Annexure 1: SJFIWG REPORT

INFRASTRUCTURE FOR THE PROVISION OF JET FUEL AT SYDNEY AIRPORT FOR THE PERIOD TO 2029

SYDNEY JET FUEL INFRASTRUCTURE WORKING GROUP

30 APRIL 2010

SYDNEY JET FUEL INFRASTRUCTURE WORKING GROUP MEMBERS

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1. TERMS OF REFERENCE

The Minister for Resources and Energy, the Hon Martin Ferguson, established a working group of senior industry representatives and key stakeholders to investigate the current and projected fuel supply situation at Sydney Airport and to make recommendations on actions that could be undertaken to provide for the effective provision of jet fuel at Sydney Airport in the short, medium and long term.

The Working Group was specifically requested to produce a report that will:

1) be provided to the Minister for Resources and Energy, the Hon Martin Ferguson AM MP, by 30 April 2010.

2) provide projections for Sydney Airport jet fuel demand, supply and capacity requirements of supporting infrastructure for 2014, 2019 and 2029. These projections are to include:

   a) projected jet fuel demand, including annual and peaks/troughs within a typical year.

   b) projected annual refinery production, including annual and peaks/troughs within a typical year and whilst the focus is on Sydney refineries other refineries in the country should be included.

   c) refinery storage capacity.

   d) import terminal storage capacity and facilities in the basin area surrounding Sydney airport.

   e) Joint User Hydrant Installation (JUHI) storage capacity and infrastructure.

   f) pipeline capacities and ratings connecting the facilities associated with supplying jet fuel to the Sydney JUHI.

3) identify any barriers to investment.

4) provide options that are optimally engineered, commercially viable and environmentally sustainable to meet jet fuel requirements and actions to address the identified barriers to investment.

5) recommend preferred option/s for action.

6) include diagrams or maps identifying the current jet fuel infrastructure network and for the alternatives recommended in (4)

7) provide information on jet fuel infrastructure issues at Melbourne and Brisbane airports as appendices to the main report.

2. EXECUTIVE SUMMARY

Efficient airports are an essential element of Australia's transport and tourism infrastructure, underpinning a large part of the countries economic activity.

The *2009 Sydney Airport Master Plan* indicates that Sydney Airport:

- makes a direct contribution of $8 billion in NSW Gross State Product and an economic contribution (taking flow-on impacts into account) of 6 per cent of the NSW economy and 2 per cent of the Australian economy;
- generates more than 75,000 jobs and about 131,000 jobs indirectly; and
- an estimated 100,000 additional jobs will be generated by Sydney Airport over the next ten years.

A number of forecasts indicate the number of passengers moving through Sydney airport will grow at over 4 per cent per annum over the next twenty years. With the expected increase in aircraft carrying capacity, total passenger aircraft movements will grow at a rate of about 2 per cent per annum over the period, with much of the growth in Australian movements expected to be in long-haul international flights.

Maintaining a competitive and efficient fuel supply to Sydney airport and other key Australian airports will be critical to ensure the economic value of the industry to the Australian economy is maximised.

Recognising the impacts of past and future growth in demand for jet fuel at Sydney airport on supply security, the Minister for Resources and Energy, and the Minister for Tourism, the Honourable Martin Ferguson AM MP, initiated a meeting between oil company, airline industry and government stakeholders on 11 January 2010.

Minister Ferguson subsequently established the Sydney Jet Fuel Infrastructure Working Group ("Working Group") to investigate the current and projected fuel supply situation at Sydney Airport and to make recommendations on actions that could be undertaken to provide for the effective provision of jet fuel at Sydney Airport in the short, medium and long term.

<u>*Existing jet fuel supply infrastructure*</u>

The basin area surrounding Sydney Airport contains significant infrastructure to supply jet fuel to the airport. Since 2003, investment in jet fuel supply infrastructure has doubled the amount of storage capacity in the basin area around Sydney Airport to 196 million litres (ML).

For the purposes of the report it has been assumed that locally refined jet fuel from the Sydney based refineries will not increase for the period to 2029 and that existing import levels will be no less than those for 2009. Therefore, the report assumes all growth in jet fuel demand at Sydney Airport will be met from an increase in jet fuel imports.

A common-user bulk liquids berth is available at Port Botany on the northern side of Botany Bay, approximately 9km from Sydney Airport. The berth is owned and managed by Sydney Ports Corporation and handles imports of hazardous and non-hazardous bulk liquids and gases which are transferred by pipeline to nearby storage and distribution facilities.

With the demand for bulk liquids imports through Port Botany increasing over recent years, and forecast to increase into the future, planning approval to construct a second bulk liquids berth at Port Botany was secured in 2008. Since this time Sydney Ports has been progressing with the design and development of the construction methodology for the berth. It is estimated that the earliest the second berth would be operational is in late 2012. At the present time, land is available in the Port Botany bulk liquids precinct to cater for additional tank storage.

The majority of jet fuel imports into Sydney are handled by Vopak through the bulk liquids berth at Port Botany. Currently 91ML of the total 350ML storage capacity is used for jet fuel.

The Sydney Airport Joint User Hydrant Installation (JUHI) facility is fed by two privately owned pipelines – the Shell pipeline from the Clyde refinery and the Caltex pipeline from the Kurnell refinery.

Jet fuel can be pumped through the Caltex pipeline from three separate facilities, including the Caltex Kurnell refinery, the jointly owned ExxonMobil and BP Botany terminal in Botany and the Vopak storage facilities. The Caltex and Shell pipelines can be used simultaneously to transfer jet fuel into the JUHI, however, only one of the options to pump fuel using the Caltex pipeline (i.e.: from Kurnell refinery or Vopak facility or Mobil Botany) can be utilised at any particular point in time.

Jet fuel demand projections

Jet fuel demand is met by the combination of on site storage capacity and the pipeline supply rates to replenish stock.

While annual demand projections are important for long-term planning and investment decisions, information about the daily jet fuel demand and duration of peak periods is central to enabling robust assessment of the adequacy of pipeline supply rates to maintain security of supply.

A number of publications provide projections for the number of aircraft movements and passenger numbers in the short, medium and long term. While these projections provide a useful proxy for jet fuel demand, accurately forecasting jet fuel demand requires modelling of the number and destination of aircraft movements with the actual aircraft likely to be used (taking into account the future fleet and fuel efficiency improvements will provide more accurate results)

For the purposes of this report, the Working Group developed its own model to project jet fuel demand over the period to 2029. The projections were based on certain assumptions; including:

- Aircraft type and destination ports for a typical busy day for each 5 year period, in accordance with the *2009 Sydney Airport Master Plan* projections;
- Fuel consumption efficiency improvements based on estimates for new aircraft technology (calculations based on manufacturer's base data for different aircraft types);
- QANTAS experience of tankering;
- Uplift figures for international flights to European destinations calculated using an average midpoint assumption (i.e. Bangkok/Singapore); and

- Jet fuel consumption pattern/profile (low, average, busy day ranges) for the full year in 2014, 2019, 2024 and 2029 derived by applying the 2007 actual consumption pattern/profile.

The modelling did not take account of flight path efficiency or Required Navigation Performance (RNP) and any differential in jet fuel pricing remains precisely the same.

Table A: Summary of annual and daily jet fuel demand projections for Sydney Airport

	2014	2019	2024	2029
Estimated annual demand (ML)	3472	3926	4864	5644
Estimated net additional jet fuel imports (ML)	1022	1476	2414	3194
Estimated daily demand (ML/day)	9.51	10.76	13.33	15.46
Projected 'busy' day demand (ML/day)	10.45	11.82	14.25	16.30

The Working Group's modelling shows that the annual jet fuel demand at Sydney Airport is projected to increase from 2450 million litres (ML) in 2009 to 5644ML in 2029. This represents an average 4.2% growth rate per annum year-on-year over the twenty year period with a significant period of growth of 7.22% from 2009 to 2014. This growth is largely attributable to an increase in larger, more fuel efficient aircraft entering the fleet which require more fuel to complete longer flights.

The Working Group also modelled daily jet fuel demand (including 'busy' day and intra-day jet fuel demand) to understand the maximum short-term requirements on the supply, storage and hydrant system and assess the adequacy of the infrastructure to meet projected demand.

The results of the intra-day modelling are shown graphically below. Figure A models jet fuel uplift on a typical busy day in 15 minute blocks and Figure B models jet fuel uplift on a typical busy day in hourly blocks.

Figure A: Intra-day demand for typical busy day (15 minute basis)

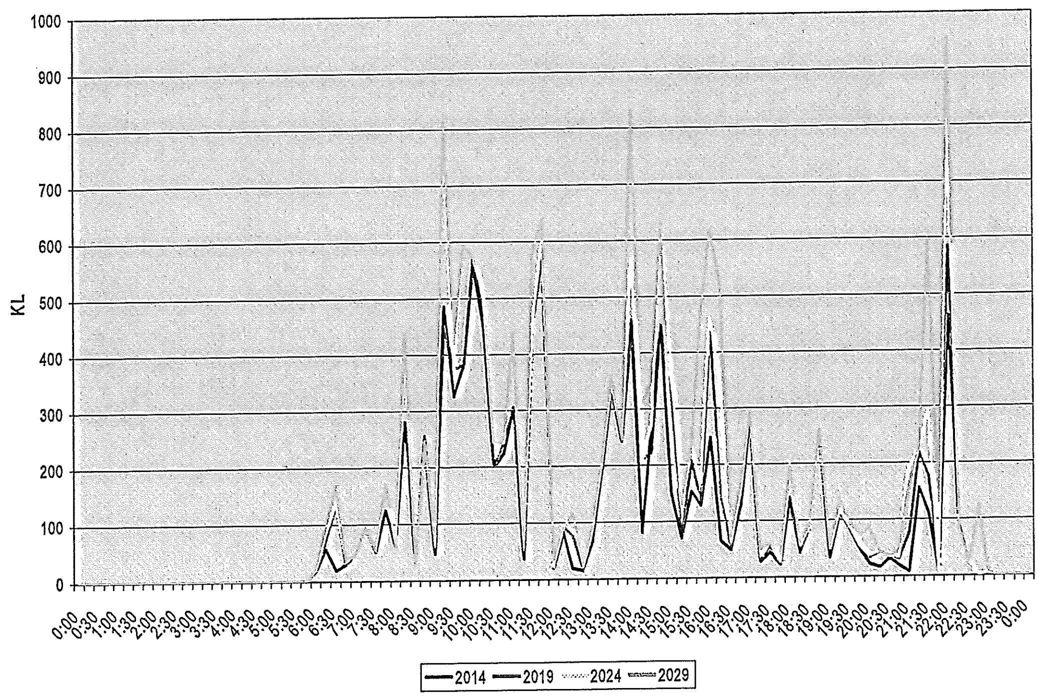
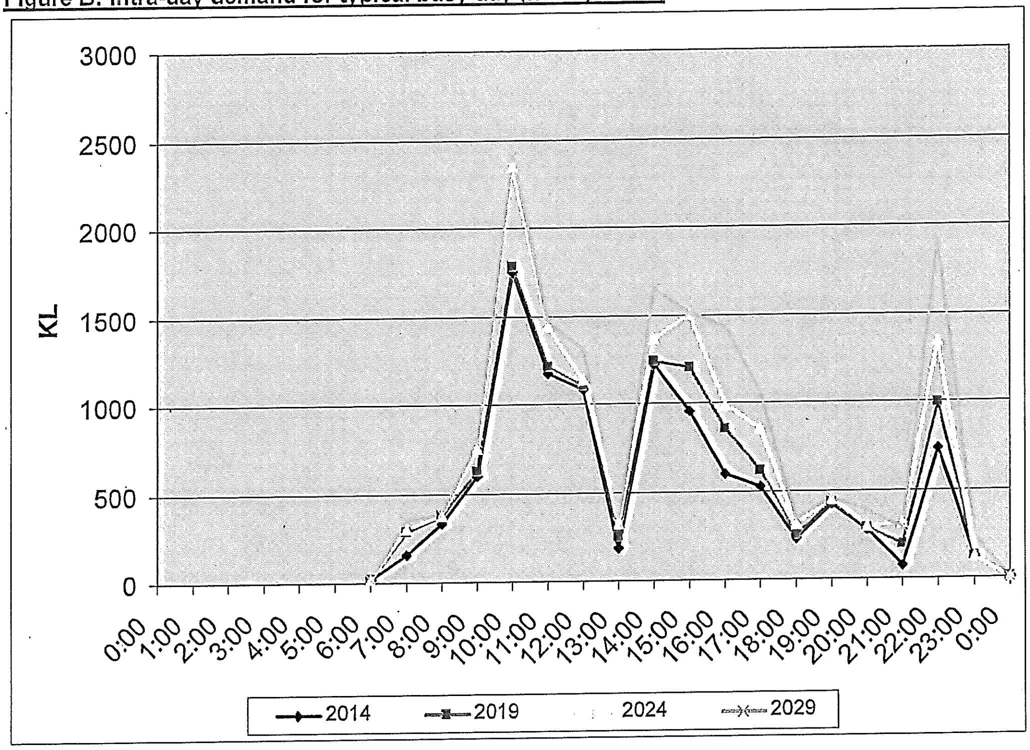
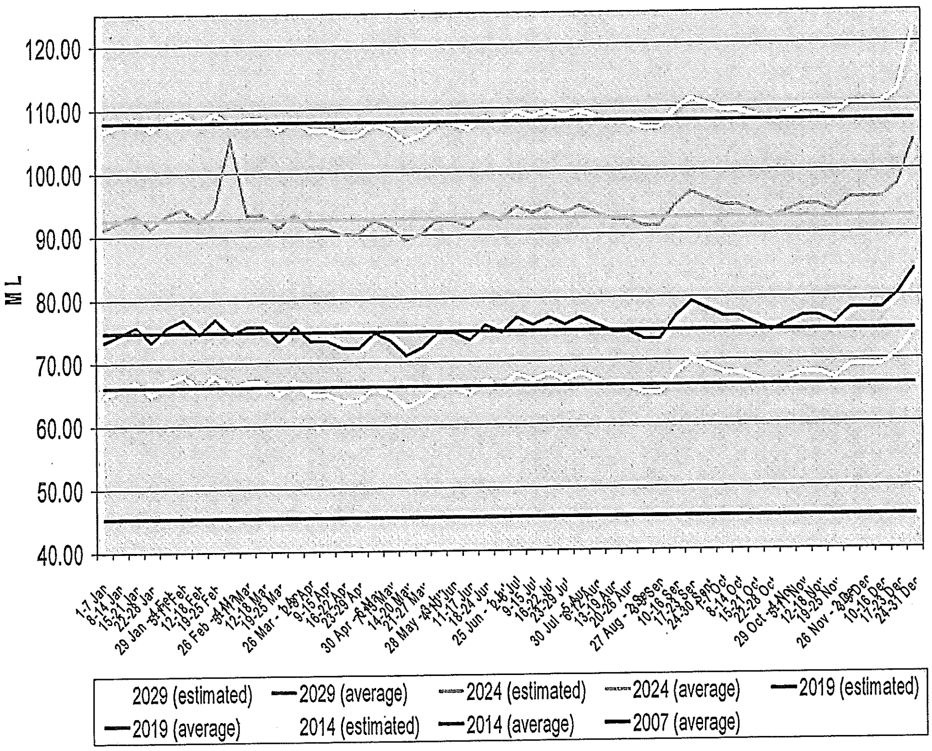


Figure B: Intra-day demand for typical busy day (hourly basis)



The peak period profiles modelled for 2014, 2019, 2024 and 2029 (Figure C) confirm that the extended peak jet fuel demand periods during Easter, school holiday and the Christmas/New Year periods places the greatest stress on the Sydney Airport jet fuel supply infrastructure.

