ENVIRONMENTAL ASSESSMENT

VOLUME 1

Main Report

April 2011

Kurnell B Line Upgrade

URS

CALTEX

Statement of Validity

Submission of Environmental Assessment

Prepared under Part 3A of the *Environmental Planning and Assessment Act 1979*

Environmental Assessment prepared by

Role	**Project Director**	**Project Manager**
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Position	Principal - Environment	Associate Planner - Environment
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In respect of

Applicant and Land Details

Applicant	Caltex Refineries 2 Solander Street Kurnell NSW 2231
Subject Site	Caltex Kurnell Refinery, 2 Solander Street, Kurnell, NSW 2231; and Caltex Banksmeadow Terminal, Penhryn Road, Banksmeadow NSW 2019
Project Summary	Upgrade of pumps, filters, other equipment and pipes for the Kurnell Jet Fuel Pipeline (B Line) at the Kurnell Refinery and Banksmeadow Terminal.
Lot and DP	Kurnell Refinery - Lot 25 DP776328, Lot 570 DP752064, Lot 283 DP752064, Lot 1 DP132055. Kurnell Wharf - Lot 456 DP1413279. Kurnell Right of Way - Lot 122 DP8135, Lot 123 DP8135, Lot 124DP8135, Lot 125 DP8135, Lot 77 DP8135, Lot 78 DP8135, Lot 79 DP8135, Lot 46 DP8135, Lot 43 DP8135, Lot 44 DP8135, Lot 45 DP8135, Lot K DP362655, Lot F DP361103, Lot G DP361103, Lot B DP338897, Lot H DP362655, Lot J DP362655. Banksmeadow Terminal - Lot 1 DP1050144.

Environmental Assessment

An Environmental Assessment is attached. The Environmental Assessment assesses the environmental impacts of this project and includes the matters referred to in Director-General's Requirements provided to the Proponent from the 18 January 2011 under Section 75F of the *Environmental Planning and Assessment Act 1979*.

Declaration

I certify that I have prepared the contents of the Environmental Assessment in accordance with the requirements of the Environmental Planning and Assessment Act 1979 and Regulation and that, to the best of my knowledge, the information contained in this report is not false or misleading.

Signature: 

Name: WILLIAM MILES **Date:** 14/4/2011

Tables

Figures

Appendices

Notes on Text

Note 1

As a determination of the Project will only be made after the Environmental Assessment has been on public display and submissions considered, the future conditional tense is used throughout this Environmental Assessment when describing the Project, alternatives and assessing impacts. “Would” is, therefore, used throughout the text in preference to “will”.

If all approvals are given for the Project to proceed, all “would” references should be interpreted as “will”, subject to final conditions of consent.

Note 2

Following the New South Wales State Elections on the 26th April 2010, a number of State Agencies have changed their names. The Department of Planning (DoP) became the Department of Planning and Infrastructure (DoPI) and the Department of Environment, Climate Change and Water (DECCW) became the Office of Environment and Heritage (OEH), a division of the NSW Department of Premier and Cabinet (DPC).

Therefore where the Department of Planning or the Department of Environment, Climate Change and Water are mentioned, and where appropriate to do so, the reader should note that the new name applies.

Other departments may also change their name during the exhibition of this Environmental Assessment. Further information will be provided on the relevant departmental websites.

Abbreviations

AADT	Average Annual Daily Traffic
ABS	Australian Bureau of Statistics
AHC	Australian Heritage Commission
AHD	Australian height datum (in metres)
AHIMS	Aboriginal Heritage Information Management System
AHMP	Aboriginal Heritage Management Plan
ANZEC	Australian and New Zealand Environment Council
ANZECC	Australian and New Zealand Environment and Conservation Council
ARG	Aboriginal Resource Gathering Site
AS	Australian Standard
ASC	Australia Soil Classification
ASL	Above sea level
AWS	Automatic Weather Station
BoM	Bureau of Meterology
CPRS	Carbon Pollution Reduction Scheme
CEMP	Construction Environmental Management Plan
CMA	Catchment Management Authority
CO	Carbon monoxide
CO_2	Carbon dioxide
DEC	Department of Environment and Conservation (NSW)
DECCW	Department of Environment and Climate Change and Water (NSW)
DEH	Department of Environment and Heritage (Commonwealth)
DEWHA	The Commonwealth Department of the Environment, Water, Heritage and the Arts
DGRs	Director-General's Requirements
DIPNR	Department of Infrastructure, Planning and Natural Resources (NSW)
DNR	Department of Natural Resources
DoP	Department of Planning (NSW)
DP	Deposited Plan
DPI	Department of Primary Industries (Now known as DII see below)
DWE	Department of Water and Energy
EA	Environmental Assessment
EC	Electrical conductivity
ECRTN	Environmental Criteria for Road Traffic Noise
EEO	Energy Efficiency Opportunities
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management Systems
ENCM	Environmental Noise Control Manual
EP&A Act	NSW Environment Planning and Assessment Act 1979
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
ESC	Effective Survey Coverage
ESD	Ecologically Sustainable Development
FM Act	Fisheries Management Act 1994
FMP	Fire Management Plan
GHG	Greenhouse Gas
GIS	Geographic Information System

GPS	Global Positioning System
HAZID	Hazard identification
HAZOP	Hazard and Operability
HIPAPs	Hazardous Industry Planning Advisory Papers
ICCG	Interim Community Consultation Guidelines
IDO	Interim Development Order
I&I	Department of Industry and Investment
INP	Industrial Noise Policy
IPCC	International Panel on Climate Change
JSA	Job Safety Analysis
JUHI	Joint User Hydrant Installation Facility (JUHI) at Sydney Airport
KTP	Key Threatening Process
KBL	Kurnell B Line or Kurnell Jet Fuel Pipeline (B Line).
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Authority
LPMA	Land and Property Management Authority
N/A	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NES	National Environmental Significance
NGA	National Greenhouse Accounts
NGER Act	National Greenhouse and Energy Reporting Act 2007
NGRS	National Greenhouse Response Strategy
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NOW	NSW Office of Water
NP	National Park
NP&W Act	National Parks and Wildlife Act 1974 (NSW).
NPWS	National Parks and Wildlife Service (NSW)
NRAtlas	NSW Natural Resource Atlas
NSW	New South Wales
NSW NPWS	NSW National Parks and Wildlife Service
NVC Act	Native Vegetation Conservation Act 1997 (NSW)
OH&S	Occupational Health and Safety
PAD	Potential archaeological deposit
PEA	Preliminary Environmental Assessment
PHA	Preliminary Hazards Assessment
PM10	Particles effectively less than 10µm diameter
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
POEO Reg	Protection of the Environment Operations Regulations
RBL	Rating Background Level
RNE	Register of the National Estate
ROTAP	Rare or Threatened Australian Plants
RTA	Roads and Traffic Authority (NSW)
SAL	Sensitive Archaeological Landform
SD	Statistical Division
SEPP	State Environment Planning Policy
SEWPAC	Department of Sustainability, Environment, Water, Population and Communities
SO2	Sulphur dioxide
sp.	Species (singular)

spp.	Species (plural)
subsp.	subspecies
TEC	Threatened Ecological Community (formerly Endangered Ecological Community)
TSC Act	Threatened Species Conservation Act 1995 (NSW).
VBMP	Vegetation and Biodiversity Management Plan.
VSD	Variable Speed Drive

UNITS

°	degrees
°C	degrees Celsius
%	percentage
bcm	bank cubic metre
cm	centimetres
D%	dispersion percentage
dB	decibels
dB(A)	The average level of sound over a set time period.
dB d	decibel, unit used to express sound intensity
deg	degrees
g	gram (= 0.001 kilogram)
GL	gigalitre (109 L or 106 m3)
Gt	gigatonnes (=1 billion tonnes)
GWh	gigawatt Hour
ha	hectare
hr	hour
Hz	Hertz
kg	Kilogram
kJ	Kilojoules
kL	Kilolitre
km	Kilometre
km/hr	Kilometres per hour
km^2	Square kilometre
kPa	Kilopascals
kV	Kilovolts
kVA	kilovolt – amperes
kW	Kilowatts
L	litre
L/hr	litres per hour
L/s	litres per second
L/t	litres per tonne
LA10	sound level exceeded 10% of the sampling time
LA90	sound level exceeded 90% of the sampling time
LAeq	the LAeq is the “equal energy” average noise levels, and is used in some instances for the assessment of traffic noise effects or the risk of hearing impairment due to noise exposures
LAeq 1 hour	the “equal energy” average noise level over 60 minutes – used for assessing impacts of noise from motor vehicles
LAeq T	sound level of continuous noise which emits the same energy as the fluctuation sound over a given time period (T)
LAmax	the absolute maximum noise level measured in a given time interval
LAN	the A-weighted sound pressure level exceeded by N% of a given measured period
m	metre
M	million
m AHD	metres above Australian Height Datum

m/s	metres per second
m^2	square metre
m^3	cubic metre
mG	milligauss
mg	milligram
mg/L	milligrams per litre (parts per million)
MHz	Megahertz
ML	Meglitre
ML/day	megalitres per day
ML/pa	megalitres per annum
mm	millimetre
mm/s	millimetres per second
Mt	million tonnes (metric tonne = 1 000kg)
Mtpa	million tonnes per annum
MW	Megawatts
pa	per annum
pH	degree of acidity or alkalinity of a solution.
PM10	particulate matter <10µm in diameter
ppm	Parts per million
s	second
t	tonne (= 1 000kg)
tpa	tonnes per annum
µg/m3	micrograms (1 x 10-6 grams) per cubic metre
µm	micrometres (= 0.001mm)
µS/cm	microsiemens per centimetre

Glossary

aboriginal archaeological site (Aboriginal site)	A place where physical remains or modification of the natural environment indicate past and 'traditional' activities by Aboriginal people. Site types include artefact scatters, isolated artefacts, burials, shell middens, scarred trees, quarries and contact sites.
acid sulphate soils (ASS)	Soils containing pyrite which produces sulphuric acid when exposed to oxygen. Main cause of acid generation within the soil mantle. Commonly found less than five metres above sea level, particularly in low-lying coastal areas such as mangroves, salt marshes, floodplains, swamps, wetlands, estuaries, and brackish or tidal lakes.
air pollutant	A substance in ambient atmosphere, resulting from the activity of man or from natural processes, causing adverse effects to man and the environment.
alluvial deposits	Soil or sediment deposited by a river or other running water. Typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel.
ambient noise	The all-encompassing sound at a site comprising all sources such as industry, traffic, domestic, and natural noises. This is represented as the L_{eq} noise level in environmental noise assessment. (See also L_{Aeq})
amenity	The desirability of an area.
aquifer	Rock formation containing water in recoverable quantities.
archaeology	The scientific study of human history, particularly the relics and cultural remains of the distant past.
background noise levels	The level of the ambient sound indicated on a sound level meter in the absence of the sound under investigation (e.g. sound from a particular noise source; or sound generated for test purposes).
background scatter	Aboriginal artefacts that cannot be usefully related to a place or focus of past activity.
Banksmeadow works	Involves all aspects of the Project works at the Banksmeadow Terminal.
biodiversity	Biodiversity is defined as encompassing biological variety at genetic, species and ecosystem scales (DASETT 1992). The maintenance of biodiversity, at all levels, is acknowledged internationally as a high conservation priority, and is protected by the International Convention on Biological Diversity 1992.
bioregion	An ecologically and geographically defined area smaller than an ecozone. They cover relatively large areas of land or water, and contain characteristic, geographically distinct assemblages of natural communities and species distinct from other bioregions.
Bora Ground site	Indigenous ceremonial sites
bunding	An area within a structure designed to prevent breaches or inundation of various types. E.g. chemicals, waste and dangerous goods must be contained within bunding.
catchment area	The area determined by topographic features within which rainfall will contribute to runoff at a particular point.
catchment disturbance index	A part of the Australian 'Assessment of River Condition (ARC)'
channel	River or irrigation channel, includes bed and bank.

community	A combination of plants that are dependant on their environment and influence one another and modify their own environment. They form together, with their common habitat and other associated organisms, an ecosystem, which is also related to neighbouring ecosystems and to the macroclimate of the region.
curtilage	The enclosed area of land around a building
culvert	A device (usually a pipe or series of pipes) used to convey water from one side of a barrier to another. Culverts are usually found beneath roads, railways or embankments, helping excess water drain without causing damage and scour erosion to the road.
dewatering	The process of removing groundwater to lower the water table below the lowest level of excavation.
dispersibility	A characteristic of soils relating to their structural breakdown in water to individual particles.
drainage line	A passage along which water concentrates and flows towards a stream, drainage plain or swamp intermittently during or following rain.
Ecologically Sustainable Development (ESD)	Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future can be increased.
ecosystem	The totality of biological processes and interaction within a specified physical environment.
emission	A discharge of a substance (e.g. dust) into the environment.
endangered species	Those plants and animal species likely to become extinct unless action is taken to remove or control the factors that threaten their survival.
environment	The physical, biological, cultural, economic and social characteristics of an area, region or site.
Environmental Assessment (EA)	The orderly and systematic evaluation of a proposal, including alternatives and objectives, and its effects on the environment, including the mitigation and management of these effects.
environmental constraints	Limitations on a project by components of the environment.
ephemeral creek	A creek that only flows after rainfall
erodibility	The tendency of a soil, earth or rock to erode.
erosion potential	The susceptibility of a parcel of land to the prevailing agents of erosion. It is dependant on a combination of climate, landform, soil, landuse and land management factors.
feasibility study	A preliminary technical and economic study to assess the viability of a project.
grassland	Land with grass growing on it, especially farmland used for grazing or pasture.
groundwater	Water found beneath the earths surface, in soil, rock, underground streams and/or aquifers
habitat index	A part of the 'Assessment of River Condition (ARC)'
heritage	is a broad concept that encompasses Natural, Indigenous and Historic or Cultural inheritance
hydrology	The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.
hydrogeology (geohydrology)	The study of groundwater and the related geologic aspects of surface waters.

hydrological disturbance index	Assesses the flow regimes change that result from river regulation and/or substantial flow diversion or extraction.
indigenous	Born or native to a land or region
infiltration	The process of surface water soaking into the soil.
intelligent pigs	pigs with in built computer monitoring systems (see 'pigging' below)
isolated find	Single stone artefact, not located within a rock shelter which occurs without any associated evidence of Aboriginal occupation within a radius of 60 m.
landform	A specific feature of a landscape (such as a hill) or the general shape of the land.
knapping	The process of shaping stone to produce tools.
Kurnell works	Involves all aspects of the Project relating the Kurnell Refinery, the right-of-way and the Kurnell wharf.
Local Environment Plan (LEP)	A plan developed by a council to control development in part or all of their shire or municipality.
lithologies	Rock types.
middens	Midden deposits can contain a variety of archaeological material, including animal bone, faeces, shell, botanical material, and other artefacts associated with past human occupation.
mitigation measures	Measure employed to reduce (mitigate) an impact (such as the construction of a perimeter bund to reduce sound emissions).
monitoring	The checking of impacts of a proposal or an existing activity in order to improve or evaluate environmental management practices. To check the efficiency and effectiveness of the environmental impact assessment process. To determine if the requirements of environmental legislation and associated regulations are being met.
native vegetation	A broad term for vegetation comprised of plant species which occur naturally in Australia (but which are not necessarily indigenous).
noxious	Introduced species considered to be harmful to native species or to the habitat of native species.
nutrient and suspended load index	A part of the 'Assessment of River Condition (ARC)'.
particulate matter	A small discrete mass of solid or liquid matter that remains individually dispersed in gas or liquid emissions
pedological organisation	The arrangement of soil peds (soil particles bound together – 'clumps' of soil). A soil with weak pedological organisation will have minimal structure, whilst a soil with strong pedological organisation has strong structure.
perennial	Refers to a stream which has flow throughout the year.
pigging	Pigging in the maintenance of pipelines refers to the practice of using pipeline inspection gauges or 'pigs' to perform various operations on a pipeline without stopping the flow of the product in the pipeline. These operations include, but are not limited to, cleaning and inspecting of the pipeline. This is accomplished by inserting the pig into a 'pig launcher'. The launcher is then closed and the pressure of the product in the pipeline is used to push it along down the pipe until it reaches the receiving trap - the 'pig catcher'. Pigs are usually bullet shaped and are tailored to the size of the pipe.
precautionary principle	The principle of ESD which states that decision about any proposed development should be guided by careful management to avoid serious and irreversible damage to the environment.

quadrat	A square survey area
ramsar wetland	Wetlands that are representative, rare or unique wetlands, or are important for conserving biological diversity
register of the national estate	A list of the National Estate developed under the provisions of the Commonwealth's Australian Heritage Commission Act 1975.
rehabilitation	To restore to a condition of good health ie rehabilitate land and vegetation.
relief	The variation in landscape elevation over a region.
revegetation	Replacement of vegetation, principally grasses and legumes on areas disturbed by construction activities.
right of way	The existing easement within which pipelines run underground from Gate 5 (in Kurnell refinery) to the Kurnell wharf.
riparian	Relating to, or situated on the bank of a river or other body of water ie riparian vegetation.
risk	Likelihood of a specific undesirable event occurring within a specified period or in specified circumstances. Listed as a frequency or probability.
risk assessment	A process used to determine whether people and the environment are at risk (e.g. health and safety) from exposure to hazardous substances used or produced (mainly in an industrial or work place) so that appropriate control measures or management practices can be introduced to prevent or minimise the risk.
scat	The excrement of an animal.
seedbank	A seedbank stores seeds as a source for planting in case seed reserves are destroyed (a type of gene bank).
slake	The process in which earth materials disintegrate and crumble when exposed to moisture
sodic	A soil in which the exchangeable sodium percentage (ESP) is greater than 6.
soil erosion hazard	The susceptibility of an area of land to erosion and includes rainfall erosivity, slope, soil erodility and cover.
stockpile	A pile used to store material for future use.
stripping transfer	'Stripping' transfers are concurrent transfers from Kurnell Refinery to both Banksmeadow Terminal and the JUHI, as opposed to just one or the other.
study area	The area in which environmental studies have been undertaken to assist in determining the environmental baseline.
substation	A facility for changing or regulating the voltage of electricity.
subsoil	The layer of soil lying below the topsoil; usually contains less organic matter and is less fertile.
surface waters	All water flowing over, or contained on, a landscape.
sustainable use	Use of organism, ecosystem or their renewable resource at a rate within its capacity for renewal.
tankering	As fuel becomes scarce, airlines are forced to take up more fuel than they need from other airports through a practice known as 'tankering'. For example, aircraft may be forced to take up enough fuel for both legs of a return flight before arriving in Sydney.

terrestrial	Of or pertaining to the land as distinct from the water.
the Project	The Stage 2 works to upgrade the KBL so as to increase its available capacity and improve the reliability of delivery of jet fuel to Sydney Airport. This would involve: • installation of new transfer pumps, coalescers, a new pigging station and other associated plant at Kurnell Refinery and replacement of the length of pipeline that runs from the refinery itself up to and on the wharf; and • installation of new booster pumps, one coalescer, a number of valves, refurbishment of the pigging stations, installation of a variable speed drive (VSD) switchroom as well as installation of other mechanical and electrical plant at Banksmeadow Terminal.
threatened ecological communities	A community listed under Schedule 1, Part 3 of the NSW Threatened Species Conservation Act 1995.
threatened species	Any species (including animals, plants, fungi etc) which are vulnerable to extinction in the near future.
topography	The relief features or surface configuration of an area.
topsoil	The upper layer of soil, usually containing more organic material and nutrients than the subsoil beneath it.
transect	Is a path along which one records and counts occurrences of the phenomenon of a study ie plants.
transient vibration	The temporary sustained vibration of a mechanical system
understory	Is the term for the area of a forest which grows in the shade of the emergent or forest canopy.
vertebrate	Species that have a backbone or spinal column.
visibility	Measure of extent to which particular components of a development may be visible from surrounding areas.
vulnerable species	Those that may soon become endangered unless action is taken.
weed	Naturalised, non-indigenous plant species which may be noxious weeds (or agriculture), environmental weeds or any other generally undesirable introduced species.
whacker rammer	A vibratory rammer used to compact soil in a confined area
wind climate	A description of the meteorological conditions created by the wind involving measurements of wind speed, direction and frequency of gusts for average, seasonal and annual conditions.

Executive Summary

Introduction and Project Need

Caltex Refineries (NSW) Pty Ltd (hereafter referred to as Caltex) is in the process of upgrading the Kurnell Jet Fuel Pipeline (B Line) (KBL). KBL is a pipeline that runs from Caltex's Kurnell Refinery, under Botany Bay, to the Caltex Banksmeadow Terminal and then on to Sydney Airport. The pipeline is used to carry jet fuel from the refinery, and other terminals, to the airport for use by various aircraft.

The Project has been proposed in response to concerns relating to the rationing of fuel at Sydney Airport. In recent years fuel rationing at the airport has been necessary due to high demand. This rationing restricts the overall operational effectiveness of the airport and thus impacts the economies of both the State and the nation. In order to reduce the need for fuel rationing at the airport, Caltex is proposing to upgrade the KBL so as to increase its available capacity and improve the reliability of delivery of jet fuel.

At the Kurnell Refinery the proposed works involve installing new transfer pumps, coalescers, a new pigging[1] station and other associated plant. A length of pipeline that runs from the refinery itself up to and on the wharf to the tie in point before the pipeline enters Botany Bay would also be replaced. The works would also install a new pigging station at the transfer pumps. At Banksmeadow Terminal the proposed works involve installing booster pumps, one coalescer, a number of valves, refurbishment of the pigging stations, installation of a variable speed drive (VSD) switchroom as well as installation of other mechanical and electrical plant.

This EA has been prepared under the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Project Description

The Project comprises a number of works at the Kurnell Refinery, right of way and wharf, as well as the Banksmeadow Terminal.

Works within Kurnell Refinery would include:

- Installation of two transfer pumps;
- Installation of two coalescer filters and associated instruments;
- Installation, modification and replacement of various valves, discharge piping and a flow control loop;
- Installation of a pigging station to be located at the new pumps;
- Replacement of the turbine flow meter;
- Installation of cabling for the pumps, motors, valves etc; and
- Installation of the new KBL from the proposed pumps to the edge of the refinery at Gate 5.

[1] Pigging in the maintenance of pipelines refers to the practice of using pipeline inspection gauges or 'pigs' to perform various operations on a pipeline without stopping the flow of the product in the pipeline. These operations include, but are not limited to, cleaning and inspection of the pipeline. This is accomplished by inserting the pig into a 'pig launcher'. The launcher is then closed and the pressure of the product in the pipeline is used to push it along down the pipe until it reaches the receiving trap - the 'pig catcher'. Pigs are usually bullet shaped and are tailored to the size of the pipe.

The new KBL would run north east from the new pumping station to 'Gate 5'. From here the new KBL would be installed close to the route of the existing KBL. The KBL would be installed along the wharf, up to the tie in point before the pipe submerges beneath Botany Bay. The work on the wharf would also remove the existing pigging station at this location.

The works within Banksmeadow Terminal would include:

- Installation of two booster pumps;
- Installation of one coalescer filter and associated instruments;
- Installation of two new variable speed pump drives;
- Installation of motorised and isolation valves;
- Modifications to booster pump suction and discharge pipe work;
- Installation of a power supply for the pumps and valves including an extension of the 11kV panel;
- Modification of the pigging stations; and
- Upgrading of the branch line into Banksmeadow to enable stripping transfers from Kurnell to Banksmeadow.

The proposed works are limited to the boundaries of Kurnell Refinery and Banksmeadow Terminal. No construction work is proposed within the water column of Botany Bay.

Project Alternatives

Several alternatives to the Project were considered in order to achieve the increased capacity required from the Kurnell Refinery to Sydney Airport. Alternatives that were considered included increasing utilisation of another existing pipeline (i.e. Shell Pipeline), installation of further storage infrastructure at Sydney Airport and taking no action.

The Project is the preferred option as it can be implemented immediately and is the most cost effective, efficient and environmentally friendly option. The Project will not impact on the supply of other products from the Kurnell Refinery whilst improving the efficiency of existing infrastructure. Furthermore, the Project offers the least amount of adverse environmental and safety impacts on the Sydney Airport and surrounding communities. The Project will safeguard the reliability of the fuel supply in the short and medium term and allow for further investment in infrastructure without sacrificing the reliability of the fuel supply in future.

