consent authority must consider:

a) whether the development would impact on adjoining zoned land and, if so, consider the objectives for development in the zones of the adjoining land, and

b) be satisfied that the development is appropriate and is compatible with permissible land uses in any such adjoining land.

The only zoned land that the development would impact upon is that zoned 7 (a) (Waterways zone) under the Kurnell Peninsula SEPP. Permissible land uses under the zone are listed as being: aids to navigation; beach nourishment; oyster farming; single moorings; aquaculture; commercial recreational activities associated with the waterways (other than marinas or activities involving the hiring of powered craft); environmental education facilities; maintenance dredging; mooring piles; pipelines; public boat launching ramps; public jetties; swimming enclosures; utility installations (other than gas holders or generating works); works associated with or ancillary to oyster farming.

The Department's assessment of the environmental impacts associated with the development indicate that, subject to appropriate mitigation, the proposal would not result in significant environmental impacts that would compromise existing surrounding land use (including aquaculture, commercial recreational activities) and that impacts would largely be confined to the construction stage with minimal ongoing residual impacts. It is noted that the proposal involves modification to an existing facility (the Caltex refinery port and berthing facility) which has co-existed with surrounding land use since 1956 rather than the development of new land use. In consideration of the above, the Department is satisfied that the proposal is appropriate and is compatible with permissible land uses within the 7 (a) zoning.

In addition, clause 19 of the SEPP requires notification of the proposal to the Port Operator if the development falls within the 'Referral Area Map' identified in the SEPP. The development falls within the 'referral area' for Port Botany as identified in the SEPP and SPC has been notified on the proposal and its submission on the proposal has been considered in the Department's assessment (refer Section 5.1 of this report). In this regard, it is noted that the role of Port Operator is currently in transition and at the time of notification and currently, SPC remains the appropriate point of contact for such referrals.

Clause 19 (4) of the SEPP requires the following matters to be taken into account by the consent authority in addition to any submission made by the Port Operator:

- the effect of the development on the practicability, cost, structural integrity and safety of future port expansion or dredging works within navigation channels,
- the effect of the development on ship movements to, from or within Port Botany.

The development would have no impact on future port expansion or dredging works within navigation channels as no works are proposed within the footprint of Port Botany or within navigation channels. However, during the construction of the development (particularly the dredging period of 21-23 weeks), additional shipping traffic would utilise the Botany Bay shipping channel. The additional shipping traffic would be in the order of 400 movements across the construction period, equating to three additional ships per day. With the implementation of standard shipping protocols that apply to Botany Bay, it is considered that the development is unlikely to significantly disrupt existing shipping traffic to and from Port Botany.

State Environmental Planning Policy (Kurnell Peninsula) 1989

A small portion of the development, comprising the south east corner of the extended fixed berth 1 and laydown and loading areas would be located on land subject to the Kurnell Peninsula SEPP and zoned as 7 (a) (Waterways zone) under this SEPP. Under this zoning the proposal is an innominate prohibited use. However, the provisions of the Infrastructure SEPP prevail over this prohibition and the development is deemed permissible in accordance with the provisions of the Infrastructure SEPP as detailed in section 3.2 of this report.

Relevant provisions of the SEPP that would apply to the proposal are assessed below.

Table 5: Assessment of relevant clauses of SEPP (Kurnell Peninsula) 1989

Relevant Clause	Assessment by the Department
Clause 18 – Development adjacent to or adjoining Zone No 7(a)	The clause requires that development consent not be granted to any development sited within 10 metres from the boundary of Zone No 7 (a), or which would otherwise require clearing, construction of a levee on, draining or filling of land within 10 metres from the boundary of Zone No 7 (a). The components of the development located on un-zoned land would be located immediately adjacent to and within 10 metres of the small component of the development (south east corner of the extended fixed berth 1) and to the marine waters in front of Silver Beach which are zoned 7(a) waterway. Notwithstanding, it is noted that these are existing structures (the Kurnell port and berthing facilities) that are proposed to be modified rather than a Greenfield development proposed adjacent to this zoning. Further, the proposal does not involve clearing, construction of a levee on, draining or filling of land within 10 metres from the boundary of Zone No 7 (a). Whilst works are proposed near the 7(a) zone boundary, the assessment undertaken in the EIS concluded that with the implementation of mitigation measures there is unlikely to be significant environmental impact on the environmentally sensitive waterway area.
Clause 21 – Consideration of environmental effect	The EIS has concluded that based on key studies undertaken covering coastal hydrodynamics, ecology and water quality, there is unlikely be significant adverse impacts on the long-term viability of nearby wetland areas including the Towra Point Nature and Aquatic Reserve, including their ecosystems and biota.
Clause 23A - Protection of heritage items and relics and Clause 23B - Development of known or potential archaeological sites Clause 23C - Conservation incentives	Sections 23(A) – 23(C) of the SEPP require that items and places of Aboriginal historic heritage are protected from the impacts arising from development, including subject to appropriate assessment and conservation, as required. Heritage applications also require advertising in at least two newspapers. Relevant items and sites are listed in the SEPP and include the Kurnell Peninsula Headland, the Australian Oil Refinery (including the Kurnell Wharf), Bonna Point Reserve, the Crown Land Boatshed, and the Silver Beach Roadway. The EIS included assessment of both Aboriginal and European heritage including maritime heritage potential. The assessments concluded that the proposal would significantly impact on the heritage values of the