Figure C: Weekly jet fuel demand profile for 2014, 2019, 2024 and 2029



Adequacy of existing jet fuel supply infrastructure

The adequacy of the jet fuel supply infrastructure was determined by taking into account the jet fuel demand projections and comparing the relevant infrastructure capacities with the working group's determined ideal capability criteria.

The working group's ideal multi-dimensional capability criteria relate to stock on hand in the Sydney basin, the airport and the replenishment rate of the supply infrastructure.

Capability criteria	Target level
Jet fuel stock on hand at Sydney Airport	Minimum 2 days daily demand (if on-airport storage is available)
Jet fuel stock on hand in Sydney basin area	Minimum 5 days daily demand; operational target 10 days 'typical' daily demand
Replenishment rate of supplying infrastructure	1.2 times daily demand

The Working Group's analysis determined that:

- The current jet fuel storage capacity at Sydney Airport is capable of storing the minimum two day reserve stock level until the end of 2014;
- Off-airport storage capacity in the Sydney Airport basin area is sufficient to meet the minimum (5 days) and operational (10 days) targets for off-airport storage to 2029;
- The theoretical maximum transfer ("sprint") rate of the existing supply infrastructure to Sydney Airport (11.8ML per day) is not capable of meeting the forecast high end typical daily demand replenishment rate in 2014.
- The typical transfer rate of the existing supply infrastructure to Sydney Airport (7.6ML per day) is not capable of meeting the daily demand replenishment rate in 2014.

Therefore, decisions to invest in additional jet fuel supply infrastructure to the airport will be necessary in the short term to meet the projected growth in jet fuel demand.

The Working Group's analysis of existing infrastructure suggests that investment in at least 0.3ML to 4.5ML per day of jet fuel supply infrastructure capacity will be needed by 2014, with total investment of at least 7.4ML to 11.6ML per day of jet fuel supply infrastructure capacity required to meet projected demand in 2029.

The Working Group understands that the earliest the second bulk liquids berth in Port Botany would be operational is late 2012. In the intervening period there may be certain months where berth utilisation could exceed the economic optimum and, if this occurs, there may be increased delays and costs associated with the import of jet fuel into Port Botany.

Recognising the jet fuel demand projections in this report, the Sydney Ports Corporation may need to consider the option of bringing forward investment in a third bulk liquids berth; and Caltex may need to consider whether it could facilitate increased imports via Kurnell.

Considered actions

The Working Group considered the following six potential infrastructure options to meet projected jet fuel demand at Sydney Airport in the short, medium and long term:

- **Second phase upgrade of the Caltex pipeline** – this option could result in a 9ML to 10ML per day 'sprint' transfer rate (up from a current 'sprint' transfer rate of 5ML per day) of jet fuel from the Kurnell refinery to the on-airport storage facility at the JUHI;
- **Increasing the utilisation rate of the Shell pipeline** - an existing link from the Sydney Metropolitan Pipeline could be used to divert jet fuel to the Clyde refinery to increase the current utilisation rate of the pipeline to a level much closer to the theoretical maximum of 3.9ML per day;
- **Permanent bridger facility at the on-airport storage facility** – this would allow the receipt of jet fuel via trucking on an on-going basis.
- **Additional pipeline from an off-airport storage facility to a holding facility on (or adjacent to) airport land** – This option envisages jet 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.
- **Additional storage at on-airport storage facility** – an additional 10ML storage tank on the existing JUHI lease area;
- **Sydney jet fuel import facilities** – availability of Shell Gore Bay, Caltex Kurnell (No 1 & No 2 Berth) and the Port Botany Bulk Liquids Berth.

Conclusions

The key factors affecting the capacity and reliability of the Sydney Airport jet fuel supply system are the capacity of existing jet fuel supply infrastructure to transfer jet fuel into the on-airport storage facility and the ability of the existing bulk liquids berth to receive the projected growth in jet fuel imports.

The Working Group welcomes the recent decision of Caltex's board to proceed with the second phase upgrade to the Caltex pipeline, 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. The Working Group also acknowledges the announcement by Sydney Ports to commit to the development of a second bulk liquids berth in Port Botany.

Upon completion of the second phase upgrade of the Caltex pipeline and the construction of the second bulk liquids berth in Port Botany, the Working Group considers that Sydney Airport can expect a higher level of jet fuel supply security to 2019. However, the Working Group believes that further investment in jet fuel supply infrastructure to Sydney Airport, in addition to the above planned investments, will be required to meet projected demand in the medium to long term.

Investment of up to an additional 2.4ML to 6.6ML per day jet fuel supply capacity is required to ensure transfers of jet fuel from off-airport storage facilities to the on-airport storage facility is sufficient to meet demand in 2029. Sydney Ports may also need to consider the ability of the existing and proposed second bulk liquids berths in Port Botany to receive the projected growth in imported jet fuel.

The availability of pre-competitive data in the form of jet fuel demand projections would facilitate consideration of investment decisions by potential investors. The Working Group considers that the inclusion of jet fuel demand forecasts as part of the airport master planning process is the most appropriate mechanism to develop and publish the data. The Working Group further considers that this approach could be utilised on a national basis and would provide useful information upon which to base jet fuel infrastructure investment decisions at all of Australia's major airports.

Recommendations

In respect to Sydney Airport, the Working Group recommends that:

1. **JUHI members undertake works required to address projected demand, with a short term horizon up to 2014/15. The decision by Caltex to proceed with the second stage upgrade of the Caltex line is noted;**
2. **The Sydney Airport Corporation, as part of the *2014 Sydney Airport Master Plan* process, further review options for the airport jet fuel storage facility, including on and off-airport storage options;**
3. **Potential investors in consultation with the NSW Government undertake a review into option 7.1.5 (additional pipelines to on-airport storage facility), taking into account the potential long lead time for the construction of the infrastructure.**
4. **The JUHI operator and the SACL review options beyond the current lease term;**
5. **JUHI members immediately commence discussions with SACL regarding site requirements for future on-airport jet fuel storage options;**
6. **Jet fuel demand projections be considered as part of all future Sydney Airport Master Plans with input from appropriate industry representatives;**
7. **Consideration is given to including jet fuel demand projections in Master Plans for other key airports with input from appropriate industry representatives;**
8. **Sydney Ports Corporation consider bringing forward investment in a third bulk liquids berth if medium term jet fuel demand as projected in this report is realised; and**
9. **The Commonwealth Government monitors the actual jet fuel usage at Sydney Airport against forecast demand and the capacity of Sydney's ports to handle the increasing volumes of imported jet fuel to supplement local refinery production.**

Melbourne Airport

Since September 2009, jet fuel supply assurance at Melbourne Airport has decreased and resulted in significantly more amber and red lights being posted by the National Operating Committee for jet fuel supply (NOC).

Based on the information provided and the strong views communicated by the key stakeholders of Melbourne Airport, the Working Group considers that the existing jet fuel supply infrastructure at Melbourne Airport is sufficient to meet current demand.

However, as jet fuel demand projections were not available, the Working Group recommends that the inclusion of jet fuel demand projections in future airport master plans. The provision of this information may lower the investment risks and encourage potential investors to commit to necessary jet fuel infrastructure investments in a timely fashion.

Therefore, in respect to Melbourne Airport, the Working Group recommends that:

10. Jet fuel demand projections are determined by appropriate industry representatives as part of all future Melbourne Airport Master Plans.

Brisbane Airport

During the period September 2009 to January 2010, jet fuel supply assurance at Brisbane Airport decreased and resulted in significantly more amber and red lights being posted by the NOC. However, the jet fuel supply situation returned to 'normal' levels during February 2010

Based on the information provided by Brisbane Airport stakeholders, it is apparent that infrastructure decisions will be needed in the short, medium and long term to ensure the jet fuel supply infrastructure is adequate to meet projected demand to 2030.

However, and as with Sydney Airport, security of tenure of the on-airport storage facility is an issue that needs to be resolved in the very near term to allow potential investors with the required certainty to make decisions.

The Working Group notes that the BAC has drafted a Memorandum of Understanding that suggests longer term tenure for the Hakea storage depot post 2012. The Working Group encourages BAC and the JUHI joint venture participants to conclude negotiations in a timely fashion to allow investment decisions and necessary infrastructure build to occur with minimal negative impact on the security of jet fuel supply at Brisbane Airport.

The Working Group acknowledges that jet fuel demand projections were developed by BAC for the Working Group's consideration and provide a robust basis for assessing the adequacy of current jet fuel supply infrastructure and identifying future jet fuel supply infrastructure needs. However, the jet fuel demand projections are not included in the *2009 Brisbane Airport Master Plan*. As previously discussed, the Working Group considers that the availability of jet fuel demand projections to potential investors will reduce investment risk and encourage investment decisions.

Therefore, in respect to Brisbane Airport, the Working Group recommends that:

11. Jet fuel demand projections are determined by appropriate industry representatives as part of all future Brisbane Airport Master Plans.

3. BACKGROUND

Following a meeting with oil company, airline industry and government stakeholders on 11 January 2010, the Minister for Resources and Energy, the Honourable Martin Ferguson AM MP, endorsed the establishment of the Sydney Jet Fuel Infrastructure Working Group ("Working Group").

The Working Group was asked to provide a report to the Government containing recommendations on actions that could be undertaken to provide for the effective provision of jet fuel at Sydney Airport in the short, medium and long term by 30 April 2010.

The Working Group met on six occasions, sought submissions and undertook consultations with key stakeholders. A list of the submissions received is provided in Appendix A, and copies of the submissions are provided at appendices A1 to A9.

3.1 Recent jet fuel supply situation

Following disruptions to jet fuel supply at Sydney airport in 2003, the Australian Government established a Jet Fuel Taskforce to make recommendations on measures to reduce the risk of a jet fuel shortage recurring and handling such shortages in future.

In response to these recommendations, the National Operating Committee (NOC) was established by the four major fuel suppliers to monitor and advise on potential jet fuel supply disruptions and manage supply disruptions. The NOC is comprised of representatives from AirBP, Caltex Aviation, ExxonMobil Aviation, Shell Aviation and an Independent Person. As Qantas is a self-supplier at Sydney Airport, it participates in NOC meetings where discussion on matters of relevance to the Sydney Joint User Hydrant Installation (JUHI) occurs.

The NOC prepares and distributes to key stakeholders a weekly 'Traffic Light Report' on supply availability for the coming week based on an assessment made using a six week period forecast provided by major airports in Australia, New Zealand and Fiji. The green, amber, red and black traffic lights are defined in the traffic light reports as:

●	OK with capacity to recover should a problem eventuate with planned production or ship arrival
●	Some concern but expectation that we can recover should there be a temporary problem with planned production or ship arrival. "Got a bit of slack but not much".
●	NO capacity to recover should there be a problem with planned production or ship arrival, etc. "Will just cope provided nothing goes wrong".
●	Problem identified and unable to be avoided from a Supply perspective. This issue now needs demand management and needs to be managed jointly with intimate involvement with the Aviation business.

The ideal situation for fuel supply assurance is when all supply sources are operational and delivering as normal (green light). If a situation is anticipated to reduce stocks to less than two days cover (or other critical stock level determined for a particular port); a red traffic light will be posted. Updates to Traffic Light Reports

are circulated as necessary and the NOC also undertakes an annual simulation exercise to test its communication protocols and decision-making processes.
Since the establishment of the NOC, there have been three black traffic lights and 21 red traffic lights periods posted for Sydney Airport (refer Table1).

Table 1: Jet fuel disruptions – Sydney Airport

	Number of black lights	Duration	Number of red lights	Duration
2010	**0**		**1**	15 Days (Jan)
2009	**1**	26 days (Dec, 100% rationing)	**4**	6 days (Jul/Aug) 7 days (Nov) 3 days (Dec) 2 days (Dec)
2008	**1**	5 days (Oct/Nov, 100% rationing)	**5**	8 days (Feb) 7 days (Mar) 12 days (Aug) 8 days (Oct) 7 days (Nov)
2007	**0**		**2**	unknown (Aug) unknown (Oct) *[note: traffic light reports for Aug-Dec 2007 period not available]*
2006	**0**		**8**	1 day (Jan) 4 days (Mar) 1 day (Jul) 1 day (Aug) 7 days (Oct) 15 days (Oct) 5 days (Nov) 7 days (Nov)
2005	**1**	6 days (Aug/Sep)	**2**	15 days (Jul) 15 days (Sep)
2004	**0**		**0**	
Total	**3**		**22**	

During November 2009, the JUHI undertook unplanned maintenance as a result of a tank inspection which reduced tank capacity. In December 2009, a 100% allocation black light was posted for a record period of 26 days to manage the regular uplift and warn the airlines that any further events could result in deeper rationing.

Whilst sufficient supply was maintained in the basin area surrounding the airport and there was no impact on travellers, the 'normal' transfer rate of stock into the JUHI was not sufficient to meet the increase in daily demand. On days when Vopak transfers occurred JUHI jet fuel stocks partly recovered. The use of trucking marginally assisted the supply situation. However, JUHI operational requirements and risk assessments had to be satisfied to enable truck bridging to occur.