Due to the projected increase in demand for fuel at the airport over short, medium and long term, many of the alternatives will also have to be implemented over the coming years in order to meet the demand for fuel. These alternatives are discussed in detail in **Chapter 2 Project Need and Alternatives.**

Consultation

Ongoing consultation with the community and other key stakeholders regarding the Project has been underway since November 2010. A program of community and government agency consultation has been undertaken as part of the EA to assist in the identification of relevant issues and potential impacts for the Director General's Requirements (DGRs) for the Project.

Following receipt of the DGRs, further consultation with relevant stakeholders and the community was completed. The Department of Environment Climate Change and Water (DECCW) and Department of Industry and Investment (DII) both responded. DII raised issues relating to Botany Bay and DECCW reiterated their DGR comments.

Several key issues were raised as points of concern by the Botany City Council, these included environmental issues (such as vegetation impacts, pollution and contaminated soils, visual impact on surrounding areas, traffic management and noise management). A summary of the consultation is provided in **Chapter 5 Consultation**.

Consultation undertaken as part of the planning of the Project and in order to satisfy the DGRs has not seen any critical constraints or issues raised by stakeholders. No issues were raised by Indigenous groups and members of the local communities around either the Kurnell Refinery or Banksmeadow Terminal. The issues that were raised by the various national, state and local government organisations have been addressed in this EA where applicable.

Assessment of Environmental Impacts

Soils, Geology and Topography

The land uses of both sites have remained the same for the last 50 years. Therefore it is highly likely that both sites have experienced some level of hydrocarbon related spill or leak during that time. A number of data sources were used to confirm the existing soil, geology and topography across the refinery and terminal sites. Both sites are relatively low lying and largely flat. They are situated on sandy substrate. Both sites fall within the "Low Probability" subgroup for Acid Sulphate Soil (ASS) potential.

Based on a review of the available information, the following contaminant groups of potential concern are likely to be present within the study area: Total Petroleum Hydrocarbons (TPH); Benzene Toluene Ethylbenzene Xylene (BTEX); and Polycyclic Aromatic Hydrocarbons (PAHs). In addition to these and given the nature of land use in the study area, it is likely that Phenols and Lead could also be present on the sites.

The key potential impacts relate to the potential for encountering contamination on site during excavation work and its dispersal on and off site. This could lead to a number of impacts including odour issues. The potential to encounter acid sulfate soils during excavations has also been considered. Finally spills and leaks from construction equipment and new plant could also cause contamination of soils.

To mitigate these potential impacts on soils a site specific Contamination Management Plan would be prepared for the Project as part of the Construction Environmental Management Plan (CEMP). This plan would include protocols that would be put in place if soil contamination is encountered. It would contain details on how soils would be tested, stockpiled and, if necessary, disposed of offsite (if found to be contaminated). Stockpiles would be managed to reduce soil erosion and silt fences would be installed around these piles reduce erosion and sedimentation. Dust and Odour suppression measures would also

be employed (refer to **Chapter 13 Air Quality**). A preliminary assessment for Potential ASS would be carried out and this would form the basis of the ASS Management Plan.

Provided the mitigation measures presented in **Chapter 6 Soils, Geology and Topography** are followed, the Project would be unlikely to have an impact on soils during construction.

During operation the Project would fall within the existing inspection, assessment, maintenance and repair programmes that Caltex already implement. No impacts are expected during operation.

Groundwater and Surface Water

The study area traverses two Catchment Management Areas (CMAs), the Upper Georges River, Towra wetlands & Woolooware Bay CMA and the Georges River estuary and southern Botany Bay CMA. The Georges River and Cooks River discharge major sediment and nutrient loads to Botany Bay, and also contribute other pollutants following rainfall. Several smaller local streams also drain directly into Botany Bay.

The Project may result in impacts to surface water and groundwater. The main potential environmental impacts with regard to surface water and groundwater are likely to occur where excavation of contaminated soil and acid sulphate soils takes place, stockpiling of soil, contaminated groundwater, waste water, hazardous substance spills and vehicle access to site causing erosion.

A number of measures have been put forward to mitigate these potential impacts. These measures relate to the correct stockpiling of soils (as mentioned above), the use of interception techniques (silt fences, platforms etc.) and testing and, where required, treating any contaminated waste water.

The Project is unlikely to affect an overall change to the interception rates of surface water flow or contribute to significant changes in rates of water infiltration within the Kurnell Refinery, the right of way area or the Banksmeadow Terminal. Therefore the Project is considered unlikely to contribute towards increased risks of flooding.

With the adherence to mitigation measures outlined in **Chapter 7 Groundwater and Surface Water**, construction and operation of the Project is unlikely to result in an adverse impact on groundwater or surface water.

Ecology

Desktop and field surveys were completed in order to understand the ecology of the local area. The results of the desktop surveys were used to guide the field surveys. Field surveys were limited to the locations of the proposed works and any areas with ecological value in the immediate vicinity (e.g. Marton Park Wetland).

The field surveys identified four vegetation communities within the study area. These were: Modified Pasture/Exotic, Coastal Banksia/Acacia Scrub (planted), Exotic Forest and Shrubland and Swamp Oak Floodplain Forest (disturbed). Certain invasive weed species were also found in Marton Park. A total of 26 avian species were recorded during diurnal bird surveys and opportunistic observations within the ecological study area. The majority of these were native species common to coastal and suburban locations. The habitat assessments for the Project suggest that four threatened species are considered likely to be present in the ecological study area based on presence of suitable habitat and known records.

Four threatened species and one threatened ecological community (TEC) were considered relevant for the Project. These were: White-fronted Chat, Orange-bellied Parrot, Green and Golden Bell Frog, Sunshine Wattle and Swamp Oak Floodplain Forest. NSW assessments of significance were completed for each species and habitat. The assessments concluded that the Project would not have a significant

impact on any threatened biota known or considered likely to occur within the study area due to the transient nature of the threatened fauna, if present, and the lack of direct impact on the flora and TEC. The Project's impact on a number of Key Threatening Process was also considered, and where relevant mitigation measures were suggested.

Whilst it has been concluded that the Project is unlikely to cause serious ecological impacts, certain direct and indirect impacts could potentially occur. These involve clearing existing vegetation in the right of way, the pollution of local soils and water during the works and potential sedimentation of stormwater run off into Marton Park. No operational impacts are expected.

In order to mitigate impacts a Flora Management Plan and a Fauna Management Plan will be incorporated into the CEMP. These plans will include wash down procedures for personnel and machinery to reduce the spread of certain fungi as well restricting access to certain areas of ecological value adjacent to the refinery. Measures to reduce potential pollution impacts have also been suggested and are in line with those proposed above. They include measures relating to the correct stockpiling of soils (as mentioned above) and the use of interception techniques (silt fences, platforms etc.) to stop sediment entering Marton Park or Botany Bay.

Provided that the measures outlined in **Chapter 8 Ecology** are implemented, no adverse impacts on ecological values are expected.

Indigenous Heritage

Aboriginal activity at Kurnell is estimated to have occurred for the last 10,000 years. Numerous archaeological investigations have taken place on the Kurnell peninsula and several finds have been recorded. Only a small number of archaeological investigations have taken place close to Banksmeadow Terminal. No archaeological sites have been found within the study area, although some features (e.g. shell middens) have been found in close proximity.

Given the heavy disturbance and industrialisation of the study area, it is considered unlikely that any *in situ* archaeological deposits remain. No aboriginal heritage sites, objects, places or areas of archaeological potential were identified within the study area. The Project is proposed within well established industrial areas, and contains no undisturbed natural landforms. Whilst some shell material was present on the surface of the right of way, the highly disturbed nature of the area caused by repeated maintenance excavations means that any cultural deposits are likely to be highly damaged and distributed across the landscape. The area is unlikely to retain any archaeological integrity or significant archaeological information.

The proposed development would not impact on any Aboriginal heritage sites, objects or places, or areas of archaeological potential or Aboriginal sensitivity. No further Aboriginal heritage assessment is required for the current proposed KBL upgrade works. This view has been confirmed by the local Aboriginal stakeholders.

Non-Indigenous Heritage

The history of the area has left a number of important heritage items across the Kurnell Peninsula. No items listed on the Commonwealth Heritage List (CHL) are in close proximity to the study area. However the *Kurnell Peninsula Headland* (Listing No. 105812) is listed on the National Heritage List (NHL) and *Captain Cook's Landing Place Historic Site* (Listing No. 3335) is listed on the Register of National Estate (RNE). Although no significant sites were located within either Kurnell Refinery or Banksmeadow Terminal, a number of sites listed under Schedule 3 of Kurnell State Environmental Planning Policy (SEPP) are located within the wider study area (refer to **Chapter 10 Non-Indigenous Heritage**).

The Project is not expected to cause any non-indigenous heritage impacts. Any impact that would be caused by excavation of pipeline trench through the right of way would be mitigated by backfilling the pipeline trench with the existing soils (if not contaminated) and returfing the surface. This will return the site to its pre-construction condition.

Traffic and Transportation

The Project is located on the northern and southern shores of Botany Bay. The arterial roads that are located adjacent to the Project include General Holmes Drive, Botany Road, Foreshore Road and Captain Cook Drive. A location plan showing the surrounding road network can be found in **Chapter 11 Traffic and Transportation.**

The main access to the Kurnell Refinery site is via Captain Cook Drive and Solander Street Access to the right of way and wharf are via Captain Cook Drive, Cook Street and Prince Charles Parade. Vehicular access to the Banksmeadow Terminal site will be along Foreshore Road and Penrhyn Road.

The traffic generated at the Kurnell Refinery and Banksmeadow Terminal sites during construction would incorporate a mix of construction plant vehicles, delivery vehicles and construction personnel movements. The number of trips generated by construction activities would be very minor when compared to the existing volumes on each of the roads. Therefore the traffic impact of the Project during construction would be negligible on the road network surrounding both sites.

No operational traffic impacts are expected at either the refinery or the terminal. No additional employees or additional traffic movements will be required during the operation of the Project.

Noise and Vibration

The noise and vibration assessment work was completed by Renzo Tonin & Associates (refer to **Appendix D Noise**). A lack of sensitive receptors in close proximity to Banksmeadow Terminal meant that no noise or vibration assessment was undertaken for the Banksmeadow works.

The survey for the construction noise and vibration impacts concentrated on the area around the western side of the Kurnell Refinery and along the right of way through to the refinery wharf. Based on the construction noise levels (refer to **Chapter 12 Noise and Vibration**), the construction noise criteria would generally be exceeded at the nearest sensitive receiver locations by most plant when operating near the receiver. It should also be noted that noise levels could exceed those reported if two or more items of plant were operating concurrently in close proximity.

To mitigate these impacts, construction works would be carried out during 7.00am to 6.00pm Monday to Saturday. Construction stages would be scheduled to minimise the multiple use of the loudest equipment or plant items near noise sensitive receptors. A construction noise and vibration management plan would be incorporated into the CEMP. Consultation with the local community during the construction works would take place to help avoid or resolve any concerns.

Vibration levels would not exceed the criteria for human comfort at all the nearest receivers as all the receivers are more than 10m from the works. This is equal to or more than the recommended minimum safe working distances from plant specified.

Noise levels during the operation of the Project would not exceed noise limits of the existing DECCW licence. The assessment found that operation of the Project would not cause any significant increase in existing noise levels at the receiver locations.

Air Quality

The local air quality in Kurnell is likely to be primarily influenced by emissions from existing operations within the refinery. The Banksmeadow Terminal is located within an industrial area of Sydney, where emissions from a range of activities are likely to impact on local air quality to some extent. These include roadways and railways on major freight routes, port facilities, petrochemical facilities, and a range of other industries including Sydney Kingsford Smith Airport.

The key sensitive receptors to air quality in the Kurnell area are located in the village of Kurnell which is adjacent to the refinery. The right of way is primarily bordered by residential properties. The refinery is over 30m from the nearest residential receptor. The Banksmeadow terminal is over 500m from the closest residential receptor. Due to the distance between Banksmeadow Terminal and the nearest residential receptor, no air quality impacts would be expected as a result of the Banksmeadow works.

From the consideration of proposed works and proximity to residential receptors it was considered that the following issues would represent key emissions in terms of potential air quality impacts:

- Particulate matter emissions from earthworks; and
- VOC and odour emissions from earthworks (i.e. the excavation of potentially contaminated soil).

These key emissions are likely to occur during the construction phase of the Project and may occur from works both within the Kurnell Refinery and the right of way. The assessment of activities associated with the construction phase of the Project has indicated that there would be only minor impacts on air quality (refer to **Chapter 13 Air Quality**). In order to mitigate any impacts an Air Quality Management Plan will be included within the CEMP. This plan will include a number of mitigation and monitoring measures including appropriate stockpile management techniques and measures to reduce the dust from construction vehicles. Exposed soils will be revegetated once construction is complete.

An Air Quality Management Plan will be included within the CEMP. This plan will include a number of mitigation and monitoring measures. Appropriate stockpile management techniques and measures to reduce the dust from construction vehicles will be implemented as part of this plan. To reduce any potential odour emissions the installation of the pipeline will be staged to limit the amount of open excavations. Exposed soils will also be revegetated to stabilise soils. The operational phase of the Project is unlikely to result in any additional air quality impacts.

Hazard and Risk

The construction, commissioning and operation of the Project will be subject to rigorous scrutiny by Caltex and the designing company, safeguarding delivery and operation of the Project in a manner that minimises the risk to workers, contractors and the community. Caltex have a commitment to Occupational Health and Safety (OH&S) and have numerous policies and procedures to achieve a safe workplace. Procedures specific to the Project and its environment will be developed and incorporated into the safety management system.

The potential for incidents is well understood and the design of the plant and equipment will minimise the probability of an incident occurring as well as mitigating an incident if it did occur.

The main hazard associated with the Project is associated with the handling of jet fuel which is a flammable liquid at atmospheric conditions. The predominant mode in which a hazardous incident may be generated is associated with a leak. This would generally only have the potential to cause injury or damage if there was ignition that resulted in a fire or explosion incident.

The Preliminary Hazard Assessment (PHA) (refer to **Chapter 14 Hazard and Risk**) concluded that the overall risk associated with the Project is low and does not introduce an excessive additional risk to the surrounding area.

Where possible, risk reduction measures have been identified throughout the course of the PHA. Three recommendations have been made to further reduce any chance of hazards or risks occurring. These are:

- Recommendation 1: As far as practicable, ensure pipes outside of contained areas are fully welded (not flanged).
- Recommendation 2: Review existing Emergency Response Plans at both the Kurnell Refinery and Banksmeadow Terminal as well as for the KBL for any changes required following implementation of the Project.
- Recommendation 3: Depending on the results of the final Fire Safety Study, further risk reduction may need to be considered for the risk associated with a knock-on effect at the neighbouring foam pump house at Banksmeadow Terminal, in case of a major fire at the proposed booster pump station.

Socio-Economic

An assessment of the potential socio-economic impacts which may arise as a result of the Project has been undertaken. The Project would generate a positive economic impact within the local community through the creation of local employment opportunities during the construction phase. Based on the expenditure information provided by Caltex and the Australia Bureau of Statistics (ABS) data, the projected total impact on the local economy from the initial expenditure of approximately $25 million is calculated at $35 million.

The construction of the pipeline would provide short-term work (approximately one year) for construction crews. The construction workforce would be a combination of labourers and skilled employees that can carry out specialised work. Given the characteristics of the labour force in the study region, it is anticipated that the workforce required would be sourced from the local area.

After adjustments for intermediate goods and services (inputs) for the capital/materials expenditure, the contribution of the initial expenditure of approximately $25 million to Gross Regional Product is calculated at $32 million. If only 30 per cent of materials were to be sourced locally, the contribution to Gross Regional Product would become $31 million.

Following construction and commissioning, the amount of activity in relation to the Project would decrease substantially. However, the operation of the Project would reduce the requirement for jet fuel rationing at Sydney Airport in the short to medium term. The Project would therefore result in the airport running more efficiently over this timescale. This in turn would safeguard both the existing airport jobs and those jobs in related industries, as well as maintaining the airport's significant contribution to both the State and national economies. The Project and any other future works would also allow the airport to grow. Estimates suggest that the airport could create an additional 100,000 jobs over the next 10 years. The Project would help achieve this target and help maintain Sydney Airport as a key international transport hub.

Greenhouse Gases

Caltex is currently listed on the National Greenhouse and Energy register and is currently a participant in the Energy Efficiency Opportunities (EEO) program. As such, Caltex reports greenhouse gas (GHG) emissions under the National Greenhouse and Energy Reporting (NGER) framework and have subsequently identified and responded to a number of energy efficiency opportunities at the Kurnell Refinery.

Direct GHG emissions (Scope 1) during the construction phase of the Project would originate from the combustion of fuels in construction equipment. Diesel would be the primary fuel used in construction equipment such as backhoes, bobcats and delivery trucks. Emissions from electricity use (Scope 2) are expected to be negligible as construction equipment is predominantly fuel based, and where electricity needs are required it is expected that diesel generators would be utilised. Indirect emissions (Scope 3) would be present in the form of embedded emissions associated with construction materials such as steel and concrete used in the pipeline construction.

Greenhouse gas emissions during operation of the pipeline are predominantly Scope 2. Scope 1 emissions would likely be generated from the combustion of fuel in vehicles used for maintenance activities. However, these are considered negligible. Predictions of greenhouse gas emissions associated with power consumption in the pumps and motors have been estimated by Caltex for three scenarios; existing, proposed and future (refer to **Chapter 16 Greenhouse Gases**).

The assessment of GHG emissions during construction and operation of the Project are considered immaterial to minor. Mitigation measures for potential GHG saving opportunities would be outlined within the CEMP for the construction phase. The CEMP would incorporate procedures for maintenance and inspections of construction equipment to ensure equipment is of an appropriate size for the nature of the works, and is working in an efficient manner. Identification of energy efficiency saving opportunities would be conducted during the detailed design phase.

Cumulative Impact Assessment

An assessment of the cumulative impacts is provided in **Chapter 17 Cumulative Impact Assessment**. Other relevant projects that may have a cumulative impact with this Project have been identified using spatial (Sutherland Shire and the City of Botany) and temporal (projects that have been submitted for adequacy review, are on exhibition, have gained planning approval, or have gained planning approval but are not yet finish construction) parameters.

A review of the other major projects close to Banksmeadow Terminal identified a number of works occurring at Orica Botany and the Port Botany Expansion project. These projects are unlikely to be affected by the small scale of the Banksmeadow works and the Project will not adversely affect the mitigation measures for these projects. Therefore it was concluded that the Banksmeadow works are unlikely to result in any adverse cumulative impacts.

No major construction works are taking place at the same time close to Kurnell Refinery. Therefore no cumulative construction or operational impacts are expected. It can therefore concluded that there is unlikely to be any cumulative impact from the Project.

Statement of Commitments

A Statement of Commitments (refer to **Chapter 18 Statement of Commitments**) has been prepared as required for Part 3A assessments under of the EP&A. This summarises the environmental management measures to be adopted in the detailed design and operation of the Project in order to mitigate adverse impacts on the environment. These commitments would be included in a CEMP which would be finalised prior to commencement of construction activities.

Project Evaluation and Justification

The justification for the Project includes a range of predicted outcomes. These outcomes respond in the most effective manner to the need for the Project. They include:

- Increasing the rate at which jet fuel can be sent from Kurnell Refinery to Sydney Airport, thereby reducing the likelihood of jet fuel rationing at the airport;
- Maintaining the efficiency of the airport and helping to secure existing and future jobs; and
- Using existing infrastructure to minimise the environmental impacts associated with supplying more jet fuel to the airport.

The need and objectives of the Project have been addressed in **Chapter 2 Project Need and Alternatives.**

An environmental risk analysis (ERA) was undertaken for the Project to determine if the Project was likely to result in any significant residual environmental risks. Residual risks are those that would remain after the proposed management and mitigation measures have been implemented. The residual risk of contamination being identified during works remains high. However provided the measures suggested in the EA are implemented, any contaminated soils or water will be managed appropriately and no impacts are expected. Noise will also be an issue during construction at Kurnell. However, these impacts will be limited to daytime hours only and mitigation measures will ensure that any impact is minimised.

The Residual Risk Analysis demonstrates that the proposed safeguards and management measures are anticipated to reduce the risk, but that residual risk remains for some potential impacts. These residual risks have been addressed through the mitigation measures.

An analysis of the Project against the principles of Ecological Sustainable Development (ESD) and against the objects of the EP&A Act was also undertaken. This discussion concluded that the Project has been completed in line with the principals of ESD and that it was consistent with the objects of the EP&A Act.

Conclusion

The EA provides a comprehensive assessment of the Project and includes investigations regarding all relevant environmental issues.

Potential adverse impacts have been assessed and strategies to avoid, minimise and mitigate those impacts form a key part of the EA. The Project includes a number of commitments to manage environmental impacts during its construction and operation.

The Project has, to the extent feasible, been designed to address the issues of concern to the community and Government. This EA has identified the Project should proceed because it would:

1. result in no long term impacts on the environment or local community;
2. provide an increased jet fuel supply to Sydney Airport;
3. provide local employment opportunities and result in positive economic impacts;
4. potentially reduce contamination on the Kurnell Refinery and remove the risks associated with having the KBL pigging station located on the wharf;
5. satisfy sustainable development principles.

This EA has highlighted a range of issues which would be addressed through the careful design and operation of the Project.

On the basis of the studies detailed within the Environmental Assessment, and with the implementation of the recommended mitigation measures, the Project is considered to be justified.

1 Introduction

1.1 Project Outline

Caltex Refineries (NSW) Pty Ltd (hereafter referred to as Caltex) is in the process of upgrading the Kurnell Jet Fuel Pipeline (B Line) (KBL). KBL is a pipeline that runs from Caltex's Kurnell Refinery, under Botany Bay, to the Caltex Banksmeadow Terminal and then on to Sydney Airport (**Figure 1-1**). The pipeline is used to carry jet fuel from the refinery, and other terminals, to the airport for use by national and international aircraft.

The Kurnell Refinery and Banksmeadow Terminal are located on opposite sides of Botany Bay in the southern part of metropolitan Sydney. The Kurnell Refinery is located on the Kurnell Peninsula within Sutherland Shire, approximately 30km south of Sydney's CBD. The site is bordered by Botany Bay National Park to the east, Captain Cook's Landing Place Park to the south, Bonna Point Reserve in the west and the community of Kurnell to the north.

The Project has come forward in response to demand forecasts and concerns relating to the rationing of fuel at Sydney Airport. In recent years fuel rationing at the airport has been necessary due to high demands. This rationing restricts the overall operational effectiveness of the airport.