Relevant Clause	Assessment by the Department
	Kurnell Refinery and included a recommendation for archival recordings. No Aboriginal archaeological sites, objects or places, or areas of archeological potential or Aboriginal sensitivity were identified within the development site. Full details of the Department's assessment of heritage values are provided in Section 5.5 of this report.

Based on its assessment of the relevant clauses of this SEPP, the Department considers the proposal to be generally consistent with the planning objectives of this EPI.

State Environmental Planning Policy No. 71 - Coastal Protection

The development and its immediate environs are not located within the NSW coastal zone and as such, the provisions of this SEPP do not apply to the proposal.

State Environmental Planning Policy No. 62 – Sustainable Aquaculture

This SEPP requires consent authorities to consider the impact of development activities on oyster aquaculture. The Department's assessment of key issues including coastal hydrodynamics, ecology and water quality indicates that the proposal is unlikely significantly impact on the long term viability of aquaculture areas within Botany Bay and the Georges River.

State Environmental Planning Policy No. 55 – Remediation of Land

This SEPP requires the consent authority to consider whether land is contaminated and whether the land is suitable in its contaminated state (or would be suitable, after remediation) for the purpose of the proposed development, and if remediation is required, that the land is suitably remediated for the proposed land use, prior to its development.

Sediment sampling undertaken at the development site indicates that sea bed sediment at various locations within the Bay are contaminated by heavy metals and other chemicals, as a result of the historical and ongoing use of the Bay as a working port and associated industrial activity. Chemicals in the sediment include TBT, which was used as an anti-fouling paint in ships, prior to its international ban in 2003. Insitu remediation of the sea-bed sediment prior to dredging (to provide navigable depths for vessels and to provide for the berthing facility upgrade) is not feasible, given the distribution of contaminated sediments across the Bay and its ongoing transportation across the Bay via natural hydrodynamic processes (wave, current action etc).

Maintenance dredging within the Port is undertaken as part of standard operations and dredging has previously been undertaken for major developments across the Bay including the Port Botany Expansion. The current development would involve the dredging of existing seabed sediment from within the Bay (some of which comprises contaminated sediments) as undertaken for previous developments within the Bay. Similar to the approach taken for previous dredging developments, mitigation measures would be put in place to reduce the potential for contaminated sediments to disperse in the water column during dredging activities. Only sediment identified to be uncontaminated would be re-used on site for infilling, whilst the remainder would be disposed offshore. The offshore disposal of the sediment is not part of the current application and is being assessed by the Commonwealth. Notwithstanding, toxicity testing information provided in the EIS indicates that the sediment would be suitable for disposal at the proposed location. Based on the above, the proposed development is considered to be suitable to be undertaken on the subject land in its existing state.

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

The requirements of this SEPP including the requirements for the preparation of a Preliminary Hazard Analysis SEPP are detailed in Section 0 of this report under 'Hazard and Risk'.

State Environmental Planning Policy No. 14 – Coastal Wetlands

The development site and its immediate environs are not located within a coastal wetland covered by the SEPP and as such, the provisions of this SEPP do not apply to the proposal.

Notwithstanding, the Department's assessment of key issues including coastal hydrodynamics, ecology and water quality indicates that the proposal is unlikely significantly impact on the long term viability of nearby wetlands including the Towra Point Nature and Aquatic Reserve.

APPENDIX E POLITICAL DONATION DISCLOSURES

See the Department's website at:
http://majordevelopments.planning.nsw.gov.au/index.pl?action=view_job&job_id=5353

APPENDIX F RECOMMENDED CONDITIONS OF APPROVAL