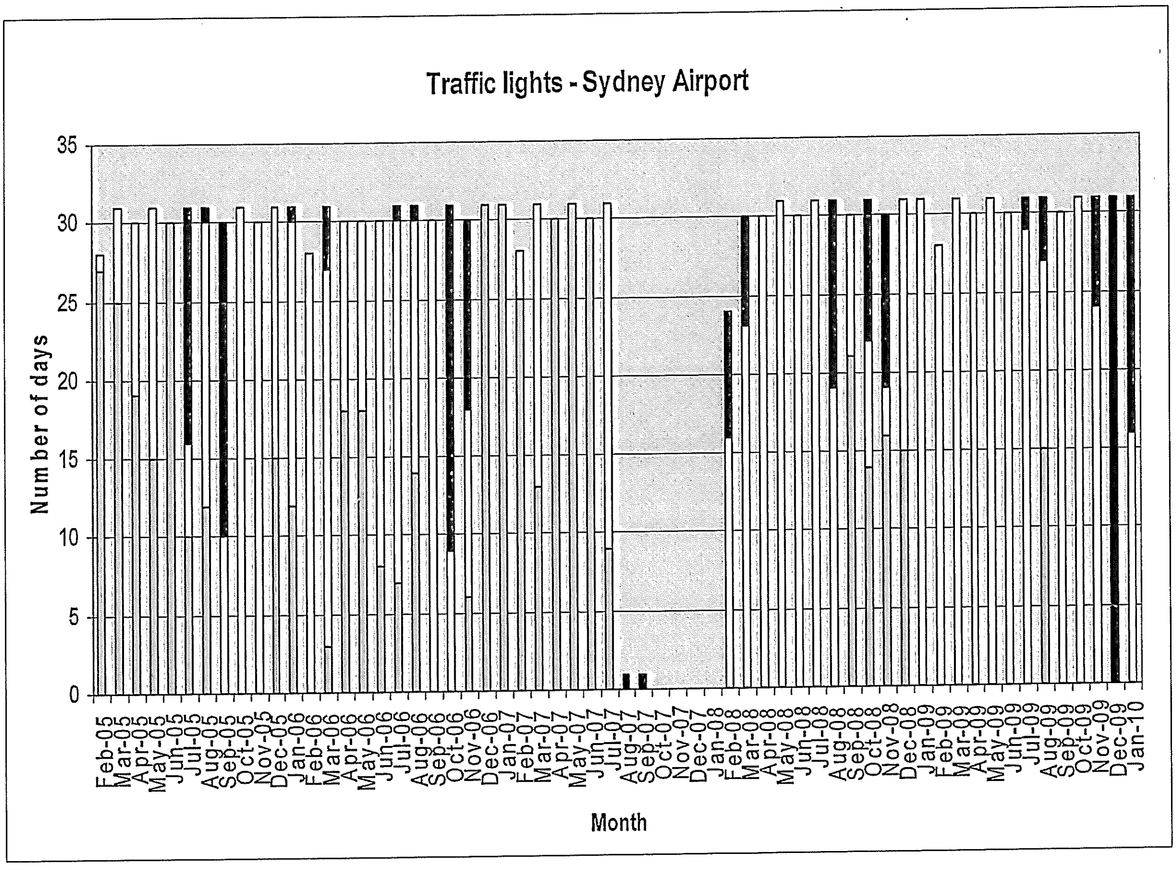
Flights were not curtailed but if uplifts of greater than 100% had been permitted, or if any malfunctions with the infrastructure or delays in importing product occurred,

deeper rationing would have been very likely. During the latter part of December 2009, when the out of service tank was commissioned, uplifts declined. JUHI stocks were rebuilt to a 2 day stock level after approximately 24 days.
The October 2008 100% allocation black light lasted for seven days as delays in pipeline maintenance work on one of the supplying pipelines resulted in JUHI stocks falling below two days cover. The black light in August/September 2005 resulted from fuel product handling issues (conductivity[1]) with imported jet fuel transferred to the JUHI.

The period of time that red lights have been posted for Sydney Airport has generally increased in recent years and, in conjunction with the black lights and more frequent amber lights, presents a concerning trend (refer Figure 1).

The most significant of the amber lights posted for Sydney was due to ongoing maintenance works at Clyde refinery throughout 2008 and its subsequent temporary shut down during November 2008 to August 2009. Whilst amber lights were posted for the majority of the latter period, jet fuel stocks at the JUHI were sufficiently maintained as Shell moved to full import mode to replace the lost local production. Amber lights were also posted during the period 1 September 2009 to 1 December 2009 whilst maintenance of two tanks occurred at the JUHI.

Figure 1: Traffic lights posted for Sydney Airport (Feb 2005 – Jan 2010)[2]



[1] Conductivity is a parameter of jet fuel specifications which refers to the fuels ability to accumulate or dissipate static charges. A Static Dissipator Additive (SDA) is used to speed up the rate at which static charge can dissipate, thereby reducing the time for which a static hazard might exist. Therefore making the fuel safer to handle. It is a well-known phenomenon for conductivity to decrease as fuel moves through the supply chain and this can require re-doping between the refinery and the airport fuelling operation.
[2] Traffic light reports for the period August 2007 to December 2007 were not available to the Secretariat.

3.2 Impact of jet fuel supply disruptions on airlines and potential flow on effects to other airports

In normal circumstances, airlines often uplift more fuel than planned to take advantage of lower fuel prices, be prepared for increased fuel use during adverse weather, or for other reasons. When the NOC posts a 100% allocation black light, suppliers restrict the amount of fuel their customers uplift in a day to the 100% contracted level and there is little impact on airlines. Generally the impact to operations is limited to airlines seeking to nominate an alternate port. The financial impact to airlines is negligible.

The declaration of deeper fuel rationing (i.e. 80 – 85% allocation) can result in the rescheduling or cancellation of flights which leads to the travelling public being inconvenienced and additional costs to airlines associated with tankering, unscheduled technical stops, reimbursement of fares and negative publicity.

When Sydney Airport faces fuel rationing, domestic airlines can uplift (tanker) extra fuel from other airports. Melbourne and Brisbane airports are generally used for flights along the Australian east coast or International flights. Tankering is very difficult and costly for airlines operating international services. The need to make a "technical stop" to secure fuel adds significantly to airline costs and is highly disruptive to airline schedules. The strategies of tankering and technical stops are discussed further in section 3.3.

3.3 Strategies used to minimise impact of jet fuel shortages at Sydney Airport

Oil suppliers and airlines have a number of strategies in place to minimise the impact of jet fuel supply shortages.

3.3.1 Additional jet fuel supply

Jet fuel suppliers have strong commercial imperatives to meet their contractual obligations, such as upholding their reputation as a reliable supplier and their ability to maintain customer relationships to retain or gain further business. However, events impacting on the ability of jet fuel suppliers to meet their commitments can occur from time to time. For example, a shipment of imported jet fuel may be delayed due to bad weather or issues at the international export port. Similarly, reduced domestic production of jet fuel may impact on supplier's capacity to meet contracts.

When a shortfall in supply eventuates suppliers will generally attempt to divert their own imports into other Australian ports, divert interstate transfers or source alternative jet fuel supply from other domestic suppliers in the first instance, as imports of jet fuel can take at least five weeks to arrive after being ordered. Suppliers with local refineries can also undertake a number of different actions to temporarily increase domestic production.

If suppliers cannot source their own product to meet their contracted sales, they can enter into a spot sale, swap or loan arrangement with another supplier. These actions are commercial matters for the supplier's supply departments and separate from the operation and management of jet fuel stocks at the JUHI facility.

3.3.2 Rationing

The NOC generally takes a conservative approach to posting traffic lights and is aware of the airlines preference for early warning of potential supply disruptions. The level of rationing will depend on the particular disruption event.

The 2003 Jet Fuel Taskforce took the view that a longer period of light rationing is to be preferred. 100% allocation can be managed for a period of time. However, just one additional problem in the supply chain can lead to deep rationing. Whilst lighter rationing over a longer period is generally preferred, there have been times where deeper rationing was encouraged by airlines to ensure the airport remained operational by maintaining sufficient reserve stock.

3.3.3 Tankering

Tankering is the practice of uplifting extra fuel on planes at an alternative airport to remove or reduce the need for uplifting fuel at the airport with fuel supply shortage. Tankering, when used, is generally only for flights that are less than about three hours duration (i.e. domestic flights), depending on the aircraft type. For example, an airline may uplift sufficient fuel at Canberra Airport for a return flight to Sydney.

Tankering is a strategy that in some circumstances can be used by Airlines to reduce fuel uplift requirements at higher fuel cost Airports (as noted in Section 3.2). Similarly, it is a strategy that in some circumstances can be safely used by Airlines to uplift less fuel at a particular airport where supply constraints apply.

3.3.4 Technical stops

In the event of a fuel supply disruption at Sydney Airport, "technical stops" are sometimes used for ultra long haul flights (>10 hours). This strategy increases total flight times and increases airline costs, such as additional landing fees, staff costs (if additional cabin or technical crew are required because of the extended flight time) and meals for passengers and crew. Wherever possible, technical stops will be made at airports along the route to the final destination. However this may not always be possible as smaller airports may not be capable of providing additional fuel over an extended period of time. In any event, technical stops result in severe disruptions to international airline schedules, and have knock on implications for other airline services.

For example, an airline reported that during one extended fuel disruption at Sydney Airport it preferred to make technical stops at Nadi for trans-Pacific flights. Whilst Nadi generally has 30 days 'normal' jet fuel demand in stock, the airline was only able to uplift from Nadi Airport for three days to supplement the up to 3 flights per day to Los Angeles. Should a Sydney Airport disruption be prolonged, the airline would have to choose a sub-optimal technical stop point to supplement its fuel requirement, for example through Brisbane, which would result in further flight time delays.

3.3.5 Type of aircraft utilised

Airlines and aircraft manufacturers have been cooperating over an extended period to ensure that each new generation of aircraft is more fuel efficient. According to the International Air Transport Association (IATA) there has been a 70% improvement in aircraft fuel efficiency in the last four decades, resulting in the fuel usage of modern aircraft averaging 3.5 litres per 100 passenger kilometres.

The A380 and the soon to be in service B787 further improve on that performance, taking the figure below 3 litres per 100 passenger kilometres. It is expected that the next generation of aircraft planned by airlines and manufacturers will result in even greater fuel efficiency. IATA expects that the planned billions of dollars of investment in new aircraft by the aviation industry worldwide will drive a 25% improvement in global fuel efficiency by 2020.

Substitution of alternate, more fuel efficient aircraft to respond to a short term jet fuel supply problem at Sydney Airport is an option that is unlikely to result in a major reduction to fuel demand. Only some airlines have sufficient aircraft to be able to re-schedule more fuel efficient aircraft on the Sydney routes and this re-scheduling could take a number of days to implement.

3.4 International jet fuel supply infrastructure models

Various models for jet fuel supply infrastructure at other international airports have developed subject to airport location, historical events and national policy. As such, no model can be referred to as "world's best practice" for jet fuel supply infrastructure ownership or third party access arrangements.

A number of models are provided below for comparison with the arrangements at Sydney Airport. Access to jet fuel infrastructure can be described as closed, limited or open:

- *Closed access* is defined as no third-party access to privately owned infrastructure.
- *Limited access* is defined as requiring participation in a joint venture owning the supply infrastructure in order to access fuel.
- *Open access* is defined as allowing all parties access to fuel through the airport fuel supply infrastructure upon payment of a throughput based fee.

Participation in jet fuel supply facility joint venture arrangements requires initial and ongoing capital investment, and acceptance of financial, maintenance, operational and environmental liabilities.

3.4.1 Hong Kong International Airport, Hong Kong

The on-airport jet fuel storage infrastructure at Hong Kong Airport is owned by the Airport authority (which is Government-owned) and is fed by the pipeline from Sha Chau Island. Product is supplied by barge into Sha Chau Island from storage at Tsing Yi (owned by oil companies) and from storage or refineries in South China. Eleven suppliers are presently in the jet fuel supply market, for which demand is estimated to be approximately 6.5 billion litres per annum.

From 30 March 2010, a new off-airport storage terminal (PAFF stage 1a 140,000 m^3) commenced operation, with supply by pipeline from PAFF to on-airport storage (via pipeline to existing pipeline at Sha Chau). During stage 1a, supply to on-airport storage will be from both PAFF and by barge via Sha Chau. Once PAFF stage 1b is completed (264,000m^3), supply via Sha Chau will be de-commissioned and all supply to on-airport storage will be from this new facility [via a new pipeline]. The PAFF storage terminal will provide open access to suppliers for bulk jet fuel imports into this terminal and for transfer via pipeline to the on-airport storage facility. The supplier must demonstrate it holds current supply contracts with airlines operating out of Hong Kong International Airport. Airlines can supply fuel for their own consumption.

3.4.2 Heathrow Airport, United Kingdom

The jet fuel supply and storage infrastructure at Heathrow Airport is owned by two separate joint venture companies. The Heathrow Hydrant Operating Company (HAPCO) owns and operates the hydrant system and the Heathrow Fuel Company (HAFCO) owns and operates the on-airport jet fuel storage terminal. The HAFCO on-airport terminal is fed by three pipelines, trucking and railway carts which originate from oil company owned refineries or storage terminals.

Both joint venture companies comprise oil companies. HAPCO includes an airline. Access to the infrastructure is available, but is dependent on participation in the joint venture (defined above as limited access). There are currently seven suppliers in the jet fuel supply market, for which demand is approximately 7.5 to 8 billion litres per annum.

3.4.3 Los Angeles Airport, United States of America

Access to on-airport jet fuel supply infrastructure is available to LAXFUEL affiliated companies through participation in the LAXFUEL consortia at agreed rates or via a (higher) published rate ('rack rate') charged to non-members. LAXFUEL members include airlines. Operation and management of the infrastructure is outsourced to experienced contractors, usually third party infrastructure companies such as in this case, Aircraft Service International Group (ASIG) [3], who own and operate the mobile equipment and provide service for a fee.

The on-airport jet fuel storage terminal is fed by four pipelines, three from oil company refineries and one from a common user storage terminal. Up to 25 suppliers use the system for which annual demand is approximately 5.5 to 6 billion litres.

3.4.4 Sydney Airport, Australia

The jet fuel infrastructure at Sydney Airport comprises an unincorporated joint venture managed on-airport storage facility and hydrant system. The on-airport storage facility is fed by two privately (oil company) owned pipelines. Trucking of limited amounts can also occur from time to time to supplement on-airport stocks.

The Caltex owned pipeline supplying the on-airport storage facility is connected to the Kurnell refinery, a major common-user import terminal (Vopak) and a small private terminal (ExxonMobil). Third party access to this pipeline is allowed for a contracted number of days per month.