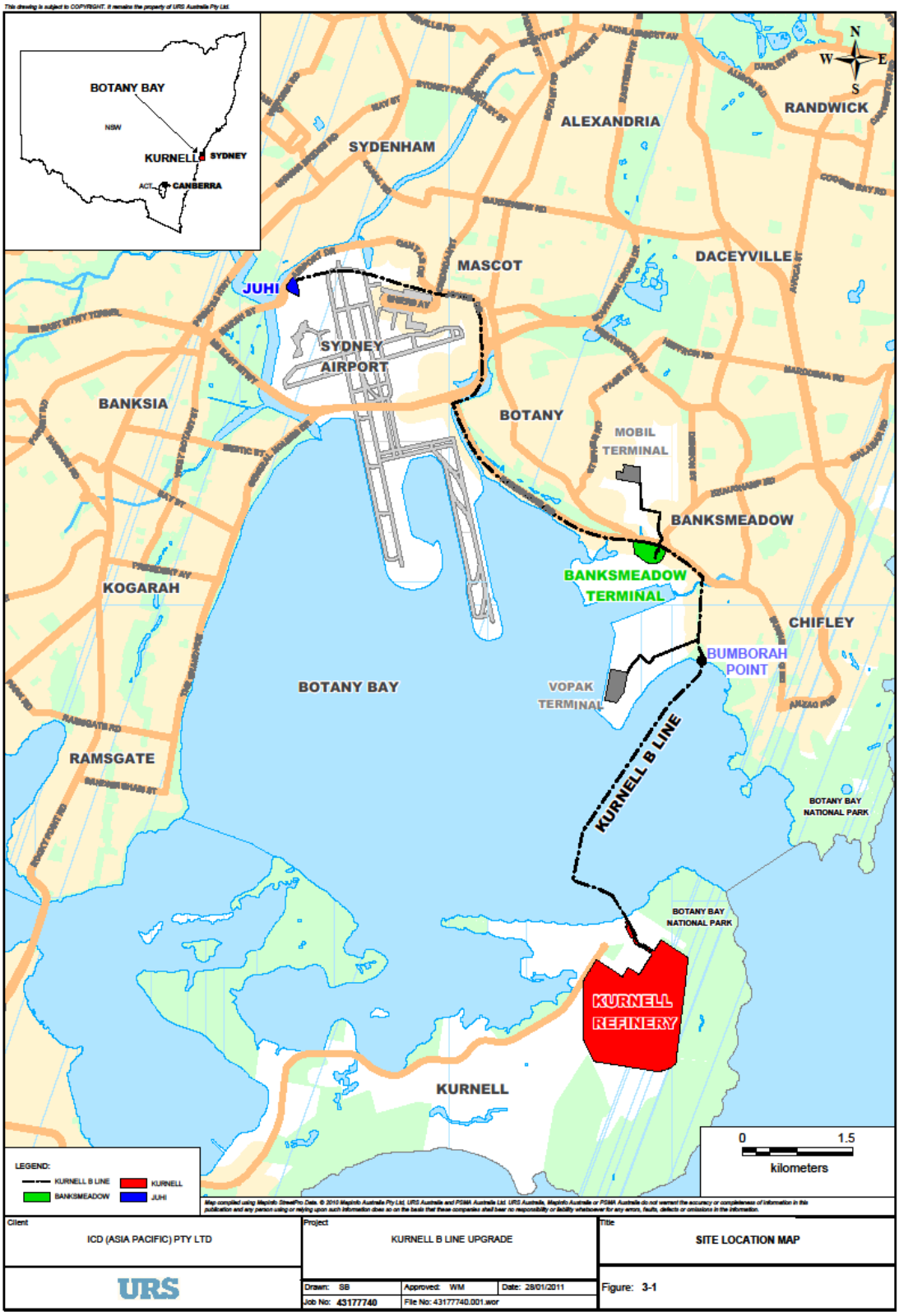
In order to increase the capacity of the KBL and in turn increase the amount of jet fuel that can be transferred from the Kurnell Refinery to Sydney Airport, Caltex is proposing to increase the rate at which the fuel can be transferred. Stage 1 of this upgrade involved minor works at Sydney Airport and the VOPAK Terminal. This Environmental Assessment (EA) has been prepared for the proposed Stage 2 upgrade works.

Under the Stage 2 works Caltex is proposing to upgrade the KBL so as to increase its available capacity and improve the reliability of delivery of jet fuel to Sydney Airport. At the Kurnell Refinery the proposed works involve installing new transfer pumps, coalescers, a new pigging[1] station and other associated plant. The length of pipeline that runs from the refinery itself up to and on the wharf to the tie in point before the pipeline enters Botany Bay will also be replaced. The works will also relocate the pigging station at the wharf and install a new pigging station at the transfer pumps. At Banksmeadow Terminal the proposed works involve installing booster pumps, one coalescer, a number of valves, refurbishment of the pigging stations, installation of a variable speed drive (VSD) switchroom as well as installation of other mechanical and electrical plant.

This EA has been prepared under the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

[1] Pigging in the maintenance of pipelines refers to the practice of using pipeline inspection gauges or 'pigs' to perform various operations on a pipeline without stopping the flow of the product in the pipeline. These operations include, but are not limited to, cleaning and inspection of the pipeline. This is accomplished by inserting the pig into a 'pig launcher'. The launcher is then closed and the pressure of the product in the pipeline is used to push it along down the pipe until it reaches the receiving trap - the 'pig catcher'. Pigs are usually bullet shaped and are tailored to the size of the pipe.

Figure 1-1 Project Location



1.2 The Proponent and Project Team

The proponent is Caltex, c/o Kurnell Refinery, Solander Street, Kurnell, NSW 2231. The Proposal is being project managed by ICD (Asia Pacific) Pty Ltd (ICD). The environmental planning and assessment work is being completed by URS Corporation Pty Ltd (URS), c/o 407 Pacific Highway, Artarmon, NSW 2064.

1.3 Project Components

The Project comprises a number of works at the Kurnell Refinery, easement and wharf and the Banksmeadow Terminal.

Works within Kurnell Refinery would include:

- Installation of two transfer pumps;
- Installation of two coalescer filters and associated instruments;
- Installation, modification and replacement of various valves, discharge piping and a flow control loop;
- Installation of a pigging station to be located at the new pumps;
- Replacement of the turbine flow meter;
- Installation of cabling for the pumps, motors, valves etc; and
- Installation of the new KBL from the proposed pumps to the edge of the refinery at Gate 5.

The new KBL would run north east from the new pumping station to 'Gate 5' within the existing pipeline easement that runs to the wharf. From here the new KBL would be installed close to the route of the existing KBL. The KBL would be replaced along the wharf, up to the tie in point before the pipe submerges beneath Botany Bay. The work on the wharf will also remove the existing pigging station at this location.

The works within Banksmeadow Terminal would include:

- Installation of two booster pumps;
- Installation of one coalescer filter and associated instruments;
- Installation of two new variable speed pump drives;
- Installation of motorised and isolation valves;
- Modifications to booster pump suction and discharge pipe work;
- Installation of a power supply for the pumps and valves including an extension of the 11kV panel;
- Modification of the pigging stations; and
- Upgrading of the branch line into Banksmeadow to enable stripping[2] transfers from Kurnell to Banksmeadow.

[2] 'Stripping' transfers are concurrent transfers to both Banksmeadow Terminal and the JUHI, as opposed to just one or the other.

The key elements of the proposed works for Kurnell Refinery and Banksmeadow Terminal are outlined on **Figures 3-2, 3-3 and 3-4, Chapter 3 Project Description.**

1.4 Terms and Definitions

Table 1-1 provides a summary of the terms used throughout this EA along with a description of the areas and activities to which they refer. The areas referred to in **Table 1-1** are shown in and specific project components more fully described in **Chapter 3 Project Description**.

Table 1-1 Summary of Key Terms and Definitions

Terminology used in this EA	Definition
KBL	Kurnell Jet Fuel Pipeline (B Line).
The Project	The Stage 2 works to upgrade the KBL so as to increase its available capacity and improve the reliability of delivery of jet fuel to Sydney Airport. This would involve: • installation of new transfer pumps, coalescers, a new pigging station and other associated plant at Kurnell Refinery and replacement of the length of pipeline that runs from the refinery itself up to and on the wharf; and • installation of new booster pumps, one coalescer, a number of valves, refurbishment of the pigging stations, installation of a variable speed drive (VSD) switchroom as well as installation of other mechanical and electrical plant at Banksmeadow Terminal.
The study area	The area in which environmental studies have been undertaken to assist in determining the impacts of the Project.
The Kurnell Works	Involves all aspects of the Project relating the Kurnell Refinery, the right-of-way and the Kurnell wharf.
The right of way	The existing easement within which pipelines run underground from Gate 5 (in Kurnell refinery) to the Kurnell wharf.
The Banksmeadow works	Involves all aspects of the Project works at the Banksmeadow Terminal.

1.5 Environmental Assessment Process

1.5.1 Environmental Assessment Scope

As a Major Project, the proposal is subject to the provisions of Part 3A of the EP&A Act and, accordingly, it will be subject to assessment by the Director-General of the Department of Planning (DoP) and determination by the Minister for Planning.

On 18 January 2011 the Executive Director of DoP, as delegate for the Director-General of DoP, issued Environmental Assessment Requirements pursuant to section 75F(2) of the EP&A Act. The Director-General's Requirements (DGRs) are provided in **Appendix A1** and a table cross referencing the DGRs and where they are addressed in this EA can be found in **Appendix A2**.

The DGRs identified both general requirements and key issues to be addressed in the EA. The key issues comprised:

- strategic planning and project justification;
- hazards and risks;
- noise and vibration;
- air quality;
- soil and water;
- greenhouse gas and energy efficiency;
- biodiversity;
- aboriginal heritage; and
- traffic and transportation.

These key issues were addressed through targeted investigations, by appropriate specialists, and described in separate reports. The project team also identified other issues that could be considered important in the context of the Project and completed any assessments accordingly. Where the reports presenting the findings of these investigations are very detailed and/or expansive (i.e. Heritage, Noise and Hazard and Risk), they are presented in the **Volume 2 Appendices** and summaries are provided in the relevant chapters of this main report. In other instances the whole assessment forms the relevant Chapter of **Volume 1** of this EA (the Main Report). The outcomes of these investigations were used as source materials for this EA.

1.5.2 Environmental Assessment Preparation and Exhibition

The objectives of this EA are to:

- comply with the requirements of the EP&A Act, as formalised in the DGRs;
- provide the Minister for Planning with sufficient information to determine the environmental impacts, assess the mitigation measures and understand the benefits of the Project; and
- inform the community about the Project.

The EA will be placed on exhibition for public review for a minimum period of 30 days in accordance with Section 75H of the EP&A Act.

1.5.3 Decisions and Assessments

Subsequent to exhibition of the EA, copies of all submissions or a report of all issues raised will be provided to Caltex and relevant Government authorities. Caltex will review the submissions and consider and respond to the issues raised.

The Director-General will prepare an assessment report for the Project which will take into account comments from relevant Government authorities as well as other stakeholders and the community. The assessment report will be provided to the Minister for Planning who will determine whether to grant Project Approval and, if so, may include a number of conditions under which the Project will commence.

1.6 Document Structure

This EA document is comprised of two volumes. Volume I, the Main Report, is divided into 9 parts. The contents of Volumes 1 and 2 are outlined below:

Volume 1	*Executive Summary*	This summarises the key issues and findings detailed in the other parts of the Environmental Assessment.
	Introduction	**Chapter 1** provides an outline of the Project, briefly outlines the environmental impact assessment process, and introduces the various terms used throughout the EA.
	Project Need, Alternatives & Justification	**Chapter 2** details the project need and development alternatives.
	Project Description	**Chapter 3** provides an overview of the project and the proposed activities.
	Statutory Planning	**Chapter 4** includes the relevant controlling Commonwealth and State legislation, and identifies the licences and approvals required to enable the Project to proceed.
	Consultation	**Chapter 5** summarises the issues raised during consultation with the statutory authorities, other relevant authorities, and the local community. The issues raised during the consultation process are addressed in the subsequent specialist chapters of the EA.
	Environmental Assessment	**Chapters 6-17** provide an overview of the existing environment, an assessment of the likely impacts of the Project and the identification of appropriate mitigation measures to safeguard the environment.
	Statement of Commitments	**Chapter 18** outlines Caltex's commitments to proposed environmental management and mitigation measures to safeguard against or minimise potential impacts.
	Project Evaluation & Justification	**Chapter 19** addresses the principles of Ecologically Sustainable Development (ESD) and provides a justification for the Project.
Volume 2	Contains the separate specialist reports. Specialist reports on Heritage, Noise and Hazard and Risk are included. The DGRs are also provided along with a response table outlining where the comments are addressed within the EA.	

2 Project Need and Alternatives

2.1 Strategic Need

The DGRs stipulate that the EA must show "…*a detailed description of the Project, including a need for the Project*…". This Chapter will outline the need and Justification for the Project to be implemented as well as outlining the alternative options that have been investigated.

The reliability of the supply of jet fuel to Sydney has been inconsistent over the past decade. Jet fuel rationing has taken place at Sydney's Kingsford-Smith Airport (Sydney Airport) in 2003, 2005, 2008 and 2009. In 2009 there was a period of 26 days where fuel rationing at Sydney Airport was required. When rationing is introduced to the airport the amount of fuel that airlines can draw is limited, in most cases so that they can only draw what they have ordered and no more (100% rationing). Under normal circumstances, it is common practice among airlines to draw more than 100% of the fuel they have ordered at airports where the fuel is cheaper, or before flying to other airports that are suffering shortages. Although the introduction of 100% rationing affects the overall efficiency of the airport, it allows the airport to remain operational and means it does not have to introduce heavier rationing (80-90%) which would impact airline scheduling and could lead to cancelled flights.

To examine the issue, a working group was set up by the then Federal Minister for Resources and Energy, The Hon Martin Ferguson. In April 2010 the working group documented their findings a report entitled *Infrastructure for the provision of jet fuel at Sydney Airport for the period to 2029*, (Sydney Jet Fuel Infrastructure Working Group, 2010[1]). The report discussed the current fuel supply situation at Sydney Airport and the limitations of the current system. The report also highlighted the strategic economic importance of Sydney Airport and investigated a number of options for improving the reliability of fuel supply in the short, medium and long term.

As part of its work the working group created its own model for jet fuel demand, supply and capacity requirements of supporting infrastructure for the short term (2014), medium term (2019) and long term (2029) based on projections and fuel usage. The model highlighted that due to the projected increase in demand, the current infrastructure will not be sufficient to meet the needs of the airport within the short to medium term.

In parallel with this study, Caltex has been considering options to improve the short term supply of jet fuel to the airport. The Project outlined in this EA is in response to those deliberations and has been welcomed by the Sydney Jet Fuel Infrastructure Working Group within whose report it is stated "*The Working Group welcomes the recent decision of Caltex's board to proceed with the second phase upgrade to the Caltex pipeline* (this Project)*, to be completed by late 2011 and provide for up to an additional 5ML per day increase to the total 'sprint' transfer rate to Sydney Airport.*" Furthermore the Working Group recommended that "*JUHI members* (Joint User Hydrant Installation of which Caltex is a member) *undertake works required to address projected demand with a short term horizon up to 2014/15*".

[1] Found on the World Wide Web: http://www.ret.gov.au/energy/Documents/fuels/Sydney_JFI_WG_report_30042010.pdf

2.2 Project Objective

By the end of 2012 the capacity to import crude oil into Sydney through the bulk liquids import berth at Port Botany is going to have doubled thanks to the completion of a second landing berth. Equally the JUHI are looking to increase the supply of fuel to the hydrant system at Sydney Airport by 0.3 - 4.5 mega litres (ML) per day by 2014 and by 7.4 - 11.6ML per day (TBC) by 2029.

Sydney Airport's ability to import fuel is crucial to its efficiency and therefore the economic output of the State and the country. According to *The Sydney Airport Masterplan* (2009)[2] such improvement in the infrastructure of the airport is critical to maintaining efficiency.

Airport fuel efficiency is rated on a traffic light system where a green light shows that the airport has no problem with its supply and holds a full reserve of fuel. An amber light indicates that there is concern that a problem with the fuel supply might occur but there is enough reserve supply to continue as normal. A red light indicates that there is no capacity to recover should anything go wrong with their planned fuel deliveries. Lastly, a black light indicates that something has gone wrong and would indicate that rationing must be introduced to allow for the continued running of the airport.

Therefore the key objective for this Project is to improve the efficiency of the infrastructure delivering jet fuel to the airport, thereby reducing the incidences of red and black lights and increasing airport efficiency. This objective will be met by increasing fuel supply rates from Caltex's Kurnell Refinery to Sydney Airport, from the current 200kl/hr to 400kl/hr. A 5% overcapacity is being designed for to help the JUHI reach their goal.

2.3 Project Justification

This Project was initiated by Caltex to secure an increased and more reliable jet fuel supply to Sydney Airport. A secure and sufficient fuel supply is considered a prerequisite to the continued successful operation of the airport. The successful operation of Sydney Airport has a direct impact upon the NSW economy contributing an estimated 6% to the NSW economy and 2% to the Australian economy overall. Furthermore Sydney Airport currently indirectly generates 131,000 jobs with an estimated additional 100,000 jobs likely to be created over the next 10 years. Therefore the success of the Project and through that the success of the Airport is important for ensuring the continued growth of the Sydney, NSW and ultimately Australia's economy.

The knock on impact of fuel shortages at Sydney Airport and therefore on the aviation industry further afield is marked. As fuel becomes scarce, airlines are forced to take up more fuel than they need from other airports through a practice known as 'tankering'. For example, aircraft may be forced to take up enough fuel for both legs of a return flight before arriving in Sydney. This is a costly and difficult process for the airlines and due to the relatively remote location of Sydney in relation to other major airports around the world, not always a viable option. Aircraft often have to make unscheduled "technical stopovers" in the mid-Pacific in order to refuel, a process which can add to flight times and overhead costs through increased landing fees and crew costs. The knock on result of this disruption can ultimately impact on the airline customer through cancellations and ticket refunds.

Through helping to increase the efficiency of the fuel supply to Sydney Airport, the Project is helping to ensure the continued operation of the airport in the short, medium and long term.

[2] Found on the World Wide Web: http://www.sydneyairport.com.au/SACL/Master-Plan.html

This improvement work also provides an opportunity to replace the existing pipeline from Kurnell Refinery to Caltex wharf. Replacement of this pipeline and removal of the pigging facilities from the wharf to the main part of the refinery will further reduce the risk of any pollution incidents occurring on the wharf in relation to this action and will also allow the new section of pipeline to be better monitored as it will be able to accept 'intelligent pigs'.

2.4 Project Alternatives

Several alternatives solutions have been considered in order to achieve the increased capacity required from the Kurnell refinery to Sydney Airport. Due to the projected increase in demand for fuel at the airport over short, medium and long term many of the alternatives will also have to be implemented over the coming years in order to meet the demand for fuel. These alternatives are discussed below.

2.4.1 Take no Action

It would be possible for the Airport to continue to operate without implementing the Project in the short term.

Issues to Consider

Currently fuel rationing has been imposed at Sydney Airport. Fuel usage is projected to increase over the next decade which would lead to an increase in fuel rationing should no improvements be made to the current infrastructure.

Currently Sydney Airport contributes an estimated 6% to the NSW economy and 2% to the Australian economy overall. Furthermore Sydney Airport currently indirectly generates 131,000 jobs with an estimated additional 100,000 jobs likely to be created over the next 10 years. These would be potentially put at risk should the efficiency of the Airport be jeopardised through taking no action.

2.4.2 Increase the Utilisation Rate of the Shell Pipeline

Currently the JUHI is connected to the Kurnell Refinery via the KBL and to the Shell-owned Clyde Refinery via a dedicated jet fuel pipeline. It is theoretically possible to increase the utilisation rate to supply more jet fuel from the Clyde refinery.

Potential positives

The current average transfer rate of 2.2ML per day could be increased to a rate much closer to the theoretical maximum of 3.9ML per day.

Issues to consider

The Clyde Refinery currently transfers all of the jet fuel that it has available to JUHI. Any additional jet fuel would need to be imported into Clyde Terminal via Gore Bay and then transferred to JUHI. This process is extremely inefficient as the pipeline between Gore Bay and Clyde is predominantly for the supply of crude oil into Clyde. Some 30% of all jet fuel import is lost as the pipeline needs to be flushed prior to jet fuel transfer. This is not a viable long term option.

2.4.3 Installing a Bridger Facility at the Airport Storage Facility

A permanent installation of a 'bridger facility' at the on-airport storage facility would allow the receipt of jet fuel via trucking.

Potential positives

The bridger facility is a relatively low cost option that could be implemented in the short term to supplement the amount of jet fuel transferred into the on-airport storage facility by approximately 0.5ML per day. Permanent road bridging infrastructure would provide additional supply security, particularly in special/emergency situations.

Issues to consider

The continual use of jet fuel supply trucks would significantly increase traffic congestion around the immediate JUHI storage area at Sydney Airport and cause disruptions to the operations at the JUHI, with fuel trucks competing with airport freight vehicles for road space. Regulatory and safety considerations would need to be considered to ensure there was minimal increase in safety risks and to minimise traffic congestion.

Due to the above concerns, this option is considered a secondary solution that is ideally suited for use in shorter term emergency situations.

2.4.4 Additional Storage at the Airport Storage Facility

It has been noted that there is sufficient space at the airport to build a larger fuel storage facility. While this would not get around the need to improve the fuel supply infrastructure it would mean that the resupply rates would not be placed under as much pressure in the short and medium term.

Potential positives

Increasing tank storage capacity from 30ML to approximately 38ML would equate to approximately 3.6 days of peak demand in 2014. This option could be part of a medium term solution as the planning and construction process would take approximately two years to complete.

Issues to Consider

The land on which the larger storage tank would be built is leased by Sydney Airport. The lease has the potential to expire in 2018 should it not be renewed. Therefore the JUHI would have to consider whether a 6 year payback period if sufficient for the investment.

2.4.5 Additional Pipeline from an Off-Airport Storage Facility to a Holding Facility on (or adjacent to) Airport Land

As a longer term option, a new storage facility and pipeline could be built on or near the airport. This option recognises that the capacity of the existing supply pipelines and on-airport storage facility will need to be supplemented in the longer term to meet projected jet fuel demand.

This option could accommodate the potential closure of the existing JUHI facility at Sydney Airport from 2024, with fuel supply provided from an off-site storage facility via a pipeline to the airport in addition to existing supply options utilising the Caltex and Shell pipelines. All supply pipelines would be connected to a holding facility at or adjacent to the airport for supply into the airport hydrant system.

The off-site storage and pipeline facility would allow open access to any party wishing to supply jet fuel to customers at Sydney Airport and envisages the use of the existing off-airport storage facilities. Under this option, additional pipeline investment would be necessary.

Potential positives

The replenishment rate of the supplying infrastructure to Sydney Airport would increase significantly upon the completion of the additional pipeline from the off-airport storage facility and would eliminate the need to consider additional storage tanks at the existing on-airport storage facility.

The additional pipeline would increase the security of supply of jet fuel to Sydney Airport on an ongoing basis, reduce the risk of supply shortages as a result of breakdowns and increase supply flexibility.

Issues to consider

This would be a long term solution to a short term problem, even if a potential site for the new storage facility could be found, the new system would not be operational until 2015 at the earliest.

2.5 Conclusions

There are a number of viable options available in order to ensure the continued strategic economic importance of Sydney Airport in the short, medium and long term. However this Project is the preferred option for a number of reasons:

- It has the least amount of adverse environmental and safety impacts on the operation of Sydney Airport and on the surrounding communities, i.e. a number of options above will result in increased heavy traffic and plant movements;
- It is the most environmentally friendly as it does not create further emissions through its operation;
- It is the most cost effective as it increases the efficiency of the current infrastructure;
- It does not impact on the supply of other products from the Caltex Refinery; and
- It can be implemented now thereby satisfying the short to medium term need for fuel by the airport.

The Project will safeguard the reliability of the fuel supply in the short and medium term and allow for further investment in infrastructure without sacrificing the reliability of the fuel supply in future.

3 Project Description

3.1 Introduction

This chapter of the Environmental Assessment provides an overview of the key components of the Project along with a description of each of the associated activities. This chapter also describes:

- The Project Location;
- the Project components at Kurnell and Banksmeadow;
- the Project schedule;
- the Project construction methodology including specific tasks, plant and staffing requirements;
- Project operation; and
- Project decommissioning.

This Project involves works at both Kurnell Refinery and Banksmeadow Terminal. The works at the two sites would take place concurrently. The whole Project would need to be operational for the new equipment to operate effectively. The works at each site are described in detail below.

3.2 Project Location

The Kurnell Refinery and Banksmeadow Terminal are located on opposite sides of Botany Bay in the southern part of metropolitan Sydney, as shown on **Figure 3-1**. The Kurnell Refinery is located on the Kurnell Peninsula within Sutherland Shire, approximately 30km south of Sydney's CBD. The site is bordered by Botany Bay National Park to the east, Captain Cook's Landing Place Park to the south, Bonna Point Reserve in the west and the community of Kurnell to the north.

The refinery was commissioned in 1956 and processes crude oil. It is the largest oil refinery in NSW and the second largest of the seven fuel refineries in Australia, based on crude oil processing capacity. The refinery mainly produces petrol (49%), diesel (22%) and jet fuel (15%). The volumes of the different products vary from year to year depending on the type of crude processed in the refinery and changes in product demand.

A pipeline right of way runs north west from the refinery to a wharf located in Botany Bay. The existing Kurnell Jet Pipeline Line, known as the B Line (KBL) is buried under this right of way. It runs from the refinery under the right of way, resurfacing after Prince Charles Parade and continuing along the wharf, before diving below Botany Bay. From here the KBL travels north until it reaches land at Bumborah Point. It is still underground at this point and remains so continuing north, before turning west and eventually surfacing at Banksmeadow Terminal.