The Shell pipeline to the on-airport storage facility is connected to the Clyde refinery and is predominantly used to transfer Clyde jet fuel production to the on-airport storage facility.

Five suppliers are presently in the Sydney Airport jet fuel supply market, for which demand is approximately 2.4 billion litres per annum. Further detail on the current arrangements to supply jet fuel to customers at Sydney Airport is provided in Chapter 4 (*Existing jet fuel supply infrastructure and logistics arrangements in Sydney*).

[3] Information on ASIG is available at: http://www.asig.com/index.shtml.

3.5 Capability criteria for Sydney Airport

To assess the current level of jet fuel supply assurance at Sydney Airport and to consider the adequacy of proposed options for action, the working group has developed ideal multi-dimensional capability criteria (table 2 refers).

Table 2: Capability criteria

Capability criteria	Target level
Jet fuel stock on hand at Sydney Airport	Minimum 2 days daily demand (if on-airport storage is available)
Jet fuel stock on hand in Sydney basin area	Minimum 5 days daily demand; operational target 10 days 'typical' daily demand
Replenishment rate of supplying infrastructure	1.2 times daily demand

Whilst the capability criteria provide target levels, the criteria itself does not represent a guarantee that sufficient jet fuel will be available all the time.

4. EXISTING JET FUEL SUPPLY INFRASTRUCTURE AND LOGISTICS ARRANGEMENTS IN SYDNEY

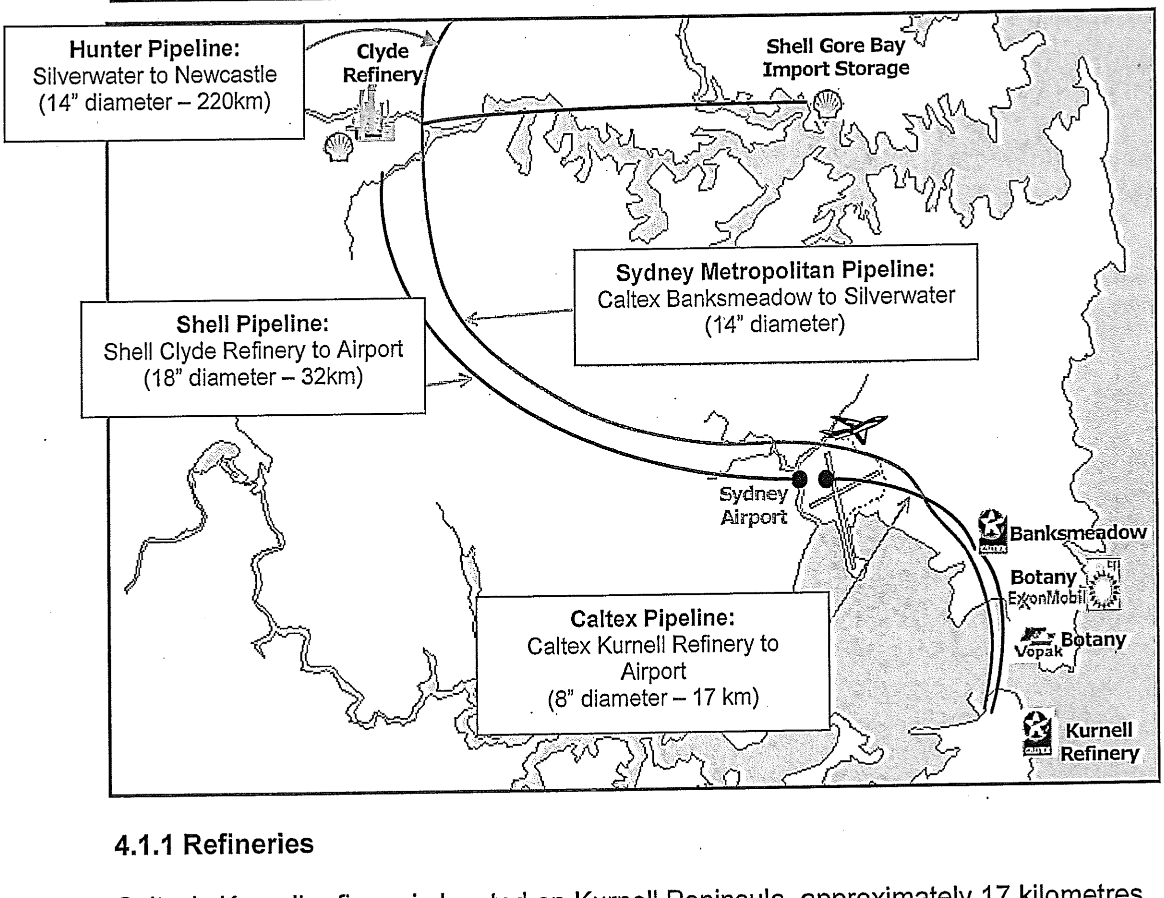
4.1 Jet fuel infrastructure to Sydney Airport

The basin area surrounding Sydney Airport contains significant infrastructure to supply jet fuel to the airport. Since 2003, investment in jet fuel supply infrastructure has doubled the amount of storage capacity in the basin area around Sydney Airport to 196ML.

The Sydney Airport Joint User Hydrant Installation (JUHI) facility is fed by two privately owned pipelines – the Shell pipeline from the Clyde refinery and the Caltex pipeline from the Kurnell refinery.

Figure 2 shows the location and jet fuel storage capacity at each supply point in the basin area.

Figure 2 – Jet fuel supply infrastructure in Sydney basin area[4]



4.1.1 Refineries

Caltex's Kurnell refinery is located on Kurnell Peninsula, approximately 17 kilometres south east of Sydney Airport. The refinery receives crude oil feedstock through the Kurnell No 3 crude berth. Crude oil is processed at the refinery to produce a range of petroleum products including jet fuel. The refinery can also receive imported finished product including jet fuel through the No 1 and No 2 product berths located on the Kurnell Wharf. Jet fuel produced at Kurnell refinery or imported jet fuel is stored on-site at Kurnell prior to being transferred via the Caltex pipeline to the Sydney JUHI for

[4] Diagram provided by The Shell Company of Australia (as Sydney Airport JUHI operator).

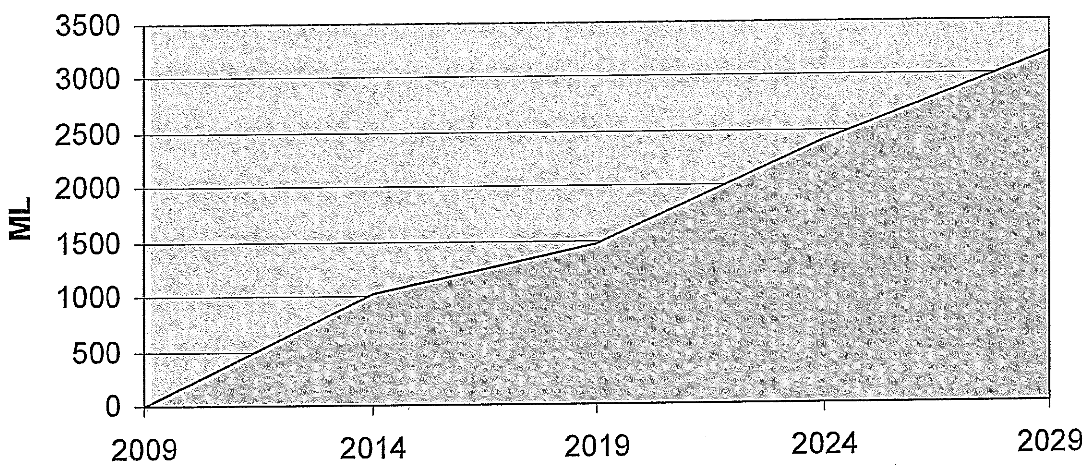
use at Sydney Airport or to the Caltex Banksmeadow terminal where it can be transferred (via trucks) for use at Canberra Airport. Jet fuel is also transferred via the Sydney Metropolitan Pipeline (SMP) and the Hunter and Newcastle Pipelines to the Caltex storage facility in Newcastle for use at Williamtown Airport. The Newcastle facility was recently used to supply Canberra in order to free up time on the Caltex pipeline for deliveries to Sydney Airport.

Shell's Clyde refinery is located where the Parramatta and Duck Rivers join, 16km west of Sydney's CBD and 32 km north-west of Sydney Airport. The refinery receives its feedstock via its twin-berth Gore Bay terminal, which is also capable of receiving imports of finished products. Jet fuel produced at Clyde refinery, and imported via Gore Bay, is transferred to the Sydney JUHI via Shell's pipeline for use at Sydney Airport.

Current and future production from the Shell and Caltex refineries in Sydney is commercial-in-confidence, therefore the Working Group is unable to address Terms of Reference 2(b) and 2(c). However, it is reasonable to assume that local refinery production is unlikely to increase materially and that all growth in airport jet fuel demand will be met by imports.

Therefore, this report assumes no material changes to Sydney area refinery production in the period to 2029. On this basis and with the assumption that existing import levels will be no less than those for 2009, Figure 3 illustrates the amount of additional jet fuel imports required to meet projected annual jet fuel demand at Sydney Airport.

Figure 3: Projected net additional jet fuel imports



4.1.2 Import terminals

The only common-user bulk liquids berth in NSW is available at Port Botany on the northern side of Botany Bay, approximately 9km from Sydney Airport (refer map, Appendix B). The berth is owned and managed by Sydney Ports Corporation and handles imports of hazardous and non-hazardous bulk liquids and gases which are transferred by pipeline to nearby storage and distribution facilities. Some export of bulk liquids products also occurs through the berth.

The main product groups handled at the bulk liquids berth are petroleum products (petroleum, diesel, naphtha and jet fuel), hydrocarbons (LPG) and chemical products (organic chemicals, solvents and caustic soda). The land in the immediate vicinity of the bulk liquids berth is also owned by Sydney Ports and is leased to a number of parties for use as bulk liquids storage facilities.

Capacity for bulk liquids servicing at Port Botany is affected by berth utilisation at the bulk liquids berth and land supply for tank storage. As at March 2010, average berth utilisation for the preceding 12 months was 60%, fluctuating between monthly utilisations of 43% and 80%. Sydney Ports Corporation has advised that an average berth utilisation of 65% is a practical and economic working limit for a bulk liquids berth. Higher utilisation creates the potential for increasing demurrage costs (i.e. costs associated with ships waiting for berth access).

With the demand for bulk liquids imports through Port Botany increasing over recent years, and forecast to increase into the future, planning approval to construct a second bulk liquids berth at Port Botany to the south of the existing bulk liquids berth was secured in 2008. Since this time Sydney Ports has been progressing with the design and development of the construction methodology for the second bulk liquids berth. It is estimated that the earliest the second berth would be operational is in late 2012. At the present time, land is available in the Port Botany bulk liquids precinct to cater for additional tank storage.

The majority of jet fuel imports into Sydney are handled by Vopak through the bulk liquids berth at Port Botany. Vopak owns and operates a petroleum product storage facility in Port Botany on land leased from Sydney Ports. Currently 91ML of the total 350ML storage capacity is used for jet fuel. Jet fuel from Vopak is transferred to the Sydney JUHI facility via the Caltex-owned pipeline from Kurnell peninsula in accordance with the supplier's pipeline access agreements with Caltex. Vopak recently increased the pumping capacity from 5.7ML per day to 7.9ML per day. Vopak advised the Working Group that its storage facility has sufficient space to install additional pipelines and sufficient storage tanks to cater for increased imports from the second bulk liquid berth.

The ExxonMobil terminal in Botany, which is jointly owned by ExxonMobil and BP, has import access via the Sydney Port Corporation's bulk liquids berth. Jet fuel storage capacity at the ExxonMobil terminal totals 18ML.

4.1.3 Pipelines

There are four supply points which utilise the two privately owned pipelines to the Sydney JUHI facility. Table 3 provides a summary of the pipeline throughput rates for each supply point.

Table 3: Sydney basin jet fuel supply pipelines - throughput rates

Pipeline to Sydney JUHI	Maximum daily throughput
Shell (ex Clyde refinery)	3.9 ML
Caltex (ex Kurnell refinery) *	5.0 ML
Caltex (ex Vopak) *	7.9 ML
Caltex (ex Mobil Botany *	4.8 ML

* Caltex pipeline throughput rates are not cumulative

The Shell pipeline is approximately 200mm (8 inches) in diameter and 32 km long with a capability of transferring a maximum of 3.9ML per day into the JUHI. The Shell pipeline is currently utilised at a rate of 56%.

The Caltex pipeline is 17 km long and capable of transferring 5.0ML per day from Kurnell to the JUHI. The pipeline is predominately 254mm (10 inch) diameter between Kurnell to Botany and 200mm (8 inch) from Botany to the JUHI. Caltex has recently completed stage one of an upgrade program to raise the pressure rating of the line and installation of high capacity line filters at the JUHI. This resulted in the maximum transfer rate of jet fuel from the Kurnell refinery increasing to 5.0ML per day. At the same time as the Caltex stage one upgrade, Vopak upgraded its six pumps at the Vopak facility.

The Caltex pipeline also incorporates links from the Vopak and ExxonMobil terminals at Port Botany. Following the recent upgrade the Caltex pipeline is capable of transferring up to 7.9ML per day but only from the Vopak facility. The ExxonMobil terminal is capable of transferring 4.8ML per day to the JUHI via the Caltex pipeline.[5]

A second upgrade to the Caltex pipeline, which will result in an increased pumping rate from the Kurnell refinery of up to 9ML to 10ML per day, is planned for completion in late 2011. To maximise throughput over the entire pipeline, an upgrade to the Vopak pumps would need to be considered by Vopak. The Working Group has been advised that Caltex's Board recently approved the second phase upgrade, which could be completed by late 2011. Vopak advised the Working Group that it is in a position to further upgrade its pipeline subject to customer approval. The Vopak upgrade could result in an increased pumping capacity of 10ML per day from the Vopak storage facility to Sydney Airport, within the next six to twelve months.

The Caltex and Shell pipelines can be used simultaneously to transfer jet fuel into the JUHI. However, only one of the options to pump fuel using the Caltex pipeline (ie: from Kurnell refinery or Vopak or Mobil Botany) can be utilised at any particular point in time. The scheduling of jet fuel transfers within the Caltex pipeline is Caltex's responsibility and is done in accordance with its pipeline access agreements with the parties involved. The agreements currently allow third parties to utilise the pipeline for approximately a total of five days per month. Negotiations to renew arrangements following the increased pumping capacity from Vopak facility are underway. The net effect for the Vopak jet fuel customers will be a function of flow rates and access agreements.