Banksmeadow Terminal is located on the north side of Botany Bay, approximately 12km south of Sydney's CBD. The Terminal is bounded by industrial storage facilities to the north, the Patrick Stevedores Container Terminal to the south, the P&O Trans Australia Terminal to the east, and Penrhyn Road and the Penrhyn Estuary to the west. Access to the Terminal is off Penrhyn Road.

Banksmeadow is Caltex's main storage terminal in NSW and has a maximum storage capacity of 50 million litres. The facility stores products from the Kurnell Refinery which reach the terminal via pipelines under Botany Bay. The main products stored are petrol, diesel, heating oil, aviation fuel and fuel oils.

Client: ICD (ASIA PACIFIC) PTY LTD	Project: KURNELL B LINE UPGRADE	Title: **SITE LOCATION MAP**
URS	Drawn: SB / Approved: WM / Date: 28/01/2011	Figure: **3-1**
	Job No: **43177740** / File No: 43177740.001.wor	

KBL heads west from Banksmeadow Terminal and eventually reaches the Joint User Hydrant Installation Facility (JUHI) at Sydney Airport. A number of other facilities also link into the KBL between Kurnell Refinery and the JUHI. The KBL is approximately 17km long.

3.3 Proposed Works at Kurnell Refinery

3.3.1 Proposed Pumping Station

The proposed works at Kurnell Refinery would be limited to the north eastern part of the refinery. The new pumps, filters, pigging facilities etc. would all be located close to Tank 166, just off Road 7. The Project would require the following to be installed at this location:

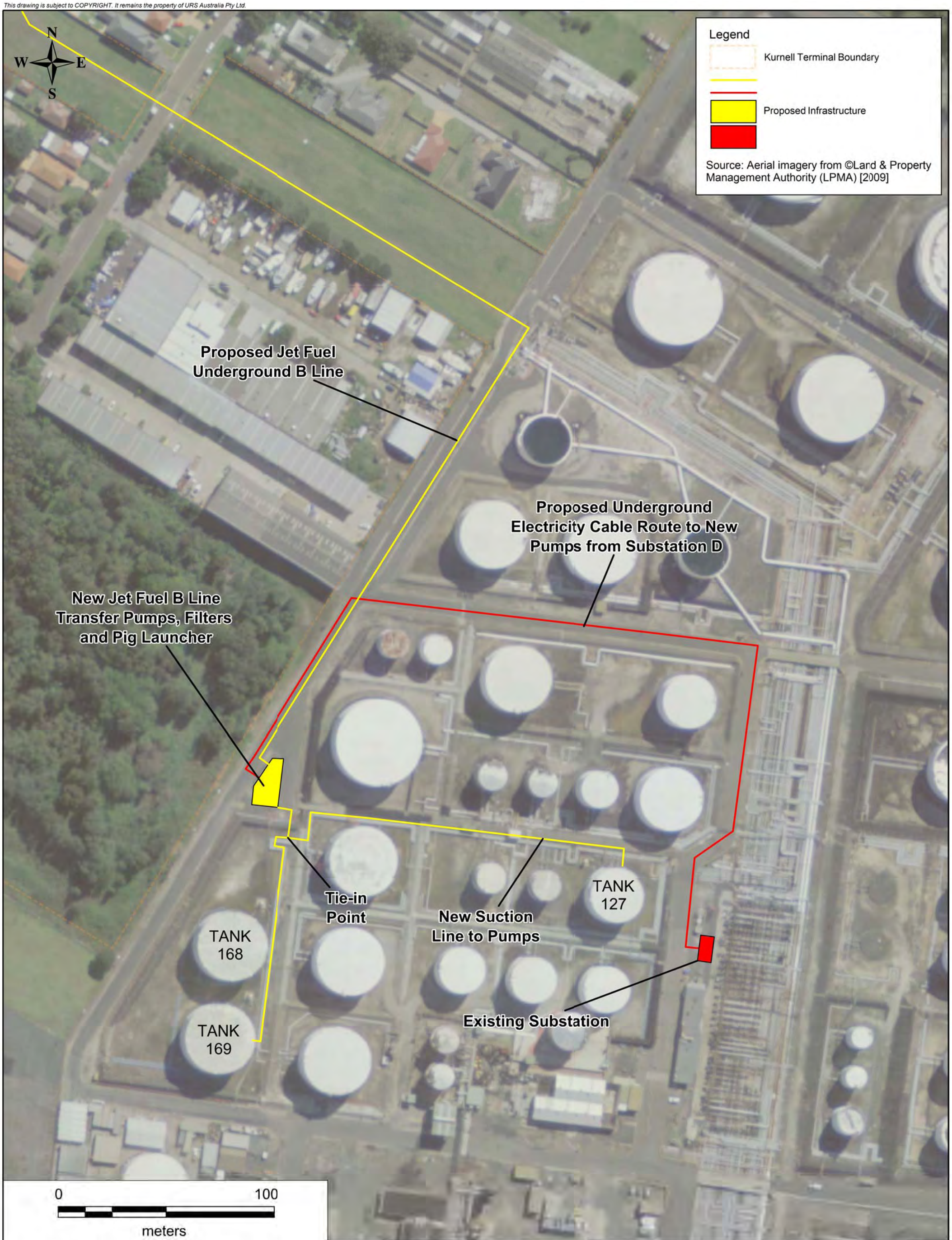
- Two transfer pumps and motors;
- Two coalescer filters and associated instruments;
- A new pigging station; and
- Cabling for the pumps, motors, valves etc.

The works would also require installation, modification and replacement of various valves, discharge piping and a flow control loop, as well as replacement of the turbine flow meter. This new equipment would be installed on a new concrete pad with an area of 286 square metres. It would be located in the area adjacent to the primary containment bund for Tank 166 (refer to **Plate 3-1** and **Figures 3-2** and **3-3**). Some minor earthworks would be required. The tallest element of the new plant would be the coalescers' access structure at nine metres in height. The concrete for the new pump pad would be delivered pre-mixed to the site from a local supplier.

This part of the refinery was chosen for the new plant due to its proximity to the jet fuel storage tanks (Tanks 127, 157, 159, 166, 168 and 169). The new plant would be connected to the existing pipes that empty these tanks by a short length of above ground pipeline. New cabling providing electricity to the pumps etc would also be installed. This cabling would run from a new substation (Substation D) to be installed just to the west of Tank 127.

Plate 3-1 Kurnell Pumping Station Location

Client: ICD (ASIA PACIFIC) LTD PTY	Project: KURNELL B LINE UPGRADE		Title: **KURNELL SITE OVERVIEW**
URS	Drawn: SB/AY	Approved: WM	Date: 28/01/2011
	Job No: **43177740**	File No: 43177740.002.wor	Figure: **3-2** Rev: A A4



Datum: GDA94, Projection: UTM, Grid: MGA Zone 56

Client: ICD (ASIA PACIFIC) LTD PTY	Project: KURNELL B LINE UPGRADE		Title: **KURNELL - OVERVIEW OF PROPOSED FEATURES**
URS	Drawn: SB/AY	Approved: WM	Date: 28/01/2011
	Job No: **43177740**	File No: 43177740.003.wor	Figure: **3-3**
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3.3.2 Proposed Pipeline

A new 10 inch (250 Nominal Bore (NB)) pipeline would be installed from the new pumping station to the existing tie-in point along the wharf. The pipeline between the pumping station and the beginning of the wharf will be buried. The new pipeline will be laid in sections and will be welded together on site.

The new KBL would run north east alongside Road 7, (refer to **Plate 3-2**) from the new pumping station to 'Gate 5' in a new pipeline trench. The distance from the new pumps to Gate 5 is approximately 230m in length. The pipeline will be underground at an approximate depth of 900mm for the whole 230m. The new pipeline trench would be 1.5m in width by 1.5m in depth. Where appropriate, and where soil or groundwater contamination are not present, the soil removed during trenching will be used for back-fill over the new length of pipeline. When the trench is initially dug, soil sampling will take place to determine whether any contamination is present.

Plate 3-2 Road 7 Looking From Gate 5 to the Proposed Pump Station

From Gate 5 the new KBL would be installed underground alongside pipelines that currently run from the refinery to the wharf. This pipeline trench is located beneath the surface of the pipeline right of way and is 600m in length (refer to **Plate 3-3**). The existing KBL would remain in place but would be cleaned and tied off. The new KBL would be installed at a depth of 900mm to top of pipe. This work would involve the removal of soil within the right of way to lay the new pipe. This trench would be 1.5m in width by 1.5m in depth. However it would not involve trenching across Cook Street, Captain Cook Drive or Prince Charles Parade as existing pipeline sleeves would be used to pass the new pipe under the roads. As before, when the trench is initially dug, soil sampling will take place to understand whether any contamination is present.

Plate 3-3 Pipeline Right of Way

If any excavated soil is contaminated, then it will be disposed off in accordance with the requirements of the Waste Management Plan and the current DECCW license at an approved disposal site. Sand will be imported to replace any contaminated soil disposed of off-site for fill around the new pipeline. Excavated soil will be placed alongside the trench but some 1.5m away from the edge (either on the refinery site or within the right of way). Excavated soil will not be left above ground for longer than 4 weeks.

The new KBL would be sleeved under Prince Charles Parade and would emerge in the existing pipe bay at the start of the wharf. From here the proposed pipeline would run for approximately 410m up to an existing tie in point before the pipe submerges beneath Botany Bay. The new pipeline would be laid alongside the existing pipes that run along the wharf.

Plate 3-4 Kurnell Refinery Wharf

3.3.3 Additional works

The Project would remove the existing pig launching facility from the tie in point on the wharf as the new pig launching facility at the pumping station would make this redundant. Moving the pig launching facility off the wharf and onto Kurnell Refinery is likely to reduce the overall environmental and hazard risk associated with the current operation. The Project also proposes to remove a redundant 18 inch (450NB) diesel pipe that currently exists under the pipeline right-of-way. The pipeline has been cleaned and capped and its removal would make way for the upgraded KBL.

3.3.4 Construction Programme and Stages

The construction work at Kurnell Refinery is expected to take approximately 10 months. Work would be completed in line with the following stages:

- Site preparation and groundworks;
- Pipeline delivery and trenching;
- Pipeline installation between pumping station site and the wharf tie in point;
- Delivery and installation of pumps, coalescers etc;
- Proposed pumps and coalescers commissioning; and
- Removal of any redundant equipment (e.g. wharf pig launcher).

3.3.5 Labour and Equipment

The proposed works at Kurnell are expected to require around 40 construction staff working in up to three teams. The following equipment will be required to complete the Kurnell works:

- Backhoes;
- Bobcats;
- Tip trucks;
- Mobile cranes;
- Diesel generators;
- Bevelling machine (Air operated);
- Welding equipment including oxy acetylene cutting;
- Hand held grinders;
- Hand Held shrink wrapping torch;
- De-watering equipment;
- X-Ray equipment;
- Hydrostatic test pump for Hydro-testing of pipeline; and
- Diesel air compressors.

It is expected that 10 trucks will be required to deliver the new equipment and new pipe to the Kurnell site - eight to deliver the new KBL to the right of way and the wharf; and two to deliver the pumping station

equipment and pipeline to the refinery. In addition to these deliveries an additional six to ten construction related movements are expected each day. The largest vehicles will be semi trailers transporting the new pipe. Therefore no over-width vehicle movements are anticipated.

3.3.6 Construction Areas and Services

Laydown areas for the works described above will be adjacent to the proposed pumping station and alongside the proposed pipeline route from Road 7 through to the Wharf. The laydown area for the proposed pipeline being installed along the Wharf will be in the right of way adjacent to Prince Charles Parade.

Site offices at Kurnell Refinery will be located adjacent to the main workshop in the north west corner of the site.

At Kurnell Refinery, temporary power will supplied to the construction site office from an existing, adjacent sub-board. Potable water would be available at all existing facilities.

3.4 Proposed Works at Banksmeadow Terminal

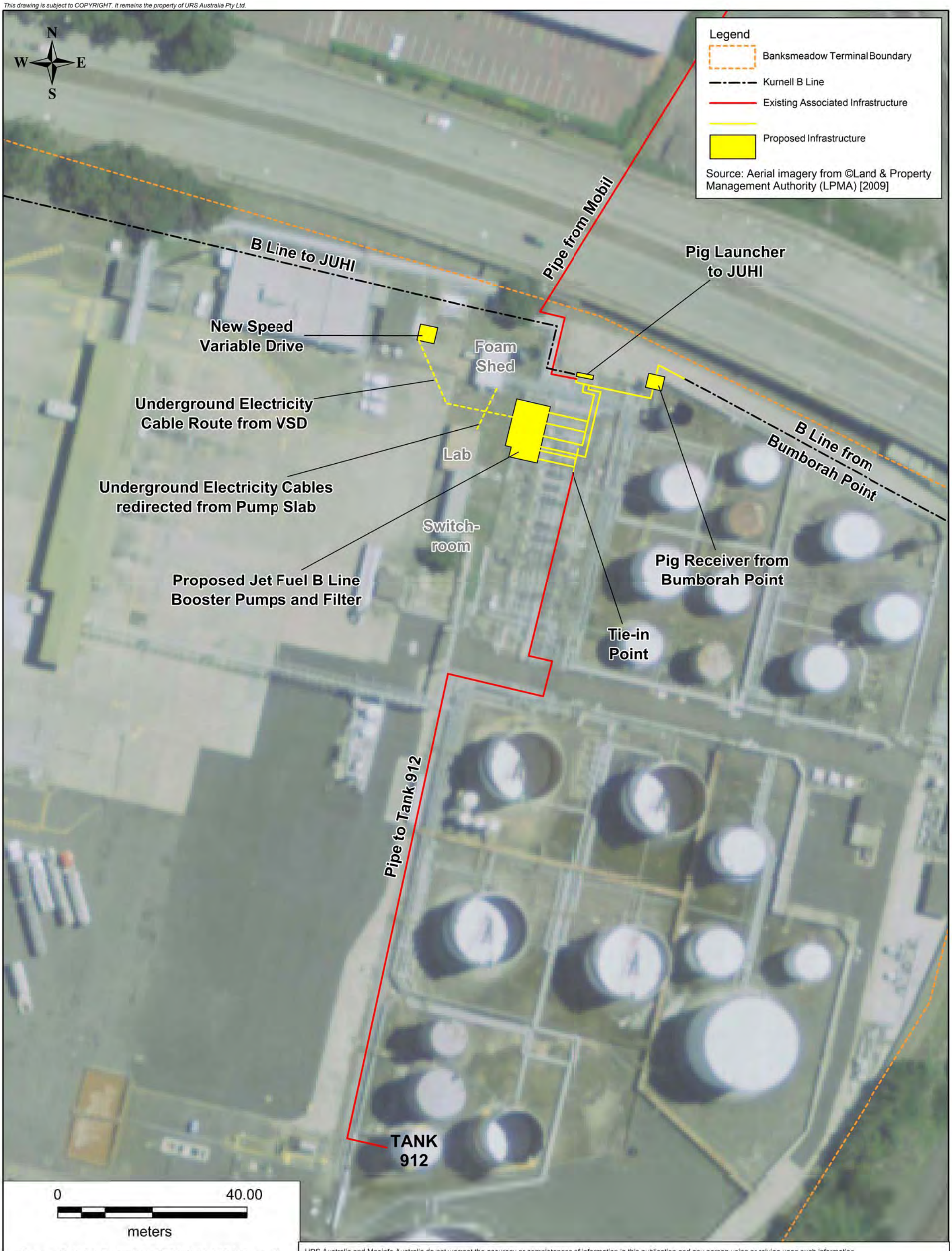
3.4.1 Proposed Equipment

The proposed works at Banksmeadow Terminal would be limited to a small area in the northern part of the site close to the existing KBL pigging and pumping facilities. The Banksmeadow works would include:

- Installation of two booster pumps;
- Installation of one coalescer filter and associated instruments;
- Installation of two new variable speed drives within a new building structure;
- Installation of motorised and isolation valves;
- Modifications to booster pump suction and discharge pipe work;
- Installation of a power supply for the pumps and valves including an extension of the 11kV panel;
- Modifications to the pig launching and receiving stations; and
- Upgrading of the branch line into Banksmeadow to enable stripping transfers from Kurnell to Banksmeadow.

This new equipment would be installed on a new concrete pad approximately 106m^2 in area within an existing pump and equipment area. The new pumps and coalescers would be located on the north western edge of the existing pipe bay, just to the south of the KBL. Limited earthworks would be required for the installation of the pump and coalescer pad. The tallest element of the new equipment would be the coalescer access structure at seven metres in height. The concrete for the new pump pad would be delivered pre-mixed to the site from a local supplier.

The works would involve modifying the existing pig launcher and receiver and installing a room to house the new Variable Speed Drive (VSD) for the KBL. The works to the pigging facilities constitute minor upgrades which would not result in any earthworks or additional plant. The VSD room would be attached to an existing structure and located on hardstanding. It would require small foundations and would be approximately 70m^2 in area and 4m in height. The works to be carried out at the Banksmeadow Terminal are outlined in **Figure 3-4.**



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Datum: GDA94, Projection: UTM, Grid: MGA Zone 56

Client: ICD (ASIA PACIFIC) LTD PTY	Project: KURNELL B LINE UPGRADE		Title: **BANKSMEADOW - OVERVIEW OF PROPOSED FEATURES**
URS	Drawn: SB/AY	Approved: WM	Date: 08/03/2011
	Job No: **43177740**	File No: 43177740.004.wor	Figure: **3-4** Rev: A A4

The new pumps, motors, coalescers and other equipment would be connected the existing KBL and modified pigging facilities through short lengths of above ground pipework. New cabling providing electricity to the pump motors, VSD etc would also be installed.

3.4.2 Construction Programme and Stages

The construction work at Banksmeadow Terminal is expected to take approximately 9 months. Work would be completed in line with the following stages:

- Site preparation and groundworks;
- Construction of VSD Room;
- Delivery and installation of booster pumps, coalescers, VSD, pigging facilities etc; and
- Proposed booster pumps and coalescer filter commissioning.

3.4.3 Labour and Equipment

The proposed works at Banksmeadow are expected to require around 30 construction staff. The following equipment will be required to complete the Banksmeadow works:

- Backhoes;
- Bobcats;
- Tip trucks;
- Mobile cranes;
- Diesel generators;
- Bevelling machine (Air operated);
- Welding equipment including oxy acetylene cutting;
- Hand held grinders;
- Hand Held shrink wrapping torch;
- X-Ray equipment;
- Hydrostatic test pump for Hydro-testing of pipeline;
- Diesel air compressors; and
- Concrete pumping equipment.

It is expected that 8 trucks will be required to deliver the new equipment and new pipe to the Banksmeadow site. In addition to these deliveries an additional three to four construction related movements are expected each day. The largest vehicles will be semi trailers transporting the new pipe. Therefore no over-width vehicle movements are anticipated.

3.4.4 Construction Areas and Services

Laydown areas for the works described above will be in the existing car park adjacent to the proposed booster pumps and the proposed VSD room. All laydown areas will be within the Banksmeadow Terminal site. The Site offices will be located on the Banksmeadow Terminal site.

3.5 Working Hours

Working hours at all sites would typically be 7.00am to 6.00pm Monday to Saturday. Any work to be carried out outside the hours stated, on a Sunday or public holiday would be subject to discussion with and approval by the relevant parties.

3.6 Project Operation

On completion of construction and commissioning of the Project, ongoing maintenance of the Project components would be required. The performance of routine maintenance activities would be necessary to ensure the safe operation and reliability of the KBL. Maintenance would include:

- inspection and assessment of the new and modified equipment as well as the pipeline itself;
- regular intelligent pig runs through the pipeline to clean and assess integrity; and
- maintaining and repairing the equipment and pipeline to ensure public safety, DECCW licence compliance and to maintain high levels of system reliability.

This work would fall within the existing inspection, assessment, maintenance and repair programmes that Caltex already implements. As such no addition operational staff would be required at either site as a result of this Project.

3.7 Project Decommissioning

The expected service life for the Project would be approximately 30 years. However in reality the pipeline itself is unlikely to be decommissioned whilst Sydney Airport is operational although certain sections may need to be repaired, upgraded or renewed. Project decommissioning would involve the removal of all physical components and would require major works at Kurnell Refinery, Banksmeadow Terminal and the JUHI at Sydney Airport. It would also involve the restoration of the Project footprint at the end of the Project's operational life.

All decommissioning and restoration activities would be in accordance with applicable federal, state, and local permits and requirements and would be completed in accordance with existing DECCW licences and the relevant legislation and safeguards of the time.

4 Statutory Planning

4.1 Introduction

The Project is subject to the development and assessment processes and requirements of Part 3A of the EP&A Act. Part 3A of the EP&A Act provides a streamlined and integrated development assessment and approvals regime for major infrastructure and other projects with state significance requiring the approval of the Minister for Planning.

To initiate the Part 3A process, a preliminary environmental assessment (PEA) was submitted to the Department of Planning on 29 Nov 2010. Following the submission of the PEA, a Planning Focus Meeting was held on 10 Dec 2010. On 18 January 2011 the Executive Director of the Department of Planning, as delegate for the Director-General, issued the Director-General's Requirements (DGRs) for an Environmental Assessment under Part 3A of the EP&A Act.

A number of statutory planning controls need to be addressed for the purposes of the proposed Project. This chapter reviews Commonwealth and State legislation as well as the State, regional and local planning policies that apply to the Project, to determine the approvals that would be required to allow the Project to proceed.

4.2 Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires that an action which has, will have, or is likely to have a significant impact on a matter of national environmental significance may not be undertaken without prior approval of the Commonwealth Minister for Environment and Heritage, as provided for under the provisions of Part 9 of the EPBC Act. The Act identifies the following matters of national environmental significance for which Ministerial approval is required:

- World Heritage properties;
- National Heritage places;
- Wetlands of international importance (including Ramsar Wetlands);
- Listed threatened species and ecological communities;
- Listed migratory species protected under international agreements;
- Nuclear actions; and
- Commonwealth marine areas.

The Act also protects the environment where actions proposed are on, or will affect Commonwealth land and the environment.

No threatened species listed under the EPBC Act were recorded during the surveys of the study area as such none are likely to be impacted by the Project (refer to **Chapter 8 Ecology**).

The Project would not involve a nuclear action, is not expected to have a significant effect upon the health and viability of any migratory species listed under provisions of the Act and would not affect any Commonwealth land and the environment.

Kurnell Refinery and Banksmeadow Terminal are located within five kilometres of the Towra Point Nature Reserve, a Ramsar wetland of international significance, and the Kurnell Peninsula Headland which is included in the National Heritage List established under the EPBC Act.

The National Heritage List (NHL) was established to protect places that have outstanding value to the nation. Approval from the Minister is required under the EPBC Act for controlled actions which are deemed will have a significant impact on items and places listed under the NHL. The Kurnell peninsula Headland is listed on the NHL (Listing No. 105812).

The two site areas comprise land which has been disturbed, and which lies within an operational storage refinery and terminal. The environmental assessment of the KBL upgrade found that the Project would be unlikely to have a significant impact on the local environment around each site and, hence, would not be declared a controlled action under the EPBC Act. Therefore, the project would not require the approval of the Commonwealth Minister for Environment and Heritage.

Australian Heritage Council Act 2003

The *Australian Heritage Council Act 2003* (AHC Act) establishes the Australian Heritage Council as an independent advisory body regarding National/Commonwealth heritage places and mandates the Council to maintain the Register of the National Estate (RNE) to promote the assessment and conservation of heritage items. Although there are no items listed under the RNE within the study area, items in the surrounding area are present. The potential impact of the Project on these items is discussed in **Chapter 10 Non-Indigenous Heritage.**

4.3 NSW Legislation

4.3.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (the Regulation) provide the framework for the assessment and approval of proposed developments in NSW. Part 3A of the EP&A Act provides a streamlined and integrated development assessment and approvals regime for major infrastructure and other projects of significance to the State that need the approval of the Minister for Planning. 'Major Projects' can be those that fall within the provisions of State Environmental Planning Policy (Major Development) 2005 (SEPP Major Development) or may be declared a Major Project by order of the Minister in the Government Gazette. This Project falls within the definition of a Major Project under SEPP Major Development.

Notes under Clause 6 of SEPP Major Development state that under section 75B of the EP&A Act, development may be declared by a State Environmental Planning Policy or Ministerial Order to be a project to which Part 3A applies.

4.3.2 Environmental Planning Legislation

While the EP&A Act provides the framework for the planning and development approvals system in NSW, there are a number of other Acts and Regulations of relevance to the Project. These Acts and Regulations have been identified and considered during the environmental assessment of the Project. Key Acts of relevance are discussed below.