4.1.4 Other supply infrastructure

Trucking of fuel into the Sydney Airport JUHI is possible, but not normally undertaken. The critical supply situation in December 2009 warranted this additional supply method and was successfully utilised to supplement the flow of jet fuel into the JUHI by approximately 200,000 L (0.2ML) per day.

Trucking significantly increases traffic congestion around the immediate JUHI area. It also increases safety risks at JUHI. Trucking is not a total solution to the bottleneck in transporting fuel from off-airport storage facilities to Sydney Airport, but can provide incremental supply in the short to medium term or under special or emergency supply conditions.

[5] NOC Chair presentation to Minister Ferguson, 11 January 2010.

4.2 Jet fuel infrastructure at Sydney Airport

4.2.1 Joint User Hydrant Installation (JUHI) facility

The Sydney Airport JUHI is an unincorporated joint venture, with one joint venture agreement covering the storage facilities and international and domestic hydrants. The JUHI is located at the northern end of the International Precinct and contains five jet fuel storage tanks with a maximum capacity of 30ML. A map showing the location of the JUHI facility on the Sydney Airport site is provided at Appendix C.

Shell Australia operates and manages developments of the facility on behalf of the joint venture participants. Component A (Storage + International Hydrant) of the joint venture comprises BP, Caltex, Chevron, ExxonMobil, Shell and Qantas. Component A, B and C comprises BP, Caltex, Exxon, Shell and Qantas (component B and C refers to the Domestic Hydrant).

The maximum operational (useable) capacity is approximately 21.2ML, with optimal operating capacity between 18ML and 19ML. Tankage is reserved to provide separation of fuel receipt and dispatch to the hydrant system as part of the fuel quality control procedures The JUHI storage facilities began operating 24 hours, seven days a week in August 2006. The JUHI storage facility is not intended for blending additives or other components into jet fuel or receiving frequent large volumes of road delivery of jet fuel.

4.2.2 Sydney Airport hydrant system

Jet fuel is distributed across the Airport from the JUHI storage facility, via a number of underground pipelines, to apron hydrant outlets located adjacent to aircraft gates. A number of the General Aviation[6] (GA) and helicopter operators have small refuelling storage facilities and equipment located in close proximity to their main facilities, either operated by the oil companies or by the operators themselves. Qantas also has onsite storage at the Jet Base which currently has one 170KL tank operational.[7]

The hydrant system feeds into the international terminal, domestic terminals and freight bays, and consists of 10 hydrant pumps with each having a maximum throughput capacity of 3800 litres per minute. The hydrant pipelines vary in size from 600mm to 100mm (refer Appendix D).

The hydrant system has expanded in accordance with the number of new bays installed at the airport and the joint venture participants believe that infrastructure is adequate to meet current customer demand. In the short term, Sydney Airport proposes to develop a number of apron expansions adjacent to and remote from the International and Domestic terminals. Traditionally, remote apron sites have not been equipped with hydrant fuel as the positions are mainly used to overlay aircraft. With increasing aircraft parking demand and the need to maximise flexibility, this situation is changing with a number of the proposed remote apron positions now requiring the provision of hydrant fuel so as to enable aircraft to be turned around during the peak hour periods. With the expansion of aircraft aprons in areas currently not serviced by hydrant fuel, the capacity of the hydrant system and solutions which deliver a cost effective expansion of such infrastructure will continue

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[6] "General Aviation" refers to premium corporate business jets, RAAF VIP aircraft and other private aircraft.
[7] Sydney Airport Corporation Limited (SACL), *2009 Sydney Airport Master Plan*, p79.

to receive focus. The issue of hydrant extensions is a matter for SACL and the JUHI joint venture participants to negotiate suitable arrangements as has occurred in the past.
'Into-plane' dispensing is undertaken directly by the fuel companies or by other entities established by the oil companies and other providers. Specialist hydrant refuelling vehicles are used for this task and administrative and maintenance support for refuelling vehicles is accommodated as part of the JUHI facility.[8]

Bulk tanker vehicles are used for the fuelling of regional and GA aircraft and helicopters where hydrant access is not available. These mobile tankers and dispensers are parked at a number of locations on the airport in close proximity to aircraft aprons and receive maintenance and servicing at the JUHI facility.[9]

4.3 Market arrangements for jet fuel supply

4.3.1 Key suppliers and third party access arrangements for privately owned infrastructure

As previously discussed in chapter 3, the current jet fuel suppliers for Sydney Airport are Caltex, Shell, BP, ExxonMobil and Qantas. The two pipelines to the Sydney JUHI are privately owned by Caltex and Shell, and third party suppliers must negotiate pipeline access arrangements with the relevant infrastructure owners.

Currently only the JUHI members supply jet fuel to customers at Sydney Airport. However, new participants can apply to the JUHI joint venture participants to negotiate access to the JUHI infrastructure and negotiate access to the privately owned pipeline infrastructure (e.g: on a throughput basis).

Shell and Qantas/Q8 Aviation have negotiated storage and pipeline access arrangements with Vopak to enable them to import jet fuel via Port Botany, in addition to negotiating pipeline access agreements with Caltex. BP and ExxonMobil also have pipeline access agreements with Caltex to allow them to transfer product from the ExxonMobil Botany storage terminal to JUHI. In total, third party access to the Caltex pipeline is currently allowed for approximately five days per month. It has been difficult for the third party users to maintain or increase their volume on the Caltex pipeline, due to Caltex's increasing use of their pipeline capacity for their own jet fuel transfers to the JUHI.

The Shell pipeline is currently primarily used to transfer Shell's jet fuel production from the Clyde refinery, supplemented with imports, to the Sydney JUHI facility. Shell can direct imports of jet fuel via its Gore Bay terminal, which is connected via a multi product pipeline to the Clyde refinery. However, this supply route is only used to supplement local jet fuel production and on a scheduled basis due to costs, potential impacts to the refinery operations and additional risks associated with maintaining jet fuel specification when the product is transported through the multi-product pipeline and transferred into, and through, the Clyde-JUHI pipeline.

[8] SACL, ibid.
[9] SACL, ibid.

4.3.2 Inventory ownership management arrangements for JUHI stock levels

Shell, as the JUHI operator, manages the Sydney JUHI facility on behalf of the joint venture parties and is responsible for oversight and management of the inventory ownership management arrangements. The joint venture principle is that each supplier's fuel off-take is balanced against its supply transfers.

Each supplier is allocated a percentage of the total storage capacity and each supplier is required to nominate a target level for its end-of-month stockholding. Suppliers must advise the JUHI manager on a monthly basis of the amount of jet fuel it intends to transfer into JUHI to meet its own demand. Suppliers also provide the JUHI manager with weekly updates to the transfer schedule.

The JUHI manager uses the monthly and weekly updates to forecast the end of month stock level for each supplier and provides feedback to suppliers on the impact of changes to its transfer schedule. The JUHI manager can make recommendations to the suppliers in relation to increasing or decreasing the amount of transfers during the month to assist them to meet their end-of-month target but does not have authority to enforce the recommended action. Should escalation of an issue be required this would be taken to a JUHI OPCOM (Operating Committee) for review and decision. At the end of the month, the JUHI manager transfers the balance of stocks to the start of the next month.

The joint venture participants are independently responsible for supply, sales and deliveries of jet fuel. If suppliers cannot meet their projected transfer schedule and end of month balance, it is the responsibility of the individual supplier to source additional jet fuel from other suppliers. Suppliers buy and sell jet fuel from each other from time to time to ensure they satisfy their contractual commitments.

5. PROJECTED JET FUEL DEMAND AT SYDNEY AIRPORT IN 2014, 2019, 2024 AND 2029

A number of publications[10] provide projections for the number of aircraft movements and passenger numbers in the short, medium and long term. The annual and representative busy day forecasts were compiled by an independent consultant for the Sydney Airport Master Plan 2009 with the plan including a projection for aircraft departures for a typical busy day in 2014, 2019, 2024 and 2029.

In addition, an independent peer review of the forecast methodology was undertaken as part of the master planning process. These forecasts represent the best available information on forecast aircraft movements and provide a firm basis to calculate future jet fuel demand.

For the purposes of this report the Working Group developed its own model to project jet fuel demand over the period to 2029 based on the Sydney Airport Master Plan data. The methodology and key assumptions for the projection model are described in section 5.1 below.

The Working Group projections have an accuracy of +/- 10%, which is sufficient to identify critical limits in regard to jet fuel supply to Sydney Airport using existing and potential future infrastructure and required onsite storage. The 2014 average jet fuel consumption projections have a higher degree of certainty compared with the projections for 2019, 2024 and 2029. As the projections for these out-years have a higher degree of uncertainty because of possible variations in the key assumptions upon which the forecasts were based, it is recommended that these projections are updated on a five-yearly basis, following the approval of future Sydney Airport Master Plans.

5.1 Methodology and key assumptions

The jet fuel demand projections are based upon the following assumptions:

- Aircraft type and destination ports for a typical busy day in 2014, 2019, 2024 and 2029 and the busy day to average day ratios for each 5 year period, in accordance with the *2009 Sydney Airport Master Plan* projections;
- Fuel consumption efficiency improvements based on estimates for new aircraft technology (calculations based on manufacturer's base data for different aircraft types);
- QANTAS experience of tankering;
- Uplift figures for international flights to European destinations calculated using an average midpoint assumption (i.e. Bangkok/Singapore); and
- The jet fuel consumption pattern (low, average, busy day ranges) for the full year in 2014, 2019, 2024 and 2029 derived by applying the 2007 actual consumption pattern/profile (the 2007 travel pattern/profile is believed to be more typical than that in 2009 which was affected by the global financial crisis (GFC)).

[10] 2009 *Sydney Airport Master Plan*; 2009 *Aviation White Paper;* 2008 Bureau of Infrastructure, Transport and Regional Economics Working Paper 72, *Air passenger movements through capital city airports to 2025–26.*

The modelling did not take account of flight path efficiency or Required Navigation Performance (RNP) and differential in jet fuel pricing remains precisely the same.

The *2009 Sydney Airport Master Plan* projections were published prior to the GFC and, therefore, potentially have a higher base compared to a forecast that may take the GFC into account. The Working Group noted that over the longer term travel levels are likely to return to the average growth levels projected by the Sydney Airport Master Plan. Further detail on the assumptions used to estimate the peak and trough pattern within the out-years is provided in section 5.3.

5.2 Projected annual and daily demand for 2014, 2019, 2024 and 2029

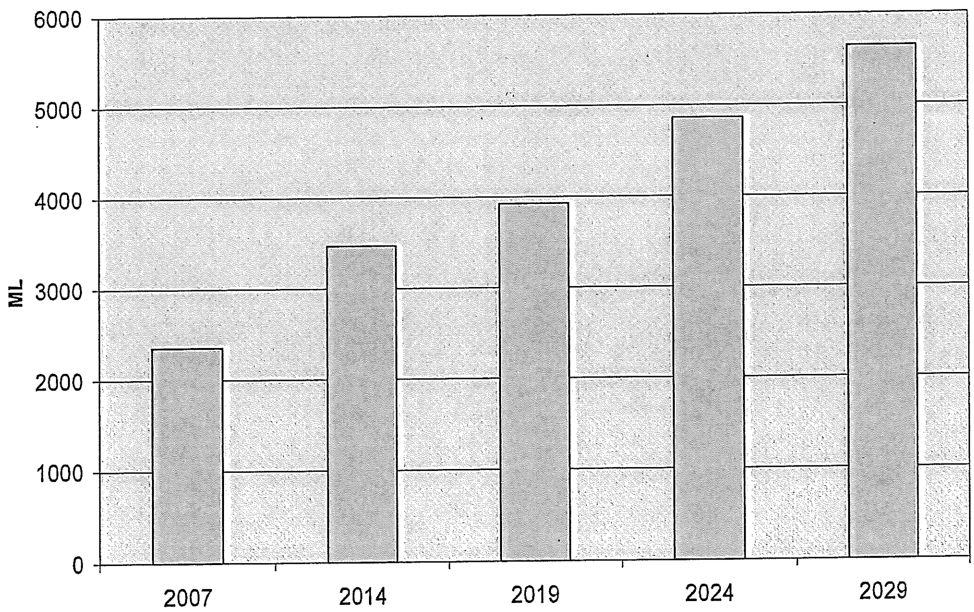
The annual jet fuel demand at Sydney Airport is projected to increase from 2450 million litres (ML) in 2009 to 5644ML in 2029 (refer Table 4). This represents an average 4.2% growth rate per annum year-on-year over the twenty year period.

The 7.22% growth from 2009 to 2014 is significant and attributable to the assumption that larger capacity aircraft (such as A380s) are increasingly used for international flights. From 2014, the 5-year growth rate moderates to between 2.49% – 4.38% over the next three 5-year periods.

Table 4: Jet fuel demand projections – annual (ML)

	Estimated annual demand	% increase over prior 5 years	Year-on-year % increase 2009 - 2029	Year-on-year % increase 2014 - 2029
2007	**2357**			
2009	**2450**		4.26	
2014	**3472**	7.22		3.29
2019	**3926**	2.49		
2024	**4864**	4.38		
2029	**5644**	3.02		

Figure 4: Annual jet fuel demand projections



The daily jet fuel demand and duration of busy day periods is critical to assessing the adequacy of pipeline supply rates to Sydney Airport and the on-airport fuel storage. Jet fuel demand is met by the combination of on site storage capacity and the pipeline supply rates to replenish stock.

The growth rate for daily demand is similarly projected to be, on average, 4.2% per annum over the twenty year period to 2029 (refer Table 5), with the growth rate in 2014 peaking at 7.23% before moderating to 2.49% – 4.38% for each forward 5-year period. Figure 5 shows the projected busy day and estimated daily demand figures, which have been calculated from the total annual demand figure for each year.

Table 5: Jet fuel demand projections – daily (ML)

	Projected 'busy' day demand	Estimated daily demand	% increase over prior 5 years	Year-on-year % increase 2009 - 2029	Year-on-year % increase 2014 - 2029
2007	6.46	**6.46**			
2009	6.71	**6.71**		4.26	
2014	10.45	**9.51**	7.23		3.29
2019	11.82	**10.76**	2.49		
2024	14.25	**13.33**	4.38		
2029	16.30	**15.46**	3.02		

Figure 5: Daily jet fuel demand projections

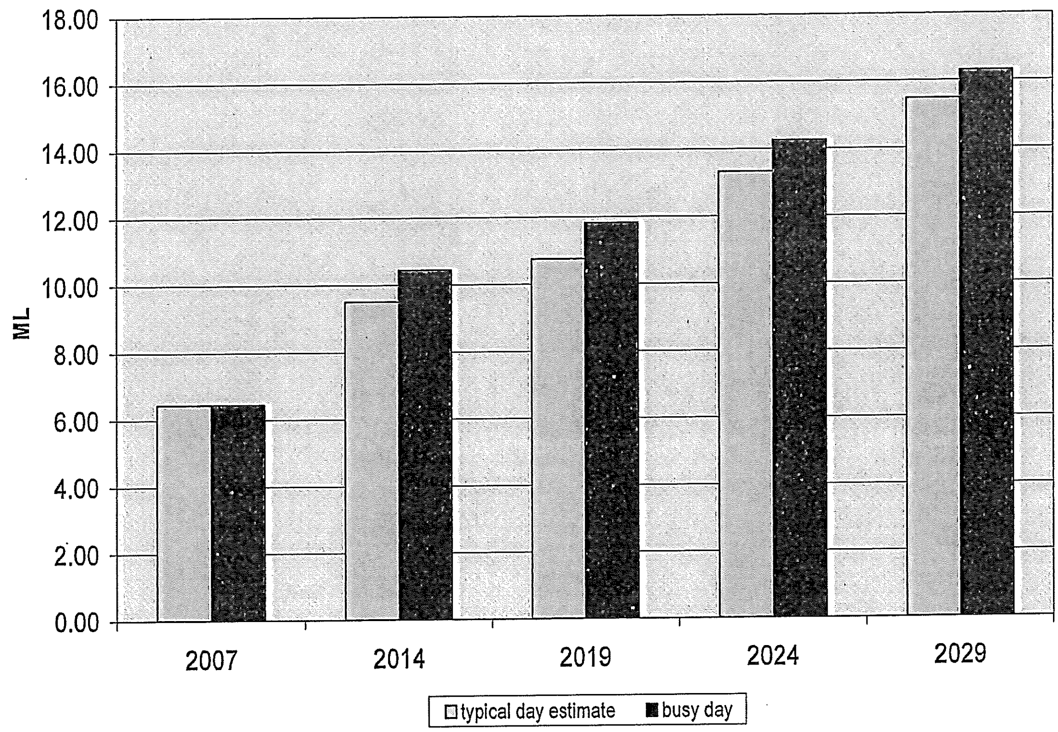


Figure 6 models the jet fuel requirement in 15 minute blocks throughout the typical busy days in 2014, 2019, 2024 and 2029. Figure 7 models the jet fuel requirements in hourly blocks throughout the typical busy days in 2014, 2019, 2024 and 2029.

An assessment of the adequacy of the existing hydrant system at Sydney Airport to meet the projected intra-day demand for jet fuel is discussed in chapter 6.

Figure 6: Intra-day demand for typical busy day (15 minute basis)

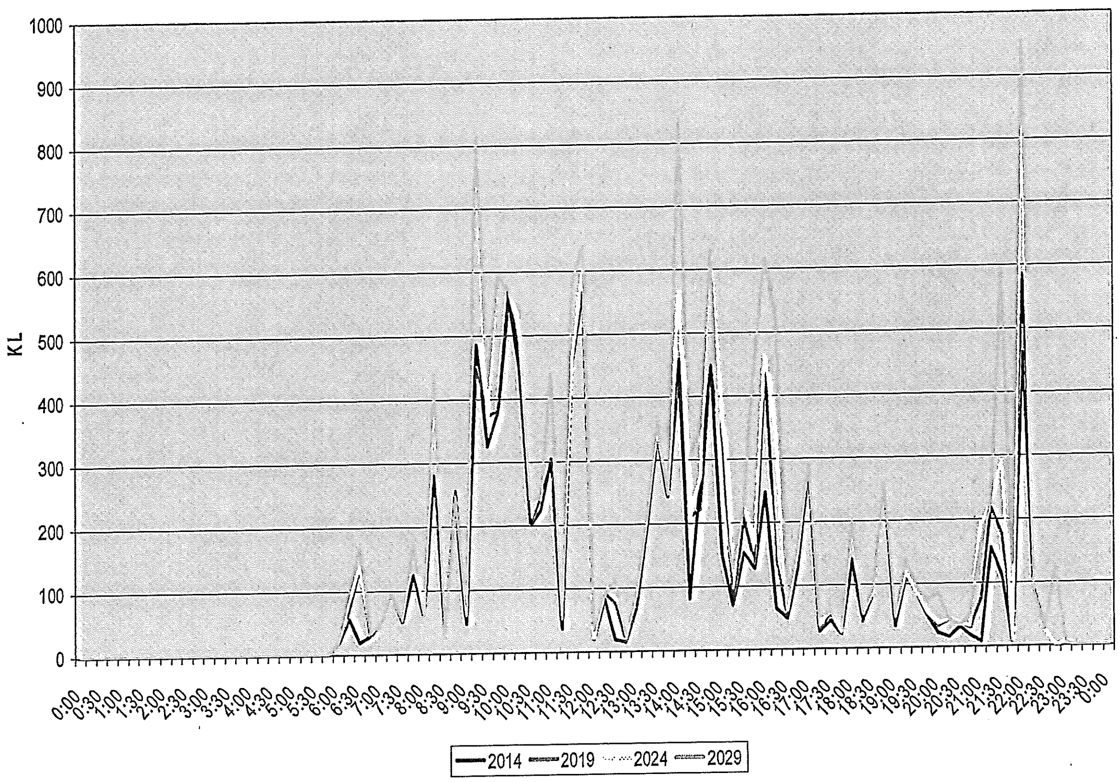
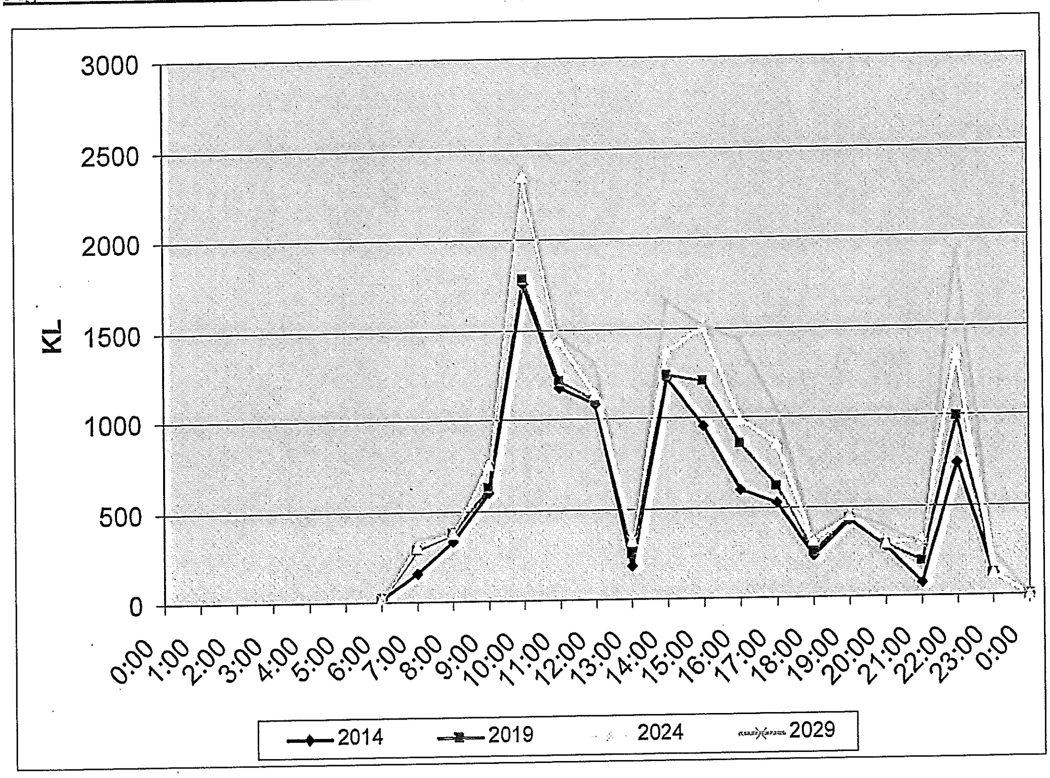


Figure 7: Intra-day demand for typical busy day (hourly basis)



5.3 Peak period profiles for 2014, 2019, 2024 and 2029

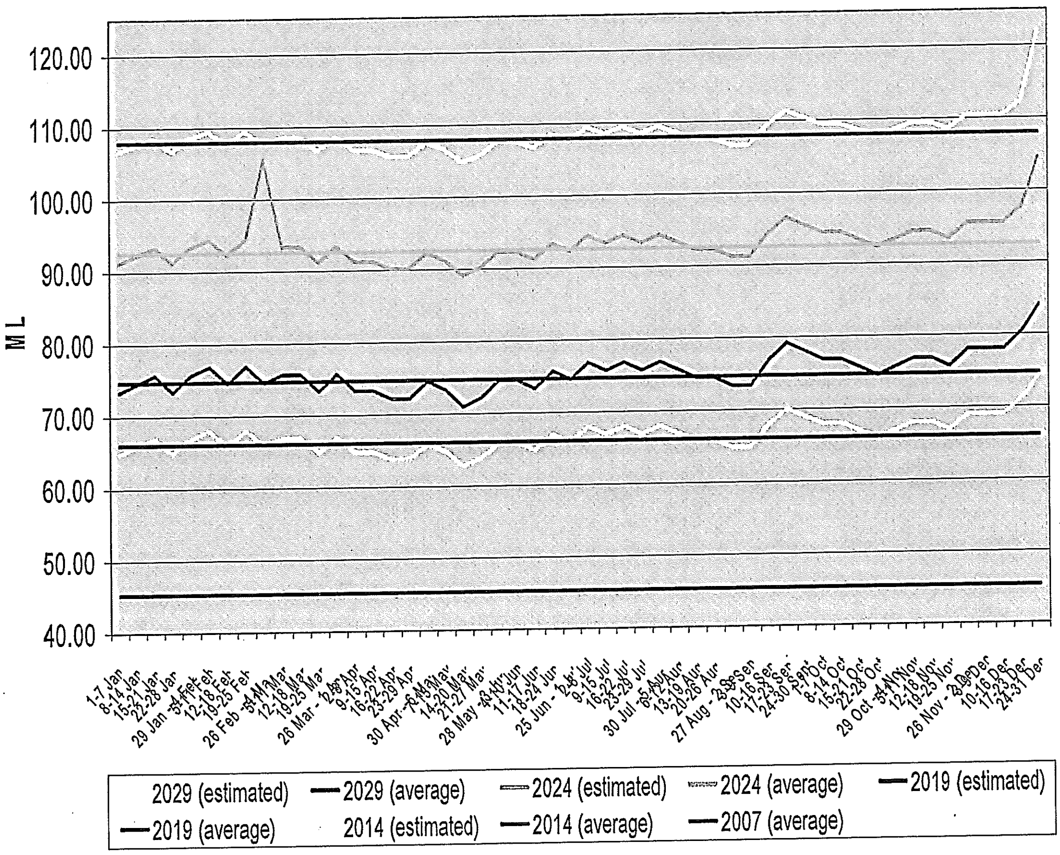
The peak period profiles for prolonged busy periods in future years were determined by applying the derived 'low', 'average' and 'busy' demand day profile in 2007 directly to 2014, 2019, 2024 and 2029.

Figure 8 shows the projected weekly demand for jet fuel in comparison with the average weekly demand for each year. The above average demand weeks cluster around February/March, July, September, and November/December, which respectively reflect the Easter long weekend period; the coinciding NSW, Victoria and Queensland school holiday periods; and the Christmas and New Year season.

As 2024 is a leap year, the week commencing 28 February is an eight day week for the purposes of the modelling and therefore shows an extraordinary spike in demand.

Extended peak jet fuel demand periods place the greatest stress on the Sydney Airport jet fuel supply infrastructure. The adequacy of the existing infrastructure at Sydney Airport to meet the projected demand for jet fuel is discussed in chapter 6.

<u>Figure 8: Weekly jet fuel demand profile for 2014, 2019, 2024 and 2029</u>



6. ADEQUACY OF EXISTING INFRASTRUCTURE AND ARRANGEMENTS TO MEET PROJECTED JET FUEL DEMAND

This chapter provides an assessment of the adequacy of the existing infrastructure to meet the projected demand for jet fuel at Sydney Airport in the short, medium and long term.

For the purposes of this chapter, the 'typical' daily demand figures for the out-years were calculated by using the full year average of the estimated daily jet fuel demand data in Chapter 5 and adding one standard deviation (based on full year data). The results are shown in Table 6.

Table 6: Typical daily demand figures

	2014	2019	2024	2029
'Normal' daily demand (ML/day)	9.51	10.76	13.29	15.46
Standard Deviation (ML/day)	0.57	0.64	0.58	0.50
Typical Daily Demand (ML/day)	**10.08**	**11.40**	**13.87**	**15.97**

The adequacy of the infrastructure was then compared with the capability criteria outlined in section 3.5, which includes targets for preferred on-airport stock holding (a minimum of 2 days typical demand), off-airport storage capacity (minimum 5 days typical demand) and replenishment rate to re-stock on-airport storage (1.2 times typical demand).[11]

6.1 Physical capacity constraints

6.1.1 On-airport storage

As noted in chapter 4, the maximum operational (useable) storage capacity of the on-site JUHI is 21.2ML and the optimal operational storage level is approximately 19ML. The JUHI stock levels at a given time depend on the supplier's transfer schedules and the uplift rate.

Whilst fluctuations occur throughout the day, the JUHI aims to have a minimum of two days demand stock level each day prior to commencement of fuelling hours, with the preferred level being stock holding above two days demand. Table 7 illustrates the future storage capacity requirements to meet the operational minimum and preferred stock levels.

Table 7: Adequacy of existing on-airport storage capacity

		2014	2019	2024	2029
Normal	Minimum Stock Holding (2 days)	19.02	21.51	26.58	30.92
Typical	Minimum Stock Holding (2 days)	20.15	22.79	27.73	31.93

Legend

- (white box) Daily demand is between JUHI optimal operational stock on hand and maximum (useable) storage capacity.
- (shaded box) Daily demand exceeds JUHI maximum (useable) capacity.