It is noted that Section 75U of the EP&A Act outlines approvals and legislation that do not apply when a Project is assessed under Part 3A. Section 75V of the EP&A Act outlines approvals and legislation that still apply when a Project is assessed under Part 3A.

The following section provides an assessment of the Project against the relevant NSW legislation that is applicable.

Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (PoEO Act) provides for the issue of an Environment Protection Licence (EPL) for scheduled activities pursuant to Section 48 of the PoEO Act, in relation to pollution and waste disposal caused by development or operation of developments. Activities requiring an EPL are listed in Schedule 1 of the Act.

Activities relating to chemical storage are listed in clause 9 of Schedule 1. These include Petroleum Products Storage with a capacity to store more than 200 tonnes (liquefied gases) or 2,000 tonnes (chemicals in any other form). The proponent has an existing EPL (No. 837) that licenses a number of activities for Kurnell, including Petroleum Products Storage. The existing Kurnell EPL is due for review on 7 April 2011. An existing EPL (No. 9650) is also held by the Proponent for Banksmeadow for Petroleum Products Storage. Licence No. 9650 is due for review on 20 March 2011.

The Project would not result in any changes to Petroleum Products Storage on site. Accordingly, no changes to either of the existing EPLs would be required.

The PoEO Act also provides for the management of water, air and noise pollution and the control of wastes. The mitigation measures outlined in the draft Statement of Commitments (**Chapter 19 Statement of Commitments**) would be implemented to minimise the potential of the Project to result in pollution of the environment.

Roads Act 1993

The *Roads Act 1993* (Roads Act) regulates a range of activities undertaken on public roads. Section 138 of the Roads Act requires that a person obtain the consent of the appropriate roads authority for the erection of a structure, or the carrying out of work in, on or over a public road, or the digging up or disturbance of the surface of a public road.

The Project would not require any of the works listed above. Accordingly an approval under section 138 of the Roads Act would not be required for the Project.

Water Management Act 2000

The *Water Management Act 2000* establishes a framework for managing water in NSW. The Act creates:

- mechanisms for protecting and restoring water sources and their dependent ecosystems;
- improved access rights to water; and
- partnership arrangements between the community and the Government for water management.

The use of water would be required during the construction of the Project for concrete batching, dust suppression activities, drilling work for footings and for earth staking. Exact water requirements cannot be adequately estimated prior to the detailed design stage.

Pursuant to section 75U(1)(h) of the EP&A Act, approvals are not required under sections 89, 90 or 91 of the WM Act.

Water Act 1912

The Water Management Act 2000 is gradually replacing the planning and management frameworks within the Water Act 1912. Surface water allocation for the Project is administered under Part 2 of the Water Act 1912 and groundwater is administered under Part 5 of the Water Act 1912. There are no exemptions under the Water Act 1912 (either under Part 2 or Part 5) for Part 3A approvals.

Where the Project is likely to intercept groundwater, a licence under Part 5 of the Water Act 1912 would be required. Groundwater is likely to be encountered in excavations deeper than 1.4m. Previous civil works at Kurnell showed that groundwater was almost always encountered in excavations greater than 1m depth. During the detailed design stage, consultation with NSW Office of Water (NOW) will be ongoing to ensure that permitting requirements are met. The proponent would apply for a water licence for temporary construction dewatering and construction would proceed only when approval is obtained from the NOW.

Threatened Species Conservation Act 1995

The TSC Act provides legal status for biota of conservation significance in NSW. The Act aims to '*conserve biological diversity and promote ecologically sustainable development*'. The environmental assessment has identified the presence of threatened species and the strategies for management and mitigation of any impacts.

Part 3A of the EP&A Act requires that potential impacts relating to threatened species, populations and ecological communities are assessed for the Project. Schedules to the TSC Act provide the listings of threatened species, populations and ecological communities that would be considered in this assessment. This is addressed in **Chapter 8 Ecology.**

Fisheries Management Act 1994

Permits under Section 201 (dredging and reclamation) and 219 (fish passage) are not required for Part 3A approvals.

Part 7a, section 220A of the Act provides for the conservation of all biological diversity of aquatic and marine vegetation. It also ensures that the impact of any 'action' affecting threatened species, populations or ecological communities is appropriately assessed.

Part 3A of the EP&A Act requires that potential impacts of a proposal on threatened species, populations and ecological communities are assessed for the Project. Despite the Part 3A exemption from this formal requirement, all works proposed within riparian areas would be consistent with the Department of Water and Energy's Controlled Activity Guidelines (2008) and all watercourse crossings would be constructed in accordance the NSW Department of Primary Industries policies and guidelines.

Noxious Weeds Act 2003

The Noxious Weeds Act provides for the identification and control of noxious weeds and specifies the duties of public and private landholders to control noxious weeds. The Act stipulates that an occupier of land must take steps to control noxious weeds on their land. The Act also provides for the monitoring of and reporting on the effectiveness of the management of weeds in NSW. Appropriate methods for controlling noxious weed species are defined under the control category or categories for particular species of weeds.

A total of 77 noxious weeds, declared by NSW DII across the two Local Government Areas within the ecological study area were identified through the desktop investigation process. Five of these weeds were recorded and identified through field survey (refer to **Chapter 8 Ecology**).

Personnel working on the Project would implement noxious weed control measures to prevent the spread and occurrence of noxious weeds within the vicinity of the Project. Additionally, mitigation measures have been outlined within the draft Statement of Commitments for the Project to manage the risk of noxious weeds on site. Details of these measures are contained in **Chapter 17 Statement of Commitments**.

Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) provides for the conservation of environmental heritage defined as places, buildings, works, relics, moveable objects, and precincts, of State or local heritage significance which are at least 50 years old. The Act provides for the listing of heritage structures on the State Heritage Register and Orders can be made under the Act to protect relics from removal or alteration. This Act applies to non-Aboriginal relics only. Aboriginal relics are protected under the *National Parks and Wildlife Act 1974* (see below).

Heritage structures listed on the State Heritage Register have been reviewed as part of the desk-based and field survey works undertaken as part of this EA. As discussed within the Heritage Assessment (**Appendix C Heritage**), none of the identified State Heritage Register items were identified within the proposed alignment or associated working areas.

Pursuant to section 170, the Heritage Act also requires government agencies to maintain a register of heritage assets. There are no items listed on the section 170 register within the vicinity of the Project.

Pursuant to section 75U of the EP&A Act, an approval under Part 4 or an excavation permit under Section 139 of the Heritage Act is not required, nor does Division 8 of Part 6 of the Heritage Act apply to prevent or interfere with the carrying out of an approved project to which Part 3A of the EP&A Act applies. Notwithstanding, an assessment of the impact of the Project on listed items has been undertaken to meet (refer to **Appendix C Heritage**).

National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the preservation of land and the protection of that land, as well as the protection of flora and fauna and aboriginal heritage. For approved projects under Part 3A (s75U(d)) of the EP&A Act, a permit under Section 87 to excavate an aboriginal site or a consent under Section 90 to destroy an aboriginal site is not required. There are no designated National Parks or Nature Reserves located within the Project. Search results of the Aboriginal Heritage Information Management System (AHIMS) are contained within section 5.13 of Appendix C Heritage. The search found that there are no recorded sites within the immediate vicinity of the Banksmeadow portion of the study area. However, there is a registered site within 150m of the Kurnell portion of the study area. This is discussed within the Heritage Assessment (**Appendix C Heritage**).

Rural Fires Act 1997

The Rural Fires Act 1997 (RF Act) manages bushfire within the State and regulates development in bushfire prone areas. The Project is not for subdivision and is not a special fire protection purpose. Approval is not required under the RF Act. Furthermore, pursuant to section 75U of the EP&A Act, a bush fire safety authority under section 100B of the RF Act is not required for Projects to which Part 3A of the EP&A Act applies.

Pipelines Act 1967

The *Pipelines Act 1967* (Pipelines Act) specifies provisions relating to the construction, operation and maintenance of pipelines and purposes connected therewith. Pursuant to clause 5(1)(a) of the Pipelines Act, subject to section 5A, a licence is not required to be held in respect of a pipeline constructed or to be constructed under, or under an approval or other authority granted under, any Act, other than this Act or the EP&A Act. Accordingly, the Project does not require a licence pursuant to the Pipelines Act.

4.4 Environmental Planning Instruments

4.4.1 State Environmental Planning Policies

State Environmental Planning Policy (Major Development) 2005

According to *State Environmental Planning Policy (Major Development) 2005* (Major Development SEPP), developments referred to as a 'Major Project' require assessment and approval of the Minister for Planning in accordance with Part 3A of the EP&A Act. The SEPP Major Projects defines certain types of developments as major projects and presents criteria for when a project is considered 'critical infrastructure'.

Schedules 2 and 3 of the Major Development SEPP lists the types of developments that can be considered major projects because of where they are located. The Kurnell Refinery is one such area. Schedule 2, Clause 4 relates specifically to the proposed project site at Kurnell and states:

Industrial development within the area identified on Map 2 to this Schedule that is:

(a) a facility that manufactures, stores or uses significant quantities of dangerous goods and meets the criteria in State Environmental Planning Policy No 33—Hazardous and Offensive Development of being potentially hazardous, or

(b) a waste facility that meets the criteria in State Environmental Planning Policy No 33—Hazardous and Offensive Development of being potentially hazardous.

Part of the Proposal is located within the boundaries of Kurnell Refinery as defined by Map 2 in Schedule 2 of the Major Development SEPP. This part of the Proposal will 'use' significant quantities of a dangerous good (jet fuel) and meets the criteria of a potentially hazardous development (as defined by Part 1, Clause 3 of the *State Environmental Planning Policy No 33—Hazardous and Offensive Development*). Therefore the Proposal can be considered a 'Major Project' under the Major Development SEPP.

Equally, the Kurnell Refinery part of the Proposal will only function efficiently when sending fuel to the JUHI if booster pumps are installed at Banksmeadow Terminal. Therefore these two parts of the Proposal are intrinsically linked. Schedule 1, Clause 6(2) of the Major Development SEPP states that

Development for the purpose of petroleum related works (including processing plants) that:

(a) is ancillary to or an extension of another Part 3A project, or

(b) has a capital investment value of more than $30 million or employs 100 or more people.

The Proposal is considered a petroleum related work, and the Banksmeadow Terminal upgrades are an ancillary to the Kurnell Refinery Major Project or Part 3A Project. Therefore the whole Proposal at both Kurnell and Banksmeadow can be considered a Major Development, and as such will require approval under Part 3A of the EP&A Act.

In addition to the approval process outlined above, the SEPP Major Development also lists a number of 'State Significant Sites' under Schedule 3. The 'Three Ports Site' is listed under Schedule 3, Part 20. Port Botany falls under this part of the SEPP and Banksmeadow Terminal is located within the boundaries of the Port Botany Zoning Maps. The terminal is zoned IN1 General Industrial pursuant to Part 20 of Schedule 3 of SEPP Major Development. The Project comprises upgrades to an existing industrial premise. As such, it is a permissible land use within the zone under this SEPP.

Clause 21 of Part 20 of SEPP Major Development provides for heritage conservation within the 'Three Ports Site'. No Heritage Items are listed within lands covered by the Port Botany listing.

State Environmental Planning Policy 33 - Hazardous and Offensive Development

State Environmental Planning Policy 33 - Hazardous and Offensive Development (SEPP 33) confirms the approach used in NSW for planning and assessing proposals for industrial development that include hazardous or offensive development. Through the policy, the permissibility of an industrial proposal is linked to its safety and pollution control performance.

SEPP 33 applies to any proposals that fall under the policy's definition of 'potentially hazardous industry' or 'potentially offensive industry'. For development proposals classified as 'potentially hazardous industry' the policy establishes a comprehensive test by way of a preliminary hazard analysis (PHA) to determine the risk to people, property and the environment at the proposed location and in the presence of controls. The policy states:

"*potentially hazardous industry means a development for the purposes of any industry which, if the development were to operate without employing any measures to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality to (a) human health, life or property, or (b) the biophysical environment; and includes a hazardous industry and a hazardous storage establishment.*

potentially offensive industry means a development for the purposes of an industry which, if the development were to operate without employing any measures to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge (including for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment."

Part of the Proposal will 'use' significant quantities of a dangerous good (jet fuel) and meets the criteria of a potentially hazardous development (as defined by Part 1, Clause 3 of the *State Environmental Planning Policy No 33—Hazardous and Offensive Development*). As such, the Project is classified as *Potentially Hazardous Development*. Accordingly, the DGRs issued for the Project require the production of a Preliminary Hazard Analysis (PHA) for the Project. A PHA has been prepared for the Project and is discussed in **Chapter 14 Hazard and Risk** and **Appendix E**.

State Environmental Planning Policy (Kurnell Peninsula) 1989

State Environmental Planning Policy (Kurnell Peninsula) 1989 (SEPP (Kurnell Peninsula)) aims inter alia to conserve the natural environment of the Kurnell Peninsula and ensure that development is managed having regard to the environmental, cultural and economic significance of the area to the nation, State, region and locality. SEPP (Kurnell Peninsula) applies to the land within the Shire of Sutherland, known as Kurnell Peninsula, and adjacent waterways.

Kurnell Refinery falls within zone 4(c1) (Special Industrial (Oil Refining) Zone pursuant to the SEPP (Kurnell Peninsula). The objectives of the 4 (c1) are to recognise land used for oil refinery, liquid fuel depot and liquefied petroleum gas extraction purposes, and to ensure that development has regard to environmental safety planning principles. SEPP (Kurnell Peninsula) also seeks to mitigate land use conflicts within and adjacent to the zone and to ensure that adequate provision is made for the supply of water and the disposal in an environmentally sensitive manner of all wastes and stormwater from the land. The proposed development is ancillary to the existing refinery and as such, is a permissible land use within the zone.

Clauses 23A to 23D, SEPP (Kurnell Peninsula) also prescribe the protection of items and places of Aboriginal and historic heritage. Schedule 3 'Heritage items' includes a number of items that are in close proximity to the Project. These are discussed in **Chapter 10 Non-Indigenous Heritage**.

State Environmental Planning Policy 14 - Coastal Wetlands

State Environmental Planning Policy No 14 – Coastal Wetlands (SEPP 14) aims to ensure that the coastal wetlands are preserved and protected in the environmental and economic interests of the State. SEPP 14 does not apply to the Project, as the Project is not within a coastal wetland zone.

State Environmental Planning Policy 71 - Coastal Protection

State Environmental Planning Policy 71 - Coastal Protection (SEPP 71) commenced on 1 November 2002. The policy has been made under the Environmental Planning and Assessment Act 1979 to ensure:

- development in the NSW coastal zone is appropriate and suitably located;
- there is a consistent and strategic approach to coastal planning and management; and
- there is a clear development assessment framework for the Coastal Zone.

On 18 November 2005 the NSW Coastal Zone was extended to the greater metropolitan region. Coastal Zone maps show the areas that are considered to in the 'Coastal Zone'. Maps 17 and 18 show that Banksmeadow Terminal and Kurnell Refinery respectively are both outside the 'Coastal Zone, as defined by SEPP 71. Part 1, Clause 4 of SEPP 71 provides that the policy only applies to land within this zone. Therefore SEPP 71 does not apply to the Project.

4.4.2 Local Environmental Plans

Local environmental plans (LEPs) guide planning decisions within local government areas (LGAs). Through zoning and development controls, councils and other consent authorities manage the ways in which land is used. In deciding whether or not to approve the carrying out of a Project, the Minister may, but is not required to, take into account the provisions of any Environmental Planning Instrument (EPI), including an LEP, that would not apply to the Project if approved.

The two sites are within the Botany Bay and Sutherland Shire Local Government Areas. Accordingly the *Botany Bay City Local Environmental Plan 1995* and *Sutherland Shire Council Local Environmental Plan 1996* should be assessed in relation to the Project, as detailed below.

Botany Bay City Local Environmental Plan 1995

The *Botany Bay City Local Environmental Plan 1995* (Botany LEP) creates a broad framework of planning controls within which the Council may prepare development control plans to formulate and adopt more detailed policies and guidelines relating to matters of significance for local environmental planning. Banksmeadow Terminal is zoned pursuant to SEPP Major Development; therefore the local zoning provisions of the Botany LEP are not applicable to the Proposal.

Additionally, Part 4 of the Botany LEP provides protection for heritage within the LGA. Schedule 3 of the Botany LEP lists items of local heritage significance within the LGA. There is one item within the vicinity of the Banksmeadow Terminal, the Botany Bay Marshalling Yards. The impact of the Project on this feature is discussed in **Appendix C Heritage**.

Sutherland Shire Council Local Environmental Plan 1996

The *Sutherland Shire Council Local Environmental Plan 1996* (SSLEP) aims to promote an appropriate balance of development and management of the environment that will be ecologically sustainable, socially equitable and economically viable. Pursuant to clause 4(a) of the SSLEP, the SSLEP does not apply to land to which State Environmental Planning Policy (Kurnell Peninsula) 1989 applies. Accordingly the SSLEP is not applicable to the Project.

4.5 Strategic Planning Framework

Land Use Safety Study (Kurnell Peninsula) 2007

The Land Use Safety Study assesses the current risks from Caltex Refinery operations to existing and future residential land uses and provides recommendations for risk reduction and development control. The Land Use Safety Study identifies three main sources of risk from the Refinery:

1) Fires from large crude oil and refined petroleum product storage tanks and associated transfer pipelines;

2) Fires, explosions or toxic gas releases from processing areas; and

3) Fires and explosions from large liquefied petroleum gas (LPG) storage.

The Project would be designed and constructed to mange risk, include fire risk, from the transfer pipeline. This is discussed in **Chapter 14 Hazards and Risks**.

NSW Coastal Policy 1997

The NSW Coastal Policy 1997 provides the strategic direction for coastal management in NSW. By using the principles of ecologically sustainable development, the NSW Coastal Policy aims to facilitate the development of the coastal zone in a way that protects and conserves its values. One of the policy's objectives is to recognise and consider the potential effects of climate change in the planning and management of coastal development. The NSW Coastal Policy is given statutory effect through State Environmental Planning Policy 71 – Coastal Protection. This is discussed in **Section 4.4.1** above.

NSW Coastal Planning Guideline: Adapting to Sea Level Rise

The *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (DoP 2010) aims to ensure that the risks of sea level rise and enhanced coastal risks and hazards are recognised. It applies to all coastal areas of NSW, including the NSW Coastal Zone, as well as Sydney Harbour and Botany Bay. 'Coastal areas' is defined broadly in the guideline to include the coastline, beaches, coastal lakes and estuaries, as well as the tidal reaches of coastal rivers. It also includes other low-lying land surrounding these areas that may be subject to coastal processes in the future as a consequence of sea level rise.

The Guideline adopts the following six coastal planning principles for sea level rise adaptation:

- Assess and evaluate coastal risks taking into account the NSW sea level rise planning benchmarks;
- Advise the public of coastal risks to ensure that informed land use planning and development decision-making can occur;

- Avoid intensifying land use in coastal risk areas through appropriate strategic and land-use planning;
- Consider options to reduce land use intensity in coastal risk areas where feasible;
- Minimise the exposure to coastal risks from proposed development in coastal areas; and
- Implement appropriate management responses and adaptation strategies, with consideration for the environmental, social and economic impacts of each option (DoP 2010).

The Guideline does not aim to preclude development, only to ensure that the risks of sea level rise and enhanced coastal risks and hazards are recognised. The Project largely comprises upgrade works of existing infrastructure across locations where such activities have proceeded for some time. Climate change induced processes would not represent a significantly different level of risk or hazard to the ongoing operation of the upgraded infrastructure compared to the infrastructure as it currently exists. This is discussed in detail in **Chapter 7 Groundwater and Surface Water**.

The Metropolitan Plan for Sydney 2036

The Metropolitan Plan for Sydney 2036 (Metropolitan Plan) integrates land use, urban and funded–transport planning together for the first time, providing a framework for sustainable growth and development across the city to 2036. It will also meet the targets in the updated *NSW State Plan*, notably in integrated transport and land use planning.

The Project addresses Objective E6 of the Metropolitan Plan, which seeks to support Sydney's Nationally Significant Economic Gateways. In particular the Project addresses Objective E6.2 in that it would build capacity and support economic growth in and around Sydney Airport and Port Botany.

5 Consultation

5.1 Introduction

The Director General's Requirements (DGRs), received on 18 January 2011, state that during the preparation of this Environmental Assessment (EA) the *"…relevant local, State or Commonwealth government authorities, service providers, community groups or affected land owners"* should be consulted. This chapter describes the consultation methodology and outlines the groups and individuals that have been consulted in preparation of this EA.

5.2 Objectives of Stakeholder Consultation

The specific objectives of the consultation program included:

- Informing stakeholders about the Project;
- identifying key issues surrounding the Project;
- providing input to the design, construction and operation of the Project to assess what is acceptable for key stakeholders; and
- promoting awareness of the Project and gathering important local knowledge about the area and what is important to relevant stakeholders.

The DGRs issued for the Project specified a requirement to undertake consultation with the following parties during preparation of the EA.

Commonwealth Agencies

- Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPAC).

State Government Agencies

- NSW Department of Environment, Climate Change and Water (DECCW);
- NSW Department of Industry and Investment (DII);
- NSW Office of Water; and
- NSW Roads and Traffic Authority.

Local Government

- Botany City Council; and
- Sutherland Shire Council.

Aboriginal Stakeholders

- NSW Aboriginal Land Councils; and
- local Aboriginal Land Councils.

Community Stakeholders

- the local community.

In addition, the following additional organisations were identified as key relevant stakeholders for the Project:

- Sydney Metropolitan Catchment Management Authority;
- Land and Property Management Authority;
- Civil Aviation Safety Authority; and
- Sydney Ports (Port Botany Group).

The Department of Planning (Sydney & Northern NSW) were also consulted as part of the Part 3A planning process. Each of the Government Agencies listed above were consulted via the Department of Planning (DoP) for their requirements and inputs into the DGRs (refer to **Appendix A-1**). In addition to the DoP, three other organisations provided input into the DGRs. These were:

- DECCW;
- Botany City Council; and
- Sutherland Shire Council.

Their comments are provided in full alongside the DGRs in **Appendix A-1**. A table in **Appendix A-2** summarises the DGRs and the additional comments and shows where each point is addressed within this EA. The aboriginal stakeholders were consulted with as part of the heritage work. A full report of the heritage assessment, including the aboriginal consultation effort can be found in **Appendix C Heritage**.

5.3 Government Agency Consultation

A letter has been sent out to each agency required by the DGRs in order to establish a point of contact. An example of the letter is available in **Appendix A-3.**

Following the receipt of a letter regarding the Project, the above listed agencies had the opportunity to give feedback and input into the Project. Scott Carter from the DII responded on the 7 February by letter. The DII raised three concerns regarding potential aquatic impacts due to works on the wharf. Two of these do not apply to the Project, as no pipes or pumps are being removed from the wharf, and no barges or boats are being used adjacent to it. The third concern asked that measures be taken to catch any waste or offcut material that may fall in Botany Bay during the installation of the new pipes. This concern has been mitigated in **Section 7.5.1** of **Chapter 7 Groundwater and Surface Water**.

Peter Bloem from DECCW responded by letter on the 10 February 2011. He sent a cover letter and attached the comments DECCW had made to DoP as part of the PEA / DGRs consultation process.

Suzanne Wren at Botany City Council responded on the 14th February 2011. Council asked that a number of issues were addressed as part of the environmental assessment for the Banksmeadow works. **Table 5-1** presents these issues and provides a brief commentary on each point.

Table 5-1 Botany City Council Issues and Responses

Issue	Response
Visual impact of the works on the surrounding locality	As discussed in the Preliminary EA, visual impacts have not been considered as part of this EA due to a lack of sensitive receptors at Banksmeadow and the existing industrial context of the proposed works. This conclusion has been confirmed by the DGRs.
Pollution that may be generated during the construction period and the operations of the terminal when works are completed	The issue of pollution, contamination and ASS is discussed in **Chapter 6 Soils, Geology and Contamination**, **Chapter 7 Groundwater and Surface Water** and **Chapter 16 Hazards and Risks**.
Contamination and Acid Sulfate Soils (ASS) on site	
Traffic impacts that may occur on the surrounding road networks due to construction related vehicles accessing the site	Traffic impacts are discussed in **Chapter 11 Traffic and Transportation**.
Impact on any vegetation	Impacts on Ecology are discussed in **Chapter 8 Ecology**.
Noise impacts that may be generated during the construction period and the operations of the terminal when works are completed	Noise and Vibration impacts are discussed in **Chapter 12 Noise and Vibration**.
Vibration impacts that may occur due to the works	

5.4 Aboriginal Stakeholders Consultation

In accordance with DECCW guidelines, advertisements were placed in the St George & Sutherland Leader newspaper on 4 November 2010. Approaches were also made to ascertain which indigenous groups would be likely to have an interest in the land on which the Project is proposed to be undertaken.

The following groups confirmed their interest to be consulted on the Project:

- Koomurri Management;
- La Perouse Botany Bay Corporation;
- Norma Simms, Woronora Plateau Gundungara Elders Council;
- Darug Aboriginal Cultural Heritage Assessments (which indicated that its area of interest in the Project only included the Banksmeadow Terminal study area); and
- Ken Forster (Dharawal Tribal Custodian).

Details of the draft heritage assessment methodology were forwarded to each of these stakeholders, and those who had requested a level of involvement were invited to participate in a site visit at both Kurnell and Banksmeadow. The following individuals attended the site visit:

- La Perouse Botany Bay Corporation – Yvonne Simms;
- Woronora Plateau Gundungara Elders Council – Scott Franks; and
- Darug Aboriginal Cultural Heritage Assessments – Gordon Morton.

After the fieldwork was conducted details of the Project (13 December 2011) and the survey findings were discussed with the representatives in the field and no objections were raised.

A full breakdown of indigenous consultation undertaken is provided in **Appendix C Heritage.**

5.5 Community Consultation

The DGRs specify that the local communities are consulted on the Project. At Kurnell, the long standing connection between the refinery and the local community has meant that Caltex already engage in a monthly consultation event with the people of Kurnell. This consultation is regularly advertised and well attended by a core group from the local community. A presentation of the Project was made to the Kurnell community at this event on the 21 February 2011. The presentation was led by the Environmental Superintendent of the Kurnell Refinery and at the end of the meeting the community was asked for its views. No issues with the Project were raised.

Banksmeadow Terminal operators do not hold community meetings as the nearest residential properties are over 500m from the site. Nevertheless Caltex representatives do attend Sydney Ports Corporation (SPC) community meetings as a tenant. This allows a forum for the various landowners and tenants in the local area to discuss various issues. At the SPC meeting on the 22 February 2011, Pamela Meers from Caltex presented the Project to the attendees. The meeting was well attended by industry, local government and community group representatives. No issues with the Project were raised.

5.6 Conclusion

Consultation undertaken as part of the planning of the Project and in order to satisfy the DGRs has not seen any critical constraints or issues raised by stakeholders. Indigenous groups raised no issues at all due to the extensively altered natural landscape of the area. Similarly no issues were raised by the members of the local communities around either the Kurnell Refinery or Banksmeadow Terminal. The issues that were raised by the various national, state and local government organisations have been addressed in this EA where applicable.

6 Soils, Geology and Topography

6.1 Introduction

This chapter provides a description of the topography, geology and soil in the study area as well as an assessment of soil contamination. This assessment identifies sources and types of soil contamination that may be present beneath the study area arising from current and/or historical activities. The study area includes areas of land within three separately defined locations; Kurnell Refinery, the right of way and the Banksmeadow Terminal.

The DGRs required that the potential impact of the Project on soils was considered. Specifically the DGRs requested '*a detailed assessment of potential soil impacts, … potential soil contamination, … and acid sulphate soils and how they would be managed if detected.*' These issues are addressed as part of this assessment.

6.2 Assessment Methodology

The assessment of soils and soil contamination has involved the review and collation of available data sources pertaining to the ground conditions of the study area. This information has been reviewed in the context of the Project to evaluate the potential direct and indirect impacts associated with the proposed Stage 2 upgrade of KBL.

Baseline information reviewed included the following:

- Port Hacking 9129-4N Topographic Map, Third Edition, Land and Property Information NSW, 2001;
- Botany Bay 9130-3S, 1:25,000 Scale, Topographic Map, Third Edition, Land and Property Information NSW, 2002;
- NSW Soil Conservation Service Soil Landscape Series, Wollongong-Port Hacking;
- Sydney 56-5, 1.250,000 Geological Series Sheets, Third Edition New South Wales Department of Mines 1966;
- Australian Soil Resource Information System (ASRIS) website;
- historical aerial photographs;
- section 149 (part 2 and 5) planning certificates; and
- previous contamination reports and environmental site assessments (ESAs) including:
  - Coffey (2007) Soil and Groundwater Contamination Assessment, Classification and Risk Ranking Report (EP Licence 837, Condition U13.2); and
  - GHD (2007) Pollution Reduction programme for Environmental Protection Licence, Soil and Groundwater Contamination Assessment, Classification and Risk Ranking Report, prepared for Caltex Oil Australia.

This information has been used to characterise the ground conditions on the sites and from that identify the likely impacts that the Project may have on surrounding human and environmental receptors. Where impacts have been identified, mitigation measures have been proposed to avoid or reduce any potentially adverse impacts.

6.3 Existing Environment

6.3.1 Regional Topography Geology and Soils

Kurnell Refinery and Right of Way

The elevation on and around the Kurnell Refinery and right of way is generally in region of 5m Australian Height Datum (AHD). Land to the east of the site in Botany Bay National Park rises to approximately 30m AHD (Port Hacking 9129-4N Topographic Map, Third Edition, Land and Property Information NSW, 2001).

The Kurnell Peninsula, including the area beneath the refinery, is an elevated plateau of Hawkesbury Sandstone, approximately 18km in length. The sandstone is described as medium- to coarse-grained, composed predominantly of quartz with minor lithic fragments, feldspar, mica and clay pellets. The sandstone is overlain by Quaternary (Pleistocene) wind-blown medium- to fine-grained well-sorted marine quartz sand (URS 2010).

The depth to bedrock beneath the refinery varies between 2m to 20m. Bedrock surface elevation rises toward the east and south of the site, with sandstone outcrops mapped at the northeast and southeast boundaries (URS 2006).

The refinery and right of way lie on the aeolian Kurnell landscape unit, composed of gently undulating to rolling coastal dunefield and relict dunes (NSW Soil Conservation Service Soil Landscape Series, Wollongong-Port Hacking).

Banksmeadow Terminal

The topography on and around Banksmeadow Terminal is generally flat, at an elevation of less than 10m AHD, with a gradual slope towards Botany Bay (Botany Bay 9130-3S, 1:25,000 Scale, Topographic Map, Third Edition, Land and Property Information NSW, 2002).

Quaternary aged sediments known as the Botany Sand Beds (referred to hereafter as the Botany Sands) overly the Hawkesbury Sandstone bedrock to depths of up to 80m and are comprised of predominantly unconsolidated to semi-consolidated permeable sands. These are interspersed with layers of peat, peaty sands, silts and clays (low permeability), which are more common in the lower part of the sequence.

Hard cemented sand layers (formed by iron and humic compounds), locally referred to as “Waterloo Rock”, are common in the upper portion of the aquifer (URS 2006).

The 1:250 000 series geological map for Sydney (Sydney 56-5, 1.250,000 Geological Series Sheets, Third Edition New South Wales Department of Mines 1966) indicates the Hawkesbury Sandstone at this location comprises quartz rich sandstone with some shale. Intrusive studies of the sub surface on adjacent sites in the region have indicated the depth to the sandstone basement in this area is likely to be 20 meters below ground level (mbgl) to 25mbgl (URS 2010).

6.3.2 Acid Sulphate Soils

Kurnell Refinery and Right of Way

The ASRIS website provides information on the coastal acid sulphate group. The Kurnell Refinery and right of way area is included in the Coastal Acid Sulphate Soils (NatCASS) Group. The Kurnell Refinery and right of way falls with the “Low Probability” subgroup for Acid Sulphate Soil (ASS) potential.

The Section 149 (2) and (5) Planning Certificates provided by Sutherland Shire Council state that the area of study in the Kurnell Refinery has been classified as Class 4 and the right of way has been classified as Class 3 with respect to ASS. Sutherland Shire Council has provided the following definitions of Class 3 and Class 4 areas:

- *Acid sulphate soils in a Class 3 area are likely to be found beyond 1 metre below the natural ground surface. Any works that extend beyond 1 metre below the natural ground surface, or works which are likely to lower the water table beyond 1 metre below the natural ground surface, will trigger the requirement for assessment and may require management* (Sutherland Shire Council 2010).
- *Acid sulphate soils in a Class 4 area are likely to be found beyond 2 metres below the natural ground surface. Any works that extend beyond 2 metres below the natural ground surface, or works which are likely to lower the water table beyond 2 metres below the natural ground surface, will trigger the requirement for assessment and may require management* (Sutherland Shire Council 2010).

Banksmeadow Terminal

The ASRIS website indicated that the Banksmeadow Terminal falls within the "Low Probability" subgroup in relation to potential ASS occurrence.

The Section 149 (2) and (5) Planning Certificates provided by City of Botany Bay Council state that the Banksmeadow Terminal is identified on the ASS Map as being Class 1 or Class 2. Botany Local Environment Plan 1995 states that a person must not carry out any works (under a Class 1 classification) or works below ground surface (Class 2) without the consent of Council. Consent is not required if the following steps are carried out:

- A preliminary assessment of the proposed works is undertaken in accordance with ASS Assessment Guidelines and this has been given to Council; and
- Council has provided written advice to the person proposing to carry out those works confirming that results of the preliminary assessment indicate the proposed need not be carried out pursuant to an ASS management plan prepared in accordance with the DUAP (1998) ASS Manual.

6.3.3 Historical Aerial Photographs

A review of historical aerial photography has been undertaken for the study area. A total of six historical aerial photographs were reviewed for the Kurnell Refinery and right of way, dating from 1947, 1961, 1979, 1984, 1994, 2005. A total of four historical aerial photographs were reviewed from the Banksmeadow Terminal, dating from 1984, 1994 and 2005. **Table 6-1** and **Table 6-2** summarise the key findings relating to the historical land use within the study area.

Table 6-1 Historical Aerial Photograph Review-Kurnell Refinery and right of way

Date	Activity	Register	
1947	Kurnell Refinery is not yet developed. The area of the refinery is clear of any development. Residential or potentially industrial developments are located to the northeast and northwest of the proposed site. The area of the right of way appears to be overgrown with trees.	Run:19	Photo No.:54-109
1961	Kurnell Refinery has been developed. The right of way has been cleared of vegetation and appears to be in use. A wharf development is visible on the bank of Botany Bay. There is an increased density of residential/commercial development to the north, northeast and northwest of the refinery.	Run: 6	Photo No.: 5600
1979	The Refinery has increased in size with additional infrastructure increasing the footprint of the facility. There is an increase in the density of residential/commercial development to the north, northeast and northwest of the refinery. There is also an increase in density of development in proximity to the easement. Kurnell Substation has been developed to the west of the Refinery across Captain Cook Drive.	Run: 23	Photo No.: 2763
1984	The area remains largely unchanged from the previous aerial photograph.	Run: 9	Photo No.: 3410
1994	The area remains largely unchanged from the previous aerial photograph. Industrial sheds are located in the north-east corner of the right of way.	Run: 9	Photo No.: 4178
2005	The area remains largely unchanged from the previous aerial photograph. New residential development is located in the south-east corner of the easement along Cook Street.	Run 1	Photo No.: 4938
2011	The refinery, right of way and surrounding areas remain unchanged from the 2005 aerial photograph.	NSW Regional Imagery	2011

Table 6-2 Historical Aerial Photograph Review-Banksmeadow Terminal

Date	Activity	Register	
1979	Banksmeadow Terminal has been developed. Industrial properties border the terminal to the northeast south east, northwest and southeast.	Run:20	Photo No.: 2763
1986	The Terminal remains unchanged. Container storage yards and a port have been developed to the south of the terminal.	Run: 6	Photo No.: 2794-77
1994	The terminal remains unchanged. Industrial developments have been completed to the north and the south of the Terminal along Botany Road.	Run: 12	Photo No: 4244
2004	The terminal remains unchanged. Increase in the footprints of the industrial developments located along Botany Road.	Run: 9	Photo No.: 4877
2011	The terminal remains and surround lands remained unchanged from the 2004 aerial photograph.	NSW Regional Imagery	

The aerial photograph review shows that the study areas have been used for petroleum uses since the 1960s. No other potential contaminating activates have been identified during the review.

6.3.4 Council Records

The study area is located within two city council areas: Sutherland Shire Council and City of Botany Bay Council. URS has obtained planning certificates issued under Section 149 (Parts 2 and 5) of the *Environmental Planning and Assessment Act 1979.* The certificates obtained are presented in **Table 6-3**. Certificates for the project footprint and adjacent areas (where appropriate) were obtained to understand the environmental baseline. The pertinent policies identified in the certificates Section 149 (2) and (5) certificates concerning contamination were:

- City of Botany Bay Council-Development Control Plan (DCP) 34 – Contaminated Land; and
- Contaminated Land Management Act 1997- Section 59 (2).

Table 6-3 Information from Section 149 Planning Certificates

Location	Planning Certificate Number	Zone
Kurnell Refinery		
*Lot 25 DP776328	CN10/05095	4 (c1) Industrial Special (Oil Refinery)
*Lot 570 DP752064	CN10/05096	4 (c1) Industrial Special (Oil Refinery)
*Lot 283 DP752064	CN10/05097	4 (c1) Industrial Special (Oil Refinery)
**Lot 1 DP132055	Not obtained	Assumed 4 (c1) Industrial Special (Oil Refinery)
Wharf		
Lot 456 DP1413279	CN10/05115	2(a) Residential 4(c1) Industrial Special (Oil Refinery, 5(a) Recreational Existing, 7(a) Waterways, 8(a) Natural Parks and Nature Reserves-Existing
Right of way		
*Lot 122 DP8135	CN10/05098	4 (c1) Industrial Special (Oil Refinery)
*Lot 123 DP8135	CN10/05099	4 (c1) Industrial Special (Oil Refinery)
*Lot 124DP8135	CN10/05100	4 (c1) Industrial Special (Oil Refinery)
*Lot 125 DP8135	CN10/05101	4 (c1) Industrial Special (Oil Refinery)
*Lot 77 DP8135	CN10/05102	4 (c1) Industrial Special (Oil Refinery)
*Lot 78 DP8135	CN10/05103	4 (c1) Industrial Special (Oil Refinery)
*Lot 79 DP8135	CN10/05104	4 (c1) Industrial Special (Oil Refinery)
*Lot 43 DP8135	CN10/05106	4 (c1) Industrial Special (Oil Refinery)
*Lot 44 DP8135	CN10/05107	4 (c1) Industrial Special (Oil Refinery)
*Lot 45 DP8135	CN10/05108	4 (c1) Industrial Special (Oil Refinery)
**Lot 46 DP8135	Not obtained	Assumed 4 (c1) Industrial Special (Oil Refinery)
*Lot K DP362655	CN10/05109	4 (c1) Industrial Special (Oil Refinery)
**Lot D DP361103	Not obtained	Assumed 4 (c1) Industrial Special (Oil Refinery)
*Lot F DP361103	CN10/05110	4 (c1) Industrial Special (Oil Refinery)
*Lot G DP361103	CN10/05111	4 (c1) Industrial Special (Oil Refinery)
*Lot B DP338897	CN10/05112	4 (c1) Industrial Special (Oil Refinery)
*Lot H DP362655	CN10/05113	4 (c1) Industrial Special (Oil Refinery)
*Lot J DP362655	CN10/05114	4 (c1) Industrial Special (Oil Refinery)
Banksmeadow Terminal		
Lot 1 DP1050144	716	IN1-General Industrial
Lot 1 DP874710	717	IN1-General Industrial
Pt 6 DP1053768	Requested but not provided	SP1-Special Activities

Notes:

** The planning certificate states that in accordance with Section 19 of the Contaminated Land Management Act 1997 a voluntary investigation agreement has been carried out for the site.*

*** Whilst Section 149 certificates were not obtained for these lots the information provided by the other certificates for the Project area is sufficient for the purposes of this assessment.*

6.3.5 EPA Notices

A search of the NSW DECCW (formerly EPA) on-line register on 22 December 2010 for contaminated land notices (issued under the *Contaminated Land Management Act 1997*) indicated that in June 2003 the EPA issued an Agreement to the Voluntary Investigation Proposal for the Kurnell Refinery and right of way. This agreement is detailed on the Section 149 Planning Certificates.

The EPA stated that three areas were to be investigated, namely the area of Tank 101, the right of way and the Caltex Lubricating Oil Refinery (CLOR) area. The EPA stated that soil and groundwater within the site are contaminated and that they present a significant risk of harm to human health and environmental receptors. Contaminants of concern in groundwater in the Tank 101 and right of way were identified by the EPA as TPH, BTEX and Naphthalene. Investigation works were carried out following receipt of the agreement and are detailed in **Section 6.3.6** below. On 1 July 2005 the EPA gave notice that the terms of voluntary investigation proposal had been satisfactorily completed.

No notices were identified for the Banksmeadow Terminal on the online register.

6.3.6 Previous Contamination Investigations

Kurnell Refinery

URS has been provided with one contamination assessment report relevant to the Kurnell Refinery and right of way as detailed below:

- Coffey (2007) *Soil and Groundwater Contamination Assessment, Classification and Risk Ranking Report* (EP Licence 837, Condition U13.2);

The 2007 investigation carried out by Coffey was prepared in accordance with condition U13.2 of the Environment Protection Licence (Licence: 837). The contamination assessment involved a review of available data to access incidents, activities or processes related to operations at the premises that may have contaminated soil and groundwater.

The Kurnell Refinery was divided into zones named “contamination management zones”. Twenty two contamination management zones were nominated (Zone A to Zone V). Risk assessments were undertaken for each of the 22 contamination management zones. Contamination risks in relation to soil and groundwaters were ranked.

The Project works in Kurnell Refinery will be carried out in “Zone E” and “Zone L” while the right of way was classified as “Zone M”. Coffey (2007) stated that source contamination assessments conducted in “Zone E” did not indicate the presence of soil contamination which warranted further investigation. No data was provided within this report on the contamination status of “Zone L”.

Coffey (2007) noted from Caltex’s loss investigation reports that three historical spills have occurred in “Zone M”. A jet fuel spill occurred in 1978 at the bend in the pipeway between Cook Street and Captain Cook Drive, the volume spilled was not known. A diesel or gasoline spill occurred in the area near Gate 5 the volume spilled was not known. A crude oil spill also occurred in 1987 in the pipeway near Prince Charles Parade the volume spilled again was not known.

Two contamination assessments have been undertaken in the right of way (“Zone M”). These reports have been referenced from Coffey 2007 and are detailed below:

- Coffey (2003) *Voluntary Investigation Final Report, Caltex Refinery Kurnell* (reference: E122586-BN, dated 16 January 2003); and

- Coffey (2005) *Preliminary Contamination Assessment, Right of Way*, Caltex Refinery, Kurnell (Adjacent to Residential Property, 29 Cook Street) reference: E12258/3-CK, dated 20 December 2005)

The purpose of the 2003 voluntary investigation was to access the extent of on-site and off-site hydrocarbon contamination and to identify areas which may require remediation and or special management procedures with respect to human health and environmental risk.

Soil assessments for the right of way (involving soil vapour surveys and soil sampling and assessment) documented within these reports indicated the following:

- Minor hotspots of elevated soil hydrocarbons were identified in the right of way. A photo ionization detector (PID) was used to measure volatile organic compounds. The maximum PID concentration was generally low along the boundary of Zone M the maximum PID recording was 210 parts per million (ppm).
- Elevated hydrocarbons were generally associated with soil samples collected along at the water table. A hotspot was found in the right of way which showed elevated concentrations of TPH and Polycyclic Aromatic Hydrocarbons (PAH). .

The purpose of the 2005 investigation was to access the potential for soil contamination along the southern boundary of the right of way adjacent to the residential property on 29 Cook Street. Soil sampling was undertaken at four locations in the central portion of the right of way. Elevated concentrations of TPH C_6-$C_{36,}$ benzene, ethlybenzene and naphthalene were detected in groundwater in the right of way.

Coffey (2007) concluded that based on the monitoring conducted to date in the right of way, TPH and PAH are considered to be the main contaminants of concern for soil and groundwater in this area. A large portion of the contamination is associated with sub surface soils in the vicinity of the bend in the central portion of the pipeway. Contamination mainly comprises TPH (C_{10}-C_{36}) and naphthalene. Ethyl benzene was also detected above the adopted investigation level in groundwater in the area of Zone M. TPH, BTEX and PAH were not detected in soil samples during this investigation.

Coffey (2007) examined the potential exposure pathways for workers and visitors for contaminated soils details are provided in **Table 6-4**.

Table 6-4 Exposure Pathways (right of way)

Location	Receptor	Source	Exposure Scenario	Notes
On-site	Refinery Worker /Construction Workers/Visitors	Affected surface soils	Dermal Contact/Ingestion	Affected surface soils have been identified in a localised hotspot in the southern portion of Zone M along the eastern boundary. Exposure is considered more likely for a construction worker than a general refinery worker.
		Affected subsurface soils	Dermal Contact/Ingestion Inhalation of vapour or particles (enclosed space and outdoor)	

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Banksmeadow Terminal

One contamination assessment report was relevant to the Banksmeadow Terminal as detailed below:

- GHD (2007) *Pollution Reduction programme for Environmental Protection Licence, Soil and Groundwater Contamination Assessment, Classification and Risk Ranking Report*, prepared for Caltex Oil Australia.

The environmental protection licence issued by the Environmental Protection Authority (licence no 6950) for the Banksmeadow Terminal includes a requirement for a pollution reduction programme. Clause U1.2 of the licence requires that the licensee prepares and implements a contaminated site assessment and risk ranking plan. In response to this licence condition Caltex engaged GHD Pty Ltd in 2007 to prepare the above mentioned plan. The scope of work conducted by GHD included the following:

- review of the historical information including files on environmental management and staff interviews on activities at the terminal that may lead to contamination;
- review of data and findings of all available reports on soil and groundwater investigations; and
- site inspection of all infrastructures relevant to the transfer, storage and handling of fuel and waste products.

GHD identified nine contaminant management zones based on common functions and potential contaminant sources. For each contaminant management zone the following aspects have been identified:

- contaminants and potential contaminants to soil and groundwater;
- mechanisms that may have caused contaminants to migrate from the source; and
- possible receptors which may be adversely impacted by the release or migration of contaminants.

The Banksmeadow works would be restricted to “Zone 4” and “Zone 5”. The area of the tank farm has been designated as “Zone 4” in the 2007 investigation. GHD reported that bund floors are not sealed in this area, thus product spills would infiltrate to soil and groundwater. Losses could also occur from perforated tank floors or walls and pipe flanges and even perforated pipe walls. GHD reported that historical losses within the bunded area would have partially infiltrated soils and groundwater. Results of soil investigations have not been provided however it is reported that groundwater monitoring wells reported low concentrations of hydrocarbons.

“Zone 5” is located west of the tank farm and is the location of the current pump slab and piping manifold. A slops pit for the collections of off takes is also located in the slab area. The area is bunded and drained to the wastewater treatment system. GHD states that as the entire area is a bunded concrete slab the risk of general infiltration of hydrocarbons is low. However, it is stated that the in ground slops tanks present some level of risks. Data was not available on soil and groundwater contamination in this area.

6.3.7 Contaminants of Potential Concern

Based on a review of the available information the following contaminants of potential concern are likely to be present within the study area:

- Total Petroleum Hydrocarbons (TPH);
- Benzene Toluene Ethlybenzne Xylene (BTEX); and
- Polycyclic Aromatic Hydrocarbons (PAHs).

In addition to those that have been identified above given the nature of land use in the study area it is likely that phenols and lead could be present. Therefore any works should allow for their presence.

6.4 Impact Assessment

The following section discusses the likely construction and operational soil and soil contamination impacts associated with Project.