[11] Note, the stock holding figures above are expressed as minimum stock holding figures, in this instance the 2 days on airport minimum represents the typical trigger point (at Sydney) for posting a Red traffic light. Hence the average stock holding will be maintained well above these "minimum" figures, particularly the "stock off airport" figure.

The above figures indicate that the current storage capacity is capable of storing the minimum stock holding of two day's demand only until the end of 2014, based upon the predicted demand.

6.1.2 Off-airport storage

As discussed in chapter 4, total off-airport storage for jet fuel at the Clyde refinery, Kurnell refinery, Vopak facility and ExxonMobil terminal currently totals 196ML. Table 8 shows the storage capacity as equivalent number of days stock holding.

Table 8: Adequacy of existing off-airport storage capacity

	2014	2019	2024	2029
Typical Daily Demand (ML/day)	10.08	11.40	13.87	15.97
Stock holding (number of days)	19.4	17.2	14.1	12.3

Based on the theoretical maximum off-airport storage of 196ML, the above figures indicate that there will be sufficient off-airport storage capacity in the Sydney Airport basin area to meet the minimum (5 days) and operational (10 days) targets for off-airport storage in the long term.

The Working Group acknowledges that each of the current suppliers has their own internal targets for minimum and average stock days and will manage their delivery schedules within these guidelines. Therefore, stock holding within refineries and import facilities will oscillate between maximum and minimum levels as product is drawn down to make room for the next import or batch of refinery production. As demand increases, individual suppliers will need to consider investment in more storage to maintain their target minimum and average stock days.

6.1.3 Replenishment rate of existing supply infrastructure

Using the optimal configuration of the Shell pipeline and transfers from Vopak via the Caltex pipeline, the theoretical maximum capability ('sprint rate') of the current infrastructure to transfer jet fuel to Sydney Airport is approximately 11.8ML per day.

The sprint rate assumes that the maximum capacity can be utilised without any disruption for any required period. However, the length of time the maximum transfer rate can be utilised is limited by the volume of stock on hand at each supply location and third party access arrangements from Vopak to the Caltex pipeline which is currently 5 days per month.

Table 9 shows the adequacy of the replenishment rates for the existing jet fuel supply infrastructure to the airport to meet a high demand period that consists of 10 consecutive days of 'busy' jet fuel demand. The analysis assumes that one day of stock will be maintained at the JUHI throughout the period and no further supply disruptions occur.

Table 9: Replenishment rates of existing jet fuel supply infrastructure to Sydney Airport

		2014	2019	2024	2029
High Period	Total 'busy' day withdrawals for 10 days	104.5	118.2	142.5	163.0
	Minimum JUHI stock holding during high demand period (one day 'normal' demand)	9.51	10.76	13.29	15.46
	Min. supply required for period	94.99	107.44	129.21	147.24
Minimum 'High' Supply Transfer Rate (ML/day)		9.50	10.74	12.92	14.72

Legend

- (unshaded) Normal and Typical daily demand is between 'Typical' and 'Sprint Maximum' supply transfer rate
- (shaded) Normal and Typical daily demand exceeds 'Sprint Maximum' supply transfer rate

The above figures indicate that the current jet fuel supply infrastructure could theoretically be capable of meeting a high demand period until at least 2019. However, the current 'typical' transfer rate of the existing infrastructure is approximately 7.6ML per day and could be improved by increasing either the frequency of higher flow rate transfer days from the Vopak facility or increasing the utilisation of the Shell Clyde pipeline.

The capability criterion for the replenishment rate of on-airport stocks uses a target level of 1.2 times daily demand. In other words, one day of "typical" demand should be replenished within five days. Table 10 shows the minimum required replenishment rates to satisfy the capability criteria in future years.

Table 10: Required minimum replenishment rates

	2014	2019	2024	2029
Required minimum replenishment rate (ML/day)	12.10	13.68	16.64	19.16

The theoretical maximum transfer (sprint) rate of the existing infrastructure (11.8ML per day) is not capable of meeting the forecast high end typical daily demand replenishment rate in 2014 (if standard positive deviation is applied). Therefore, investment in at least 0.3ML of capacity per day will be required in the short term and at least 7.4ML per day to supply the projected long term jet fuel demand.

As the current typical transfer rate of the supply infrastructure is approximately 7.6ML per day, the minimum required level of investment in supply infrastructure is more likely to be in the order of 4.5ML per day in the short term (i.e. before 2014) and at least 11.6ML per day to supply the projected long term jet fuel demand.

6.1.4 On-airport hydrant system

The intra-day demand profile in section 5.2 indicates that the maximum uplift of jet fuel on a typical busy day in 2029 reaches approximately 950,000 litres within the peak 15 minute period and up to 2,400,000 litres within the peak hour period.

The existing hydrant piping system has a maximum flow rate of 38,000 litres per minute, which equates to 570,000 litres per 15 minutes or 2,280,000 litres per hour. The current flow rate through the hydrant system is dependent upon the mix of aircraft type and level of concurrent refuelling activity. JUHI has provision for installation of two further pump units, which given projected demand peaks, may be required to provide sufficient pumps to transfer fuel at the required rates.

6.1.5 Import capacity

As noted in Chapter 4.1.1, the report assumes no material changes to refinery production and imports will be no less than those in 2009. Therefore, the net additional jet fuel imports required to meet projected demand totals 1022ML in 2014; 1476ML in 2019; 2414ML in 2024; and 3194ML in 2029.

Sydney Ports Corporation have announced that a second bulk liquids berth is to be constructed at Port Botany to cater for the predicted future growth of bulk liquids products, including jet fuel. It is understood that the earliest the second berth would be operational is late 2012. In the intervening period there may be certain months where berth utilisation could exceed the average economic optimum.

Based on future trade growth predictions by Sydney Ports prior to the preparation of the demand figures presented in this report, it was assessed that the existing bulk liquids berth would reach the 65% economic utilisation by about 2011 and a third bulk liquids berth would be required by about 2025. Sydney Ports has designed the second bulk liquids berth to allow for a third berth to be constructed adjacent to it. The jet fuel predictions presented as part of this report are higher than those predicted by Sydney Ports and could result in the need for the third bulk liquids berth earlier than previously forecast.

6.2 Infrastructure deficiencies in the short, medium and long term

Decisions to invest in additional jet fuel supply infrastructure to the airport will be necessary in the short term to meet the projected growth in jet fuel demand. The above analysis suggests that investment in at least 0.3ML to 4.5ML per day of jet fuel supply infrastructure capacity will be needed by 2014, with total investment of at least 7.4ML to 11.6ML per day of jet fuel supply infrastructure capacity required to meet projected demand in 2029.

If the utilisation of the bulk liquids berth increases prior to the second berth being operational, there may be increased delays and costs associated with the import of jet fuel into Port Botany. Recognising the jet fuel demand projections in this report, the Sydney Ports Corporation may need to consider the option of bringing forward investment in a third bulk liquids berth; and Caltex may need to consider whether it could facilitate increased imports via Kurnell.

Therefore, investment in jet fuel infrastructure will need to occur in the short and medium term to meet the forecast growth projections included in the *2009 Sydney Airport Master Plan*.

Potential investment options to meet the identified minimum replenishment rates for jet fuel supply infrastructure to Sydney Airport are discussed in chapter 7.

7. OPTIONS FOR ACTION TO MEET PROJECTED JET FUEL DEMAND AT SYDNEY AIRPORT

7.1 Options, including risk analysis

The previous chapters provide a foundation for, and an assessment of, the adequacy of the existing jet fuel supply infrastructure at Sydney Airport. This chapter provides consideration of a number of potential infrastructure options to meet projected jet fuel demand at Sydney Airport in the short, medium and long term.

Apart from demand projections, a key factor in selecting any option is the life of the existing lease and long term intention of Sydney Airport Corporation to require the JUHI to move from its current location.

7.1.1 Second phase upgrade of the Caltex pipeline

Caltex has advised that its Board has approved funding for the second stage upgrade of its pipeline. Work to complete detailed design and engineering has commenced and subject to receiving relevant statutory approvals the upgrade is expected to be completed in the second half of 2011.

This option will cost approximately $20m to $25m and result in a 9ML to 10ML per day 'sprint' transfer rate (up from a current 'sprint' transfer rate of 5ML per day) of jet fuel from the Kurnell refinery to the on-airport storage facility at the JUHI.

Caltex have indicated that the second stage upgrade will take the existing pipeline to its operational maximum capacity with no technical capacity for any material additional upgrades.

To maximise throughput over the entire pipeline, an upgrade to the Vopak pumps would need to be considered by Vopak. Vopak have indicated that investment (subject to its customer's consent) to upgrade its pumping capacity to 10ML per day could be the quickest and cheapest option to help meet short to medium term demand. However, at the time of writing, no decision to proceed has been made by Vopak.

<u>Potential positives</u>

Based on the jet fuel demand projections in Chapter 5 and the theoretical maximum transfer rate of the Shell pipeline (3.9ML) and an upgraded Caltex pipeline (10ML), this option (which includes an upgrade of Vopak pumping capacity), has the potential to meet the peak daily demand in 2019 (11.82ML) and the average daily demand in 2024 (13.33ML). Taking into account the normal total transfer rate of 7.6ML per day, the additional sprint capacity rate that this option provides (up to 5ML per day) has the potential to meet the peak and average daily demand in 2019.

This option presents an opportunity for new or existing access agreements to be negotiated by third parties with Caltex, with the view to increasing the amount of fuel third parties can transfer via the privately owned pipeline.

Increased pumping from Caltex refinery to the JUHI allows the two Caltex refinery product berths to be used for jet imports which may be useful during times of congestion at the Port Botany Bulk Liquids Berth.

Issues to consider

This option assumes that pipeline connection to an on-site storage facility will continue to be available. The decision about whether the on-airport storage facility will remain on airport land post 2024 may impact on the consideration of this option.

If this option proceeds there may be a delay in, or reduced incentive for, investment decisions regarding longer term jet fuel supply solutions for Sydney Airport to be made. Even if a decision is made to proceed with this option, the jet fuel demand projections in chapter 5 and assessment of the adequacy of existing infrastructure in chapter 6 indicates that investment in up to 7.1ML per day of jet fuel supply infrastructure to the Sydney Airport will be required to meet jet fuel demand in 2029,.

The capacity of import facilities to facilitate the projected increase in imports will need to be considered. As noted in chapter 6, the earliest that the second berth will be operational is projected to be late 2012 and in the intervening period average berth utilisation may exceed the economic maximum.

7.1.2 Increase the utilisation rate of the Shell pipeline

An existing link from the Sydney Metropolitan Pipeline could be used to divert jet fuel to 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

Access arrangements to the SMP would need to be negotiated with the pipeline owners on a commercial basis. Product would need to be sourced from Kurnell unless facilities were installed at Port Botany which allowed the transfer to take place while maintaining jet fuel product integrity. Any jet fuel scheduled to Clyde via the SMP will displace the carriage of other products and, be subject to pipeline availability. As pumping of petrol and other ground fuels is faster on the SMP than jet this option will require the trucking of approximately 1.5 litres of ground fuels from the Port Botany area to Sydney west for every litre of jet fuel pumped to Clyde.

This option is likely to be considered for the short and medium term and is an additional way to supplement supply to the existing on-airport storage facility via the Shell Clyde pipeline during periods of required "sprint" stock builds.

The capacity of import facilities to facilitate the projected increase in imports will need to be considered. As noted in chapter 6, the earliest that the second berth will be operational is projected to be late 2012 and in the intervening period average berth utilisation may exceed the economic optimum.

7.1.3 Permanent bridger facility at on-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. This option was considered by the JUHI joint venture participants in 2007 and was estimated to cost approximately $460,000.

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.

The capacity of import facilities to facilitate the projected increase in imports will need to be considered. As noted in chapter 6, the earliest that the second berth will be operational is projected to be late 2012 and in the intervening period average berth utilisation may exceed the economic maximum.

7.1.4 Additional storage at on-airport storage facility

The Working Group was advised that there is sufficient space to build a new 10ML storage tank on the existing JUHI lease area. However, the initial hazard risk assessment completed by the JUHI joint venture participants raised concerns about the construction of a new tank and its potential impact on adjacent buildings and air traffic. Investment could be undertaken by all, or some, of the current JUHI joint venture participants.

The Working Group acknowledges that the building of additional on-airport storage is not in itself a solution to the current infrastructure constraints. An increase in replenishment rate capacity from off-airport storage facilities to on-airport storage facility will be needed, however the construction of more on-airport storage could reduce the extent to which replenishment rates will need to be increased.

Potential positives

The increase of tank storage capacity 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 construction of a new tank would require the relocation of into-plane servicing equipment. The present JUHI lease term expires in 2015, with SACL required to provide three years notice to 2018. The Working Group notes there are two options to extend the lease period to 2024. If renegotiations do not result in an extended lease period, investors would need to consider whether a six year payback period is sufficient. The JUHI manager has advised that future investment by the JUHI participants in additional storage stands a greater chance of approval subject to the confirmation of lease tenure at the existing JUHI location until 2024 or longer. The capacity of import facilities to facilitate the projected increase in imports will need to be considered. As noted in chapter 6, the earliest that the second berth will be operational is projected to be late 2012 and in the intervening period average berth utilisation may exceed the economic maximum.

7.1.5 Additional pipeline from an off-airport storage facility to a holding facility on (or adjacent to) airport land

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.

As noted above, additional pipelines to the airport have been considered by stakeholders in the past, at an estimated cost in 2008 of $50 million to $60 million. This option also recognises that its commercial underpinnings would depend on the facility operator entering into a prices and services agreement with stakeholders.

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.

BARA considers that this option would resolve some airline stakeholders' concerns with third party access.

Issues to consider

The point where the pipeline connects to the airport would need to be carefully considered. The matters of securing land close to Sydney Airport (or on the airport) for the holding tank and leasing tank storage capacity for the off-airport storage facility would need to be addressed in the short term.

Even if a decision to expedite the development of the pipeline under this option was taken before the end of 2010 it is unlikely the pipeline would be operational before 2015. This is on the basis that the time required to complete an environmental impact assessment process could be of the order of 12 to 18 months with a likely 30 months required for approvals and construction.

The capacity of import facilities to facilitate the projected increase in imports will need to be considered. As noted in chapter 6, the earliest that the second berth will be operational is projected to be late 2012 and in the intervening period average berth utilisation may exceed the economic maximum.