6.4.1 Construction Impacts

The proposed construction works at Kurnell Refinery, the right of way and Banksmeadow Terminal are detailed in **Chapter 3 Project Description**. Construction of the Project will involve trenching, stockpiling soils vehicle movements etc. A number of investigations and data sources have indicated that it likely that some contaminated soil will be encountered when undertaking excavations or other intrusive works. Therefore the following impacts could be associated with construction phase:

- Contaminated soil may be encountered in the study area during trenching activities, excavation of foundations for the new concrete pad, or when the bund wall is being removed;
- Odours may be generated during the disturbance of any potentially contaminated soils;
- Stockpiles generated during intrusive works have the potential to cause ground and surface water contamination;
- Potential acid sulphate soils (PASS) may be encountered during construction;
- Dust may be generated during excavation activities and from stockpiles;
- Re-use of potentially contaminated soil materials on site for backfilling and/or site grading;
- Any spills and leaks from construction equipment would have the potential to contaminate soil; and
- Vehicle movements may results in contaminated materials being dispersed around the work site.

Measures to avoid or mitigate these impacts and risks are outlined below in **Section 6.5**.

6.4.2 Operational Impacts

No impacts to soils or ground conditions are expected during the operation of the Project. All work at both the Kurnell Refinery and the Banksmeadow Terminal will continue under the same controls that are currently licenced under the Protection of the Environment Operations Act 1997. The operation of the Project is unlikely to result in any additional contamination on or off site, provided the agreed controls are implemented.

Indeed the Project has the potential to reduce the risk of contamination and pollution by:

- Upgrading the existing pipeline between the refinery and terminal, thus allowing intelligent pigs to run all the way between the two facilities. This will allow more detailed assessments of pipeline integrity, which in turn will reduce the likelihood of any pollution events;
- Moving the existing pigging facilities from Kurnell Wharf into the new pump pad site within the refinery, thereby reducing the risk of a spill or pollution event on the wharf; and
- Removing contaminated soils from the study area and disposing of any contaminated soil in an appropriate manner. Any contaminated soils that are removed would be replaced by clean soils, reducing the overall contamination on site.

Significantly upgraded infrastructure would ultimately replace redundant systems, and the improvement towards facilitating the 'smart pigging' system would also inherently decrease the ongoing operational environmental risk of piping product under Botany Bay.

6.5 Mitigation Measures

6.5.1 Construction Phase

In order to mitigate any adverse impacts or contamination risks the following mitigation measures would be implemented.

Soil Management

- A site specific Contamination Management Plan would form part of the Project CEMP.
- Soils would be tested for both for contaminants and odour (refer to **Section 13.6**) using standard practices (e.g. soil vapour and soil, leachate and water sampling etc.) as they are stockpiled following excavation.
- Clean materials would be separated from suspected contaminated materials for reuse as backfill. They would be stored for approximately a two-week period.
- Any suspected contaminated materials would be transported via tipper truck and stored on the refinery site at least 800m from any residential properties in Kurnell.
- All materials would be would be stockpiled in accordance with 'The Blue Book' *Managing Urban Stormwater – Soils and Construction Volume 1 and 2* (Landcom, 2004). Principal controls would include the following.
  - Silt fences would be installed around the stockpile to reduce erosion as necessary.
  - Stockpiles will be covered and wetted down in order to reduce dust creation.
  - Stockpiles would not be located in close proximity to any drainage system or surface waterbodies.
- Suspected contaminated materials would then be classified in accordance with *NSW (2009) Waste Classification Guidelines: Part 1: Classifying Waste*, batched, further tested (where required) and disposed within one month of excavation.
- The method of disposal would be in line with the materials' classification in accordance with specifications set out in a Waste Management Plan (WMP). This would include disposal of any contaminated materials to appropriately licensed facilities in accordance with the above classification guidance and the *Contaminated Land Management Act (1997).*
- The above process is likely to require additional Virgin Excavated Natural Material (VENM) to be imported to site to provide additional backfill material. These materials would be validated on site prior to use to reduce the risk of introducing additional contamination.

Acid Sulphate Soils

- A preliminary assessment for PASS would be carried out, which would include soil testing in the areas of potential disturbance; and
- An ASS Management Plan would be prepared in accordance with the ASS Manual (ASS Management Advisory Committee 1998) if ASS is encountered.

6.5.2 Operational Phase

No impacts during operation are expected however the following measures should be implemented across the Kurnell Refinery, right of way and Banksmeadow Terminal to ensure that any risks are negligible:

- Regular inspection and maintenance of equipment, piping and protective bunding to minimise the risk of leaks flowing from the pipeline;
- Regular intelligent pig runs through the pipeline to clean and assess integrity; and
- Maintaining and repairing the equipment and pipeline to ensure public safety, EPA licence compliance and to maintain high levels of system reliability.

This work would fall within the existing inspection, assessment, maintenance and repair programmes that Caltex already implement. These safeguards would also be incorporated into an Operational EMP which would be developed for the operational phase of the Project.

6.6 Statement of Commitments and Conclusions

Provided the mitigation measures listed above are implemented during construction and operation the likelihood of the Project resulting in a significant adverse impact on any ground conditions is unlikely. Storage of any contaminated soils within the Kurnell Refinery site would help ensure that the works are in line with the EPA Licence requirements for the refinery and terminal. Specific measures to mitigate any potential odour impacts are outlined in **Section 13.6**. Provided the mitigation measures within this EA are followed no residual effects are expected. **Table 6-5** outlines the commitments that will be put in place to ensure no adverse impact.

Table 6-5 Statement of Commitments – Soils, Geology and Topography

Mitigation Measure and Commitment	Implementation of mitigation measures		
	Design	Construction	Operation
A Site specific contamination management plan would be prepared.	✓	✓	
Any contaminated soils would be tested and disposed of within one month of excavation.		✓	
Soils would be tested for contamination as they are stockpiled. Any contaminated soils would be stored within Kurnell Refinery at least 800m from any properties within Kurnell.		✓	
Contaminated soil would be disposed of off-site to appropriately licensed landfill facility once it has been classified in accordance with the DECC, NSW (2009) Waste Classification Guidelines: Part 1: Classifying Waste		✓	
Any soil excavated and stockpiled on-site would be appropriately validated prior to reuse as backfill.		✓	
Stockpiled soils would be appropriately managed (in accordance with 'Blue Book' requirements to reduce the risk of soil erosion and/or dust creation and propagation. Silt fences would be installed around the stockpiles where necessary and stockpiles would be covered and wetted down as required.		✓	
A Preliminary assessment would be carried out to assess the presence of potential acid sulphate soils (PASS)	✓	✓	
An Acid Sulphate Soils Management Plan would be prepared in accordance with the Acid Sulphate Soil Manual (ASS	✓	✓	

Mitigation Measure and Commitment	Implementation of mitigation measures		
	Design	Construction	Operation
Management Advisory Committee 1998) if ASS are encountered			
The pipeline would be maintained and repaired as required to ensure public safety, EPA licence compliance and to maintain high levels of system reliability.			✓

7 Groundwater and Surface Water

7.1 Introduction

The DGRs, as received on 18 Jan 2011 requested "…*a detailed assessment of all potential…surface and groundwater impacts; potential soil contamination; details of proposed erosion and sediment controls (during construction), storm water management and spill containment and bunding [as well as a] consternation of sea lavel rise and how this would be managed…"*. This chapter addresses the impact of the Project on all aspects of the water environment during both construction and operation. Impacts on surface water and groundwater are considered in the context of water quality, flow and use. Issues relating to flooding and sea level rise are also addressed.

7.2 Assessment Methodology

7.2.1 Desktop Assessment

In order to understand the hydrological and water quality baseline for Kurnell Refinery and Banksmeadow Terminal a desktop study of all available information was completed. This study reviewed the following data sources:

- publicly available Catchment Management Area (CMA) information and existing water quality information available online from the Botany Bay Coastal Catchments Initiative website;
- historical and recent groundwater reports and contamination risk reduction plans for Kurnell Refinery and Banksmeadow Terminal provided by Caltex;
- the statutory planning framework and appropriate legislative context (refer to **Chapter 4 Statutory Planning**); and
- aerial and satellite imagery.

7.2.2 Evaluation of Impact

The evaluation of potential impacts on groundwater and surface water and is based on

- the findings of the desktop assessment;
- a thorough understanding of the nature of the Project during construction and operation; and
- the consideration of the Project against Department of Environment Climate Change and Water (DECCW) Water Quality and River Flow Objectives for the Botany Bay sub catchment region. These water quality and water flow objectives are the agreed environmental values and long-term goals for the management of surface water within NSW.

The assessment also considers likely impacts of the Project against the '*Coastal Planning Principles: adapting to sea level rise*' Guidelines produced by the Department of Planning (DoP) in 2010.

Water Quality and Flow Objectives

The federal and all state and territory governments have adopted the National Water Quality Management Strategy for managing water quality. The Australian and New Zealand Environment Conservation Council (ANZECC) guidelines form the central technical reference for this strategy (DECCW 2009).

Within the NSW context, the NSW State government has endorsed environmental values for water – these are known as the water quality objectives. As part of the decision making process outlined within the National Water Quality Management Strategy, Water Quality Objectives are the environmental values and long-term goals for consideration when assessing and managing the likely impact of activities on waterways. They are not intended to be applied directly as regulatory criteria, limits or conditions but are one factor to be considered by industry, the community, planning authorities or regulators when making decisions affecting the future of a waterway (DECCW 2009).

Water quality objectives are based on providing the right water quality for the catchment and the different uses of the waterway by the community. The guiding principles can be summarised as:

- where environmental values are being achieved in a waterway, these should be maintained; and
- where the environmental values are not being achieved the focus of activities should be towards achieving these values over time (Sydney Metropolitan Catchment Authority 2007).

Table 7-1 below describes specific catchments within the Botany Bay system, current environmental conditions, desired outcomes and goals, as well as the ANZECC levels of protection.

Table 7-1 Management goals and ANZECC protections levels – Botany Bay

Catchments	Environment condition	Desired outcomes	Management goal	ANZECC Levels of Protection
Upper Georges River, Towra wetlands & Woolooware Bay	Slightly modified	Restore natural processes and biodiversity as much as practicable.	Restore natural condition	Slightly to moderately disturbed
Georges River estuary and southern Botany Bay.	Moderately modified	Retain or restore important natural processes/ biodiversity and protect desired public uses.	Maintain or restore healthy modified conditions	Slightly to moderately disturbed

Source: Healthy Rivers Commission – Independent Inquiry into the Georges River – Botany Bay System (Sydney Metropolitan Catchment Authority, 2007)

Two categories apply to the Project; 'Waterways affected by urban development", and "Estuaries" (DECC 2006). The Water Quality Objectives for **'Waterways affected by urban development'** within the Georges River CMA are:

- Aquatic ecosystems;
- Visual amenity;
- Secondary contact recreation; and
- Primary contact recreation.

The River Flow Objectives for **'Waterways affected by urban development'** within the Georges River CMA are:

- Maintain wetland and floodplain inundation;
- Maintain natural flow variability;
- Maintain natural rates of change in water levels; and

- Minimise effects of weirs and other structures.

The objectives also note that '*Waterways within urban areas are frequently substantially modified and generally carry poor quality stormwater. Local communities are often keen to see these waterways returned to more natural conditions.*'

Areas categorised as **Estuarine** are recognised as areas dominated by saline conditions with hydraulic and water quality characteristics. The issues faced by estuaries are often very different from those of freshwater systems and include water quality degradation from increased nutrients, pesticides and heavy metals, reduced freshwater flows due to river regulation and unsustainable use of estuarine resources.

The Water Quality Objectives for **Estuaries** within the Georges River CMA are:

- Aquatic ecosystems;
- Visual amenity;
- Secondary contact recreation;
- Primary contact recreation (as a longer term objective, 10 years or more); and
- Aquatic foods (cooked) (as a medium term objective, 5 to 10 years).

The River Flow Objectives for **Estuaries** within the Georges River CMA are:

- Protect pools in dry times;
- Protect natural low flows;
- Maintain wetland and floodplain inundation;
- Maintain natural flow variability; and
- Minimise effects of weirs and other structures.

7.2.3 Sea level Rise

The NSW Coastal Policy 1997 sets the overall strategic direction for coastal management in NSW and is based on the principles of ecologically sustainable development. It aims to facilitate the development of the coastal zone in a way that protects and conserves its values. One of the policy's objectives is to recognise and consider the potential effects of climate change in the planning and management of coastal development. The NSW Coastal Policy is given statutory effect through State Environmental Planning Policy 71 – Coastal Protection (refer to **Chapter 4 Statutory Planning**). The goal of this SEPP is to ensure that development that might be affected by sea level rise recognises and can appropriately accommodate the projected impacts of sea level rise (i.e. coastal hazards and flooding) through appropriate site planning, design and development control.

NSW Coastal Planning Guideline: Adapting to Sea Level Rise

The Department of Planning has released the final NSW Coastal Planning Guideline: *Adapting to Sea Level Rise* (DoP, 2010). It applies to all coastal areas of NSW, including the NSW Coastal Zone, as well as Sydney Harbour and Botany Bay. The term 'coastal areas' is used broadly to include the coastline, beaches, coastal lakes, estuaries, as well as the tidal reaches of coastal rivers. It also includes other low-lying land surrounding these areas that may be subject to coastal processes in the future as a consequence of sea level rise.

The Guideline adopts the following six coastal planning principles for sea level rise adaptation:

- Assess and evaluate coastal risks taking into account the NSW sea level rise planning benchmarks;
- Advise the public of coastal risks to ensure that informed land use planning and development decision-making can occur;
- Avoid intensifying land use in coastal risk areas through appropriate strategic and land-use planning;
- Consider options to reduce land use intensity in coastal risk areas where feasible;
- Minimise the exposure to coastal risks from proposed development in coastal areas; and
- Implement appropriate management responses and adaptation strategies, with consideration for the environmental, social and economic impacts of each option (DoP 2010).

7.3 Existing Environment

7.3.1 The Catchment

The catchment of Botany Bay is approximately 1,165km^2 in area, bounded by the Parramatta River and Sydney Harbour catchments in the north, the Hawkesbury-Nepean catchment in the west and the Hacking River catchment in the south (Sydney Metropolitan Catchment Management Authority, 2007).

The two main sub-catchments within the Botany Bay catchment, accounting for approximately 900km^2 of the total catchment area, are the Georges River and the Cooks River. The largest inflows to the bay are the Georges and Cooks Rivers. These Rivers discharge the major sediment and nutrient loads to the Bay, and also contribute other pollutants following rainfall. Several smaller local streams also drain directly into Botany Bay.

Kurnell Refinery and Banksmeadow Terminal are located within five kilometres of the Towra Point Nature Reserve, a Ramsar wetland of international significance, as well as the Kurnell Peninsula Headland which is included in the National Heritage List established under the EPBC Act.

The two site areas comprise land which has been disturbed, and which lies within an operational refinery and a storage terminal. Land use surrounding Botany Bay is dominated by large areas of urbanised land, however significant areas of vegetation are also present, particularly in the south. The western boundary is characterised by rural lands, however these rural lands are also under increasing pressure from development. Of note are the industrial lands at La Perouse and Kurnell which discharge directly to the Bay, in addition to Kingsford Smith Airport, which contains large areas of impervious surface and subsequently would generate significant runoff during rainfall and storm events.

The waters of Botany Bay are used for a mixture of commercial and recreation pursuits. There is a fish farm lease adjacent to the Caltex's Australian Oil Refinery Wharf. No commercial fishing is permitted within Botany Bay, with the exception of limited oyster plots and the fish farm. Recreational fishing is permissible in most other parts of the assessment area and adjacent areas. Recreational boating is popular throughout the Bay and is extensively used by sailboarders. Yarra Bay and Silver Beach are also used by swimmers.

Water Quality of Botany Bay

According to Department of Sustainability, Environment, Water, Population and Communities (2010), Botany Bay and its catchment waterways are subject to ongoing threats due to nutrient and sediment-laden run-off from various non-agricultural land uses. A substantial part of the catchment is highly

developed with almost 40% of its area being used for urban, industrial or commercial purposes. Pollutants of concern are nitrogen, phosphorus and total suspended solids.

A number of studies have been commissioned through the Botany Bay Water Quality Improvement Program. Real-time water quality monitoring stations have been installed at 5 locations (2 Georges River, 2 Cooks River and one Botany Bay). These monitoring stations are currently collecting data on turbidity, dissolved oxygen, chlorophyll (a measure of nutrients), temperature, light - the specific parts of the spectrum utilised by plants for photosynthesis, (known as PAR) and salinity at all locations every 10 minutes (Botany Bay and Catchment Water Quality Improvement Plan website, http://www.sydney.cma.nsw.gov.au/bbcci/).

The following table is an extract from the Botany Bay E2 Pollutant Load Modelling Report, October 2007 (SMCMA 2007). It shows the pre-urbanisation and current load differences for common stormwater pollutants in the Botany Bay catchment.

Table 7-2 Historical changes in stormwater quality for Botany Bay

Constituent*	Mean Annual Load (tonnes/yr) Pre-European	Mean Annual Load (tonnes/yr) Current
Flow GL/yr	260 (GL/yr)	290 (GL/yr)
Total Suspended Solids	7,600	21,000
Total Organic Carbon	1,900	3,700
Total Nitrogen	180	360
Total Phosphorous	16	39
Biochemical Oxygen Demand	1,100	2,600
Faecal Coliforms	1.1 (*10 12 counts/yr)	20 (*10 12 counts/yr)

Nutrient concentrations are used frequently to assess and evaluate water quality in estuaries and coasts. Trace elements in sediments are also indicators used in water quality monitoring programs. Sediment chemistry reflects the source of sedimentary material as well as the processes at play high concentrations of some elements in sediments can be toxic to aquatic organisms and may indicate contamination from domestic or industrial sources. and may indicate contamination from anthropogenic sources.

A study has recently been completed assessing the Bottom Sediments of the Georges River and its Bays and Tributaries (Albani and Rickwood , 2010). A comparison of heavy metal concentrations found within the sediments at various locations across the Georges River Catchment revealed that Botany Bay sediments were not found to contain concentrations considered within the ‘high range’ according to Australian and New Zealand Environment and Conservation Council (ANZECC) Interim Sediment Quality Guidelines. Between ‘mid point’ and ‘high’ concentrations were detected for Chromium, Zinc, Lead, Antimony and Lead (Albani and Rickwood , 2010).

7.3.2 Kurnell

The Project is located within an area of the refinery which is essentially flat and low lying, at an elevation of approximately 5m Australian Height Datum (AHD). Surface drainage generally flows from the steeper areas on the eastern boundary of the refinery via a series of constructed drainage lines within the refinery, towards the northwest into Quibray Bay and Botany Bay. Small wetland areas are present to the north of Solander Street and at the northeast boundary of the site which may be points for groundwater discharge (Coffey 2003 in URS 2004).

Surface water

The Kurnell Refinery has a stormwater management system which separates stormwater and potentially contaminated stormwater. Rainwater which falls within tank bund areas, near process units and pump slabs is potentially contaminated stormwater. This is ultimately directed to the refinery's oily water treatment plant. Treated wastewater is then discharged via a submerged diffuser to the ocean at Yena Gap in accordance with the Refinery's Environmental Protection Licence (EPL). Rainwater which falls outside the main operational areas where stormwater would be less likely pick up contamination is channelled along open pipeway systems which provide storage capacity for flows during storm events. This nominally clean runoff is directed to oil/water separators and is eventually discharged from the site either through an outlet adjacent to the refinery wharf on Silver Beach, or through a drainage line through a constructed wetland which discharges into Quibray Bay. Both outlets have primary oil/water and sediment removal systems. These stormwater outlets are routinely inspected by refinery staff at two stormwater outlet points (URS 2004).

Groundwater

Groundwater in the refinery area is contained within an unconfined aquifer in Quaternary sands. The depth to groundwater is approximately 2m; however in the easement ground water has been as high as 700mm. Groundwater flow is generally in a north-westerly direction and is largely influenced by the strike and dip of the underlying sandstone bedrock.

Acid Sulphate Soils

A review of the NSW Acid Sulfide map (Department of Infrastructure, Planning and Natural Resources (DIPNR)) online and review of previous reports for the area where the Kurnell works will take place indicate that the proposed works are on ground classified as 'Low Probability' of containing PASS.

As discussed in **Section 6.3.1**, Section 149 (2) and (5) Planning Certificates provided by Sutherlandshire Council state that the area of study in the Kurnell Refinery has been classified as Class 4. A Class 4 classification indicates that if improvement works, such as drainage or excavation works were to be undertaken below 2mbgs, further investigation would be required to determine the potential impacts of acid sulphate soils prior to commencement of works.

The right of way has been classified as Class 3. A Class 3 classification indicates that if improvement works, such as drainage or excavation works were to be undertaken below 1mbgs, further investigation is required to determine the potential impacts of acid sulphate soils prior to commencement of works.

Existing Contamination

Kurnell Refinery implements a boundary groundwater monitoring program as a protection system to identify the potential for migration of hydrocarbon contaminated groundwater before it leaves the refinery site. A system of monitoring wells is monitored regularly for the presence of hydrocarbons. Groundwater monitoring is also supplemented by soil vapour surveys, soil sampling and surface water sampling as needed.

The Coffey (2007) *Soil and Groundwater Contamination Assessment, Classification and Risk Ranking Report* involved review of available data to access incidents, activities or processes related to operations at the premises that may have contaminated soil and groundwater. The Project works in Kurnell Refinery will be carried out in "Zone E" and "Zone L" while the right of way was classified as "Zone M". Coffeys concluded that source contamination assessments conducted in 'Zone E' did not indicate the presence of soil contamination which warranted further investigation. No data was provided on the contamination status of 'Zone L'. Given the land use and proximity to operational areas of the Refinery, the groundwater beneath the Project is considered potentially contaminated for the purposes of this EA.

Coffey (2007) noted from Caltex's loss investigation reports that three historical spills occurred in Zone M, (i.e. the pipeline right of way). A jet fuel spill occurred in 1978 at the bend in the pipeway between Cook Street and Captain Cook Drive, the volume spilled is not known. A diesel or gasoline spill occurred in the area near Gate 5 the volume spilled was not known. A crude oil spill also occurred in 1987 in the pipeway near Prince Charles Parade; again the volume spilled was not known. In addition, previous investigations have detected elevated concentrations of Total Petroleum Hydrocarbons (TPH C_6-C_{36}), benzene, ethlybenzene and naphthalene in groundwater across Zone M.

Based on the site's land use and the identified Contaminants of Concern highlighted within numerous previous investigations of soil and groundwater within the Kurnell Refinery, there is potential for elevated concentrations of TPH C_6-$C_{36,}$ benzene, ethlybenzene and naphthalene to exist within all Project areas for Kurnell Refinery.

7.3.3 Banksmeadow Terminal

Surface Water

The topography on and around Banksmeadow Terminal is generally flat, at an elevation of less than 10m AHD, with a gradual slope towards Botany Bay (Botany Bay 9130-3S, 1:25,000 Scale, Topographic Map, Third Edition, Land and Property Information NSW, 2002) .

The Terminal is bounded to the north by Botany Road; to the west by Penrhyn Road, and to the south and east by a railway easement operated by Sydney Ports. Land to the north of Botany Road is under industrial use. Land to the east amd south of the railway easement is the Sydney Port Aurthoriy's port facilities. West of Penrhyn Road lies the estuarine area where Springvale and Flood Vale drains enter Botany Bay (PB, 2009).

Appropriate management of stormwater and drainage of the site is via a system of bunds around infrastructure where potential spills and leaks could occur, as well as drainage collection systems and pavement design to channel appropriate stormwater sources to waste water collection systems (PB 2007).

Groundwater

The flow of groundwater is generally in a south-westerly direction throughout the aquifer. The water is generally shallow and is found within 3m of the surface. The groundwater at the location of proposed pump slab installation works is found at 1.2mbg (PB 2009).

Potential Contamination of Groundwater

Groundwater monitoring is carried out at the Banksmeadow Terminal Site on a bi-annual basis in order to monitor hydrocarbon concentrations in groundwater migrating across the southern boundary of the site. An air sparging and Soil Vapour Extraction system has been in operation along the southern boundary of the Banksmeadow site since 1993. No elevated concentrations were detected from any wells in the general vicinity of where works at Banksmeadow Terminal would be carried out as part of the B Line Upgrade (Ecowise Environmental, 2006).

In addition to the active clean up of contaminated groundwater at the site, the Caltex Sydney Terminal was required under their existing Environment Protection licence to prepare a Contaminated Sites Risk Reduction Plan (PB, 2007). The sole area of relevance to works with the potential to impact upon underlying groundwater would be the extension of the concrete slab and installation thereon of the proposed booster pumps and filter within the zone identified within the PB Pollution Reduction Plan (2007) as Zone 5 - Terminal Pipe and Pump Manifold.

According to PB (2007), this zone is contained within a bunded slab, which drains to a trade waste pit. The plan identified the only likely area of impact to groundwater to be the area where the concrete in-ground waste water collection pit is located. The Integrity of this pit was unknown at the time of the report.

Proposed works would not involve any excavation of, or changes to this existing stormwater drainage and collection system.

7.4 Assessment of Impacts

7.4.1 Construction Impacts

Kurnell Refinery

Surface Water Impacts

The main construction activities with potential to impact upon surface water quality and flow within and potentially beyond the Kurnell Refinery site involve those where excavation would be required. Excavation and ground disturbing activities could involve:

- The excavation of contaminated soil in the area of works during trenching activates;
- The excavation of foundations for the new concrete pad, during bund wall removal;
- The disturbance of Acid Sulphate Soils during excavation;
- Soil erosion may occur when soil is being stockpiled and when vehicles are being moved around the active construction site. This eroded soil may have the potential to impact off-site receptors.

Changes to Surface Water Quality

Rainfall in the areas disturbed by construction activities has the potential to cause soil erosion. Runoff from work sites may contain high levels of sediments that could enter the natural drainage system, potentially carrying elevated concentrations of the identified contaminants of concern. Construction activities are also likely to present an erosion hazard from sediment movement from ground disturbance at the new pump pad sites and as a consequence of driving vehicles over unsealed or unprepared surfaces.

In addition to excavation, potential impacts on surface water quality during the construction of the Project could also be caused by:

- Oil and grease leakage from construction equipment;
- Fuel, oil and chemical spills from temporary storage areas;
- Potentially contaminated surface water runoff from demolition debris and excavation spoil stockpiles;
- Sediment laden runoff from spoil stockpiles for the excavation of trenches and from backfilling operations; and
- Debris and spills on roadways which could find their way to the stormwater system.

Fill material containing elevated chemical concentrations for use during construction may also cause a number of potential water quality impacts. Run off from this material may carry pollutants into local drainage systems, and contamination could leach into the underlying soils and groundwater.

Water quality could also be affected by runoff from disturbed acid sulphate soils. Acid Sulfate Soils are those soils deposited under estuarine conditions and contain the sulphidic mineral pyrite. They underlie many coastal floodplain and wetland areas, and once disturbed and exposed to air, they generate sulphuric acid. Release of this sulfuric acid from the soil can in turn release iron, aluminum, and other heavy metals (particularly arsenic) within the soil. Once mobilized in this way, the acid and metals can create a variety of adverse impacts: killing vegetation, seeping into and acidifying groundwater and water bodies, killing fish and other aquatic organisms, and contributing to the failure of steel and concrete structures (National Working Party on Acid Sulfate Soils, 2000).

The area of study in the Kurnell refinery has been classified as Class 4. As excavation works required for the pipeline trench would be unlikely to exceed 1.5m depth, it is unlikely that these soils would be encountered. Should excavation be required below 2 mbgs, further investigation would be required.

The right of way has been classified as Class 3. A Class 3 classification indicates that if improvement works, such as drainage or excavation works were to be undertaken below 1 mbgs, further investigation is required to determine the potential impacts of acid sulphate soils prior to commencement of works. Given the required depth of trench excavation to 1.5m, construction works would proceed in accordance with a site specific ASS Management Plan prepared as part of the Construction Environment Management Plan (CEMP).

Section 7.5 below outlines the proposed management measures to limit the potential impact of construction activities upon surface water quality. Provided works are carried out in accordance with the CEMP, the risk of negative impacts would be effectively managed by Caltex and its contractors.

Changes to Surface Water Flows

Given the staged construction schedule as well as the temporary nature of the surface water hydrology impacts, the Project is unlikely to affect an overall change to the interception rates of surface water flow or contribute to significant changes in rates of water infiltration. For these reasons, the Project is considered unlikely to contribute towards increased risks of flooding.

Management of stormwater within the right of way (ROW) relies upon infiltration into the grass covered surface as well as runoff into council stormwater drains along Cook St, Captain Cook Drive and Prince Charles Pde. The proposed trenching and installation of the pipeline would be unlikely to impact upon infiltration or run off rates generated across the ROW.

The ROW also contains pipelines carrying stormwater from the refinery site to the licensed discharge point at Silver beach. These pipelines would not be impacted by the Project. This function would continue unimpinged throughout the construction and operational phases of the Project.

Section 7.5 below outlines the proposed management measures to limit the potential impact of construction activities upon surface water flow. Provided works are carried out in accordance with the CEMP, the risk of negative impacts would be effectively managed by Caltex and its contractors.

Groundwater

The main construction activities with potential to impact upon groundwater quality and flow involve excavation work which may potentially interact with groundwater systems. It is feasible that trench excavation activity could pose a risk to groundwater if the trenches were to intersect the water table. The potential adverse impacts from this interaction would include:

- The interception of potentially contaminated groundwater during excavation;
- contamination of clean groundwater by trench material; and
- generation of waste water requiring disposal and the treatment and disposal of contaminated or saline groundwater.

Previous civil works at Kurnell showed that groundwater was almost always encountered in excavations greater than 1m depth. Caltex has a well established procedure of dewatering using dewatering spears to drop the water table locally before the start of excavation. This method is also known as well point dewatering, and would be carried out across required areas of the Kurnell Site as well as along the Right of Way. The spears would be connected to a vacuum pump that sucks up the groundwater surrounding the excavation site and discharges to a tank. The advantages of this method are that well-point dewatering helps prevent groundwater from entering excavations in the first place, and hence would limit the opportunity for chemicals to be released into the atmosphere through exposure within the trench.

Groundwater removed by dewatering, and any runoff that may accumulate in excavations, would be periodically tested for contamination as it was removed. If the groundwater has elevated levels of contaminants that should not enter the stormwater drainage system, then this water would be disposed of into the oily water system and treated in the Waste Water Treatment Plant (WWTP). Clean water would either be disposed off in the stormwater drainage system or collected and re-used on site during construction activities (e.g. for dust suppression activities).

The Project would not be expected to cause a significant disruption to the groundwater flow given the small extent and discrete nature of trench dewatering required.

Beyond any potential localised interaction with contaminated groundwater, groundwater quality across the refinery would continue to be managed in accordance with existing agreements within the EPA Licence as part of the current groundwater voluntary investigation program.

The potential human receptors of contaminated groundwater from the trenching works include workers conducting sub-surface excavations at the site who may come into direct contact with or ingest contaminated soil or groundwater, or inhale hydrocarbon vapours during earthworks. Health risks associated with exposure to contaminated groundwater during dewatering of excavation works would be minimised through implementing appropriate health and safety training and instituting suitable handling protocols for minimising human contact.

Section 7.5 below outlines the proposed management measures to limit the potential impact of construction activities upon groundwater quality and flow. Provided works are carried out in accordance with the CEMP, the risk of adverse impacts could be effectively managed by Caltex and its contractors.

Sea level Rise and Flooding Potential

In simple terms, sea level rise will raise the average water level of oceans and estuaries. As the average water level rises, so too will high and low tide levels affecting the natural processes responsible for shaping the NSW coastline. Exactly how the coast and estuaries will respond is complex and often driven by local conditions but, in general, higher sea levels will lead to:

- increased or permanent tidal inundation of land by seawater;
- recession of beach and dune systems and to a lesser extent cliffs and bluffs;
- changes in the way that tides behave within estuaries;
- saltwater extending further upstream in estuaries;
- higher saline water tables in coastal areas; and
- increased coastal flood levels due to a reduced ability to effectively drain low-lying coastal areas.

Relevant policy and guidance regarding this issue (including the NSW Coastal Policy 1997 and *Coastal Planning Principles: adapting to sea level rise (DECCW 2009)* does not aim to preclude development, only to ensure that the risks related to sea level rise are recognised.

The Project represents essentially upgrade works of existing infrastructure across locations where similar activities have proceeded for some time. Aside from an overall increase in the capacity of the pipeline, climate change induced processes would not represent a significantly different level of risk or hazard to the ongoing operation of the upgraded infrastructure compared to the infrastructure as it currently exists.

Both Kurnell Refinery and Banksmeadow Terminal have a document management system which is kept up to date with revised process descriptions and operational work procedures as these are required. The upgraded infrastructure at both the Kurnell and Banksmeadow sites would be integrated into Caltex's maintenance, repair and upgrade scheduling, and the existing procedures concerning spills and emergency response for both sites would continue to apply.

The Project would involve the proposed relocation of the pigging launching system from the Kurnell Wharf to within the boundaries of the Kurnell Refinery. In accordance with the NSW Coastal Planning Principles, this improvement would minimise the exposure of this infrastructure to immediate coastal risks. This option represents a commitment by Caltex to reduce land use intensity in coastal risk areas. Moving the pig launching facility off the wharf and onto Kurnell Refinery is also likely to reduce the overall environmental and hazard risk associated with the current operation.

Increased Flood Risk

Given the staged construction schedule as well as the temporary nature of the surface water hydrology impacts, the Project is unlikely to affect an overall change to the interception rates of surface water flow or contribute to significant changes in rates of water infiltration within the Kurnell Refinery or the Right of Way. Therefore the Project is considered unlikely to contribute towards increased risks of flooding.

Banksmeadow Terminal

The KBL currently runs across the northern part of the Banksmeadow Terminal site. All of the proposed works are located on a small part of the northern side of the terminal itself. **Figure 3-4** shows the location of the Banksmeadow works. Unlike works proposed at the Kurnell Refinery and Right of Way, the only earth disturbing activity proposed is the extension of the existing concrete slab at the location of the booster pumps and filter and the low foundations for the new variable speed drive housing.

Therefore the potential impacts to surface water quality comprise:

- Oil and grease leakage from construction equipment;
- Fuel, oil and chemical spills from temporary storage areas;
- Potentially contaminated surface water runoff from demolition debris and excavation spoil stockpiles;
- Sediment laden runoff from spoil stockpiles for the excavation of trenches and from backfilling operations; and
- Debris and spills on roadways which could enter the stormwater system.

It is unlikely that ASS materials would be unearthed, or that groundwater would be intercepted through excavation of underlying soils due to the limited proposed depth of trenching activities likely to be required. Groundwater quality across the Banksmeadow Site would continue to be managed by the Project in accordance with existing agreements within the EPA Licence as part of the current groundwater voluntary investigation program.

Section 7.5 below outlines the proposed management measures to limit the potential impact of construction activities upon surface water quality. Provided works are carried out in accordance with the CEMP, the risk of negative impacts would be effectively managed by Caltex and its contractors.

7.4.2 Operation

During operation, the Project is not anticipated to impact the groundwater across any part of the Kurnell or Kurnell or Banksmeadow site areas. A potential source of groundwater contamination would be the leakage of the pipeline, however the Kurnell B Line upgrade would be closely monitored through the refinery's existing inspection and maintenance procedures and any detected leaks would be expeditiously repaired as part of ongoing refinery maintenance. These procedures would be the same as those currently performed under the EPA Licence for the refinery and existing KBL. Therefore the operation of the Project is unlikely to result in any additional surface water or groundwater quality or flow impacts on or off site, provided the agreed controls are implemented.

Indeed the Project has the potential to reduce the risk of pollution by:

- Upgrading the existing pipeline between the refinery and terminal, thus allowing intelligent pigs to run all the way between the two facilities. This will allow more detailed assessments of pipeline integrity, which in turn will reduce the likelihood of any pollution events;
- Moving the existing pigging facilities from Kurnell Wharf into the new pump pad site within the refinery, thereby reducing the risk of a spill or pollution event on the wharf; and
- Removing potentially contaminated soils from the study area and deposing of any contaminated soil in an appropriate manner. Any contaminated soils that are removed would be replaced by clean soils, reducing the risk of contamination affecting surface or ground water.

Significantly upgraded infrastructure would ultimately replace redundant systems, and the improvement towards facilitating the 'smart pigging' system would also inherently decrease the ongoing operational environmental risk of piping product under Botany Bay.

7.4.3 Assessment Against Water Quality and River Flow Objectives

This assessment has considered the potential of the Project to affect the water quality and river flow objectives for the Georges River Catchment Management Area. The Project essentially represents an upgrade and improvement of existing infrastructure within the Kurnell, Right of Way and Banksmeadow Terminal sites. As discussed within this assessment, no natural surface water features exist in the direct vicinity of relevant project areas, however the Project could potentially impact upon water quality at Silver beach and aquatic habitats found bordering Botany Bay.

The agreed upon **Water Quality Objectives** for *Waterways affected by urban development* within the Georges River CMA are:

- Aquatic ecosystems;
- Visual amenity;
- Secondary contact recreation; and
- Primary contact recreation.

The agreed upon **Water Quality Objectives** for *Estuaries* within the Georges River CMA are:

- Aquatic ecosystems;
- Visual amenity;
- Secondary contact recreation;
- Primary contact recreation (as a longer term objective, 10 years or more); and
- Aquatic foods (cooked) (as a medium term objective, 5 to 10 years).

The protection of aquatic ecosystems, visual amenity, secondary and primary contact recreation are listed as common Water Quality Objectives applicable to all areas relevant to the Project. An additional objective for Estuaries is the longer term goal for water quality to be suitable for aquaculture (within 5 – 10 years).

The agreed upon **River Flow Objectives** for *Waterways affected by urban development* within the Georges River CMA are:

- Maintain wetland and floodplain inundation;
- Maintain natural flow variability;
- Maintain natural rates of change in water levels; and
- Minimise effects of weirs and other structures.

The agreed upon **River Flow Objectives** for *Estuaries* within the Georges River CMA are:

- Protect pools in dry times
- Protect natural low flows

- Maintain wetland and floodplain inundation;
- Maintain natural flow variability; and
- Minimise effects of weirs and other structures.

The surface water and groundwater assessment identified that the Project would be unlikely to significantly change existing surface and groundwater flow to, across or from relevant areas of the Kurnell Refinery, Right of Way and Banksmeadow Terminal. Construction impacts with the potential to impact upon surface and groundwater flow would be temporary and short in duration. Temporary changes may include redirected stormwater or stormwater retention, or dewatering activities. The operation stage would see stormwater management resume as per current drainage arrangements. No significant changes to hardstand areas would be required, so no changes to infiltration and drainage would be expected.

In the 'moderately modified' catchment of the Georges River estuary and southern Botany Bay, the desired management outcomes have been identified by Sydney CMA as "Retaining or restoring important natural processes/ biodiversity and protect desired public uses". This environmental assessment of potential surface and groundwater impacts has identified that the proposed upgrade would be consistent with this stated goal.

Providing mitigation measures are adhered to, construction impacts would be unlikely to negatively impact upon important natural surface water of groundwater processes, or on aquatic biodiversity. It is recognised that Silver Beach is a popular swimming and sail boarding destination. Construction works would be unlikely to disturb public uses of the beach given that the upgraded infrastructure would be confined within the existing wharf compound area. No works are proposed within the water column.

The upgrade works would ultimately improve the current environmental performance achieved by Caltex for the transport of jet fuel from Kurnell Refinery, beneath the Bay and to the Banksmeadow Terminal. Significantly upgraded infrastructure would ultimately replace redundant systems, and the improvement towards facilitating the 'smart pigging' system would also inherently decrease the ongoing operational environmental risk of piping product under Botany Bay.

7.5 Mitigation Measures

7.5.1 Construction Phase

Prevention of Surface Water Quality Impacts

Surface water quality impacts during construction would be managed across the Kurnell, Right of Way and Banksmeadow Site through adherence to the following management measures:

- keeping hardstanding areas and stormwater drainage system clear to prevent outflow of potentially contaminated storm water;
- regular inspection and maintenance of equipment, piping and protective bunding to minimise the risk of leaks flowing from the pipeline; and
- inspection and maintenance of storm water drains and channels to ensure that these do not become blocked with litter.

Works on the Kurnell Wharf would also include a number of measures to safeguard Botany Bay. Platforms would be placed on the wharf, under the area where the pipeline would be installed. These platforms would be covered in plastic sheeting to collect any rust or other metal that may fall as a result of the pipeline installation. These platforms would be moved along the wharf as the work progressed. Any

waste that collected on them would be sorted and disposed of in line with the Waste Management Plan (WMP) within the CEMP. No existing pipelines on the wharf are being removed; therefore no liquid spills are expected. As the pipeline is hydro-tested, prior to being commissioned, spill teams will be placed along the length of the new pipeline to check for leaks and to ensure a swift response in the unlikely event of a leak occurring. Provided these measures are followed, no adverse impacts on Botany Bay are expected.

Prevention of Soil Erosion and Sedimentation Impacts

At a minimum, the measures outlined in the *Managing Urban Stormwater – Soils and Construction Volume 1 and 2* (NSW Department of Housing, 2004) (commonly referred to as the Blue Book guidelines) would be implemented for all construction works across the Kurnell and Banksmeadow areas.

These safeguards would be incorporated into the CEMP which would be developed for the construction phase of the Project.

Stockpile Management

Excavated material is likely to require stockpiling within the Kurnell Refinery site areas as well as across the Right of Way. It is necessary to ensure that spoil is disposed of in an appropriate manner to avoid potential contamination of surface water and/or local air quality. If sediment is stockpiled on the ground, then rainfall runoff could carry sediment from the site and contaminate surface runoff. Similarly, sediment may become suspended and transported by wind which would contaminate the local air quality. In order to mitigate these potential impacts, the following measures would be implemented:

- stockpiled soils would be appropriately managed to reduce the risk of soil erosion. Silt fences would be installed around the stockpiles to limit the spread of suspended sediments in run off;
- appropriate dust suppressions measures would be implemented. Measures would include wet dust suppression (refer to **Chapter 6 Soils, Geology and Topography** and **Chapter 13 Air Quality** for further details).
- where possible stockpiles would not be located in close proximity to any drainage system or surface water body. If stockpiles did need to located close to drainage systems or water bodies, then silt fences and / or temporary cut off ditches will be used to intercept suspended sediments; and
- as a precautionary measure, hay bales or similar should be placed in drainage paths.

Acid Sulphate Soils Management

A contaminated soil and acid sulphate soil management plan would be prepared to identify and manage contaminated soils potentially disturbed during construction. The plan would apply to all areas across both sites where excavation would be required. The plan would include the following measures:

- methods to classify spoil for disposal in accordance with environmental guidelines;
- developing management and disposal options for acid sulphate soils in the event these are encountered in accordance with the Acid Sulphate Soil Manual (ASS Management Advisory Committee 1998); and
- monitoring of water quality to be discharged at Silver beach as stormwater during the duration of construction works in the event that ASS or PASS materials are unearthed.

Prevention of impacts to groundwater quality and flow

It is likely that groundwater may be encountered within the Kurnell and Right of Way Easement. The potential exists for groundwater to be intercepted at the Banksmeadow site, given that excavation would likely intercept groundwater at shallow depths (1.2m). The potential impacts from the required dewatering activities (where these would be required) would include the following management strategies:

- The development of a Groundwater Management Plan (GWMP) to manage contaminated groundwater and prevent the infiltration of contaminated runoff to groundwater due to construction activities. This plan would be included as part of the CEMP.
- Soil vapour monitoring would be used to assess the level of hydrocarbon contamination encountered during excavation activities.
- Testing groundwater accumulated in excavations to ensure that it is disposed of in the correct system, in accordance with the refinery's existing wastewater management procedures.

Leaks, spills and contaminated runoff

Leaks, spills and contaminated runoff that could pollute surface water flows or infiltrate to groundwater and result in contamination would be prevented through:

- appropriate and timely disposal of any contaminated spoil, water or waste generated during construction;
- regular inspection of erosion control structures and bunded areas;
- maintenance of the existing storm water drainage system and the inclusion of protective bunds if appropriate;
- regular inspection and testing of containment areas, drainage lines and process pipe work.

These mitigation measures would apply to the Kurnell Refinery, the Right of Way, and the Banksmeadow Terminal.

7.5.2 Operation Phase

Prevention of Surface Water Quality Impacts

Surface water quality impacts during operation would be managed by following the same broad principals as outlined for the construction phase. These measures would be implemented for the Kurnell, Right of Way and Banksmeadow sites. Management measures include the following:

- Keeping the pavement and drainage system clear and functional to prevent outflow of potentially contaminated storm water from the project site;
- Regular inspection and maintenance of equipment, piping and protective bunding to minimise the risk of leaks flowing from the pipeline;
- Inspection and maintenance of storm water drains and channels to ensure that these do not become blocked with litter.

These safeguards would be incorporated into and Operational Environmental Management Plan (OEMP) which would be developed for the operational phase of the Project and would be incorporated into the current inspection and maintenance procedures used at the refinery and terminal.

The performance of routine maintenance activities would be necessary to ensure the safe operation and reliability of the KBL. Maintenance would include:

- inspection and assessment of the new and modified equipment as well as the pipeline itself;
- regular intelligent pig runs through the pipeline to clean and assess integrity; and
- maintaining and repairing the equipment and pipeline to ensure public safety, EPA licence compliance and to maintain high levels of system reliability.

This work would fall within the existing inspection, assessment, maintenance and repair programmes that Caltex already implement. No operational impacts on groundwater are expected, and as such, no project specific mitigation measures are required.

7.6 Conclusions

The main construction activities with potential to impact upon surface water quality and flow within and potentially beyond the Project site areas involve those where excavation would be required. The main construction activities with the potential to impact upon groundwater quality and flow also involve excavation work which may interact with groundwater systems. Groundwater removed by dewatering, and any runoff that may accumulate in excavations, would be tested and either disposed of into the oily water system and treated in the Waste Water Treatment Plant (WWTP), or if considered clean, re-used on site during construction activities or disposed of in the stormwater drainage system. Clean water would be used for:

- wetting down stock piles for dust management control;
- wetting down work areas within the Right of Way for dust management control; and
- irrigation of grassed areas within the Right of Way.

Adherence to mitigation measures outlined in **Section 7.5** and **Table 7-2** would ensure that no significant impacts on surface water or groundwater are likely as a result of the Project. These measures would be included within the CEMP for the Project.

The assessment of the Project has concluded that works are unlikely to affect an overall change to the interception rates of surface water flow or contribute to significant changes in rates of water infiltration within the Kurnell Refinery, Right of Way easement area or the Banksmeadow Terminal. The Project is considered unlikely to contribute towards increased risks of flooding.

The Project would not be expected to cause a significant disruption to the groundwater flow beneath the Kurnell or Banksmeadow sites.

The upgrade works would ultimately improve the current environmental performance achieved by Caltex for the transport of jet fuel from Kurnell Refinery, beneath the Bay and to the Banksmeadow Terminal. Significantly upgraded infrastructure would ultimately replace redundant systems, and the improvement towards facilitating the ‘smart pigging’ system would also inherently decrease the ongoing operational environmental risk of piping product under Botany Bay.

7.7 Statement of Commitments

Table 7-3 Statement of Commitments – Groundwater and Surface Water

Mitigation Measure and Commitment	Implementation of mitigation measures		
	Design	Construction	Operation
The proposed relocation of pigging launching system from the Wharf to within the boundaries of the Kurnell Refinery avoids the risk of any pollution events affecting Botany bay.	✓		✓
Groundwater removed by dewatering, and any runoff that may accumulate in excavations, would be periodically tested for elevated levels of contamination. Any water removed by dewatering that was considered contaminated would be disposed of into the oily water system and treated in the Waste Water Treatment Plant (WWTP).		✓	
Clean water removed through the dewatering process would be collected and re-used onsite where possible to minimise discharges to the stormwater drainage system.		✓	
A Groundwater Management Plan (GWMP) would be developed to manage contaminated groundwater and prevent the infiltration of contaminated runoff. This plan would be included as part of the CEMP.	✓	✓	
Erosion control measures would be implemented at each work site as per **Chapter 6 Soil, Geology and Topography**		✓	
Any required dewatering activities would be carried out in strict compliance with NSW Office of Water licensing conditions.		✓	
In the event of prolonged wet conditions creating vulnerability for water quality impacts, Caltex would direct the contractor to cease work at any location where it is considered that there is a significant risk to water quality until conditions improve.	✓		
Platforms will be attached to the wharf as the new pipeline is installed to intercept any rust, offcuts or metals falling from the works.		✓	
Spill teams will be placed along the route of the new pipeline as it is hydro-tested to check for leaks and ensure a swift response in the unlikely event of a leak.		✓	