7.1.6 Sydney jet fuel import facilities

All options noted above assume adequate supplies of jet fuel can be delivered into Sydney. While neither Shell or Caltex are prepared to make comment regarding the longer term production of jet fuel from their refineries it is reasonable to assume that local refinery production is unlikely to increase materially and that all growth in airport jet demand will be met by imports.

Available import berths include Shell Gore Bay, Caltex Kurnell (No 1 & No 2 Berth) and the Port Botany Bulk Liquids Berth. Shell Gore Bay has limitations when used in an ad-hoc manner for jet fuel imports. Caltex product berths have import capacity available.

Issues to consider

As noted in Chapter 6.1.5, the net additional jet fuel imports required to meet projected demand totals 1022ML in 2014; 1476ML in 2019; 2414ML in 2024; and 3194ML in 2029.

Port Botany bulk liquids berth is operating close to its economic optimum utilisation level and will be supplemented with a second berth in approximately 2012. There is room for a third berth if required at a later date. It is not expected that product berth capacity will normally be an impediment to jet supply although some periods of congestion may be experienced before the second bulk liquids berth is commissioned.

7.2 Barriers to investment

The current suppliers of jet fuel at Sydney Airport face a number of issues that need to be addressed when considering future investment decisions for jet fuel infrastructure. These include: selecting the most economical investment option within an uncertain market for future jet fuel demand, the location of the JUHI facility post-2024 and competition for land for expansion of the facilities on-airport; the performance of the existing infrastructure and options to prolong the life of this infrastructure; and, the existing jet fuel market arrangements and the likely investment decisions of competitors.

Potential new entrants into the market face similar issues. Moreover, they are faced with a complex array of commercial arrangements between suppliers and users of jet fuel, together with the need for commercial considerations over access to the jet fuel infrastructure that supplies Sydney Airport (including the JUHI storage system), pipelines servicing the airport and the airport hydrant system), with the incumbent suppliers, and their competitors. It is likely that a new entrant will require a sizeable portion of the Sydney Airport jet fuel volume to justify its new investment. Negotiating such a deal in the existing commercial environment would be a challenging task.

These barriers to investment essentially relate to commercial decision making issues involving the commercial parties associated with jet fuel supply and the Sydney Airport. The Working Group notes that existing regulatory regimes do not preclude the creation of open access infrastructure to supply jet fuel to Sydney Airport.

The Board of Airline Representatives of Australia (BARA) expressed the view that the barriers to investment in jet fuel supply infrastructure are sufficient to warrant an inquiry by the Productivity Commission. This view is not supported by the other members of the Working Group.

7.2.1 Lease period for existing on-airport storage facility location

The current lease term for the JUHI on-airport storage facility expires in 2015 and there are two options to renew the lease until 2020 and 2024. SACL is required to provide three years notice if it wishes to terminate the lease and can do so from 2015. Therefore, the earliest the JUHI site could be vacated is in 2018.

In its submission, Shell (the operator of the JUHI on behalf of the joint venture participants) believes the joint venture participants would have a greater willingness to invest in capital works, including the construction of an additional storage tank, if the JUHI lease is extended until 2024. Shell noted its willingness to recommence negotiations with SACL for a firm lease period to 2024 and advised that this was supported by the joint venture participants at the recent Operating Committee meeting. SACL has indicated its willingness to enter discussions concerning the current lease term.

7.2.2 Availability of land for on-airport storage

The *2009 Sydney Airport Master Plan* notes that the planned expansion of the International Terminal aircraft parking stands will not require the re-location of the on-airport storage facility until at least 2024. Future sites off airport also need to be considered.

As mentioned in section 7.1 and section 7.2.1, it is unlikely that investment decisions about new jet fuel supply infrastructure that requires connection to the on-airport storage facility will be made whilst the location of the storage facility post-2024 is not known.

Stakeholders would welcome a further review of this matter as part of the *2014 Sydney Airport Master Plan*, as all future investment options require the supply point of the pipelines (existing and new) to be identified. SACL have advised that an update and consideration of further storage options will be reviewed as part of the *2014 Sydney Airport Master Plan*.

7.2.3 Current ownership arrangements of the jet fuel supply infrastructure

Presently the ownership of jet fuel supply infrastructure includes oil companies, airlines and third party terminal owners. Some airline stakeholders maintain the commercial interests of the different parties are in conflict and not aligned with promoting the long term efficient provision of jet fuel at Sydney Airport.

It should be noted that the owners of the infrastructure do not support that view, noting that the creation of the existing jet fuel infrastructure relevant to Sydney airport is entirely due to the investment and other commercial decisions of the JUHI participants.

Only two companies, Caltex and Shell own infrastructure across the entire supply chain from refineries and import berths through supply pipelines to the JUHI and into plane services. Two other oil companies BP and ExxonMobil, together with Qantas, also have ownership in the JUHI and into plane services.

This ownership has been the basis of investment in the supply infrastructure that has supplied Sydney airport for most of its history. The other and more recent development has been investment in third party import and terminal infrastructure at Port Botany. This investment in jet storage at Port Botany has been on the back of commitments to use that storage capacity by JUHI participants or their suppliers and the willingness of Caltex to create spare capacity in its pipeline and make it available to these participants.

Airline stakeholders have also expressed a concern regarding future access by competitively priced third parties as the import, pipeline and JUHI facilities remain privately owned and short and long term access agreement negotiations may not result in increased throughput by third parties. The Working Group notes that infrastructure owners have an economic interest in maximising the utilisation of that infrastructure by making it available to other users.

The Caltex second stage upgrade was made recognising that airport development plans could mean an operating life for that line of as little as 7 years (i.e. 2011 to 2018) with a probable life of 13 years (i.e. 2011-2024).

The importance of clarity regarding future airport developments and demand projections cannot be overstated when considering major long term investment in fuel supply infrastructure. For this reason the *2014 Sydney Airport Master Plan* will be a critical document supporting infrastructure decisions for the 2019-2024 period.

Given the very significant investment required, particularly if post 2024 the JUHI is relocated and no on-airport jet fuel storage is possible, it is unlikely that multiple independently owned jet fuel supply chains can be economically supported. In this high investment case there may well be an opportunity or even a need to bring new major investors into the overall jet fuel supply infrastructure ownership mix with a possible change to the operating and access model. However, the ownership arrangements of the existing infrastructure, and the commercial arrangements between the jet fuel suppliers and the airlines may prevent this occurring in the short to medium term.

Those airline stakeholders that consider barriers to investment arise from the current ownership arrangements of the jet fuel supply infrastructure, believe this is due to the following reasons:

The existing ownership arrangements encourage vertical integration

Some oil companies (e.g. Caltex) are vertically integrated, providing jet fuel, the supply infrastructure and 'into-plane' services. Vertical integration by existing suppliers discourages investment by other non-vertically integrated existing suppliers and potential new entrants. In this regard, structural reform of Australia's public utilities across a range of industries (e.g.: gas, electricity and telecommunications) has been necessary to address the problem of a vertically integrated provider of both monopoly and contestable services.

Lack of end-to-end planning and provision of jet fuel supply infrastructure

The current ownership arrangements mean that no one entity is responsible for the end-to-end planning and provision of jet fuel supply infrastructure. There is also no overarching framework for the cost recovery of investment. As the various parties (e.g. pipeline, JUHI and off-site storage owners) pursue their own commercial objectives there is a tendency for investment to be focussed on the next infrastructure upgrade necessary to meet demand in the short term. Investment is constrained because to look beyond the immediate future requires responsibility for overall outcomes and a stable and known commercial environment. Also, any new investment devalues current infrastructure.

The current ownership arrangements have delivered storage facilities both on- and off-site of Sydney Airport; has confused investment planning; and constrains new investment by creating high transaction costs. By controlling at least one part of the supply chain, existing suppliers have made it difficult for new fuel suppliers to enter the jet fuel market at Sydney Airport. The establishment of a competitive market for jet fuel supply at Sydney Airport will require as a pre-condition the ability for existing and new entrants to enter and exit the market at reasonable transaction costs.

Generally, the lack of a stable and certain planning and investment environment limits the ability of users and the provider of infrastructure to negotiate delivery and pricing of that infrastructure. The replacement of the existing arrangements with market based outcomes would encourage investment in adequate infrastructure with non-discriminatory access.

7.3 Considered actions

7.3.1 Potential impact of infrastructure investment decisions

The analysis indicates there are two critical time periods for Sydney Airport's jet fuel supply infrastructure. Decisions are needed by approximately 2012 and 2018 to enable the market to provide sufficient jet fuel to meet the projected demand at Sydney Airport. The potential impact of various decisions is discussed below.

Short term – present to approximately 2019

The decision taken by Caltex to upgrade the Caltex supply pipeline capability will ensure jet fuel supply to Sydney Airport will be adequate to meet projected jet fuel demand requirements. Vopak has indicated it would, pending customer approval, also increase pumping rates to those to be achieved by Caltex (assuming availability of the Caltex pipeline).

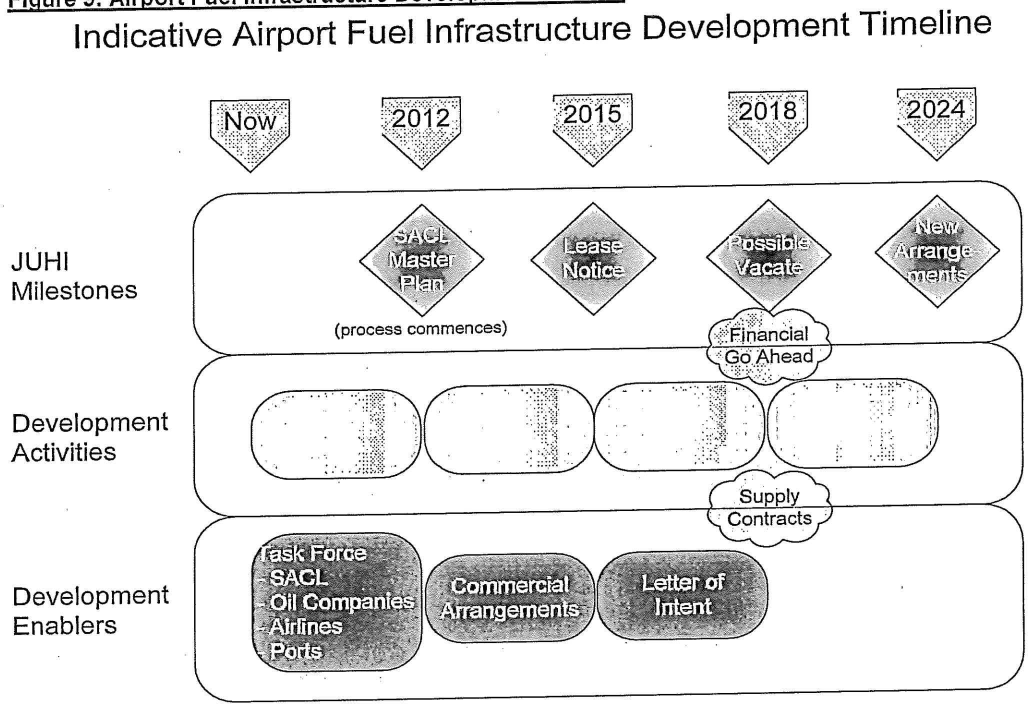
Port Botany bulk liquids berth is operating close to its economic optimum utilisation level and will be supplemented with a second berth in approximately 2012. Whilst it is not expected that product berth capacity will normally be an impediment to jet supply, some periods of congestion may be experienced before the second bulk liquids berth is commissioned.

Medium to long term - approximately 2018 and beyond

Irrespective of the upgrading of the Caltex supply line capability and utilisation of the Shell link to the SMP, if one or more of the options detailed by the Working Group in Chapter 7 are implemented, jet fuel supply will meet projected jet fuel demand requirements.

Sydney Ports Corporation will need to consider bringing forward investment in a third bulk liquids berth if medium term jet fuel demand as projected in this report is realised; and Caltex may need to consider whether it could facilitate increased imports via Kurnell.

Figure 9: Airport Fuel Infrastructure Development timeline



An indicative development timeframe is illustrated in Figure 9 and envisages the following steps:

- A taskforce develops physical scopes (layouts, pipeline sizing etc) for the various jet fuel supply options to Sydney Airport and indicative capital costs, namely:
    a. a new pipeline (ex Vopak) supplying the existing or re-located JUHI facility on Airport or adjacent land; pressure boosted by JUHI into the distribution system; and
    b. Caltex, Shell and new (Vopak) pipelines supplying directly into the Airport distribution system at required distribution pressure *(Allow 12 months; completion by mid 2011)*
- The taskforce proposes a "preferred option", taking into account future jet fuel consumption at Sydney Airport, new investment capital costs, SACL land issues, existing Sydney Airport/JUHI contract and preparedness of JUHI participants to accept a new commercial arrangement for fuel supply to Airport fuel users, airlines acceptance of proposed commercial structures for new jet fuel supply infrastructure and practicalities for potential investors in the new supply infrastructure. *(Allow 12 months: completion by mid 2012)*
- A "Project Sponsor" is appointed to call for Expressions of Interest for provision of /capital investment in the proposed new jet fuel supply infrastructure and commences Planning Approval processes *(Commences mid 2012/late 2012; EOI review completed year end 2012 - mid 2013)*

- Commercial arrangements with preferred EOI candidate and jet fuel suppliers and users negotiated to Letter of Intent stage *(Allow 12 months to year end 2013)*
- Completion of EIS and Planning Approvals *(by year end 2014)*
- Completion of Jet Fuel commercial arrangements *(by year end 2014)*
- Design and Construction phase (allow 30 months, completion by mid 2017).

7.3.2 Increasing certainty to encourage investment decisions

Greater certainty on key issues is required to encourage investment in jet fuel supply infrastructure to, and at, Sydney Airport.

SACL has indicated its willingness to enter into discussions concerning the current lease term of the existing JUHI facilities. Consideration should be given to the future options for on and off airport storage facilities as part of the 2014 Sydney Airport Master. Similarly, the potential costs and benefits associated with the removal of on-airport storage facilities and the use of an off-airport storage facility with associated pipeline development needs to be considered.

The development of jet fuel demand projections has underpinned the Working Group's consideration of the adequacy of existing jet fuel supply infrastructure and potential infrastructure expansion options. The availability of this data to potential investors will assist them when making their investment decisions.

The Working Group recommends that:

1. **JUHI members undertake works required to address projected demand, with a short term horizon up to 2014/15. The decision by Caltex to proceed with the second stage upgrade of the Caltex line is noted;**

2. **The Sydney Airport Corporation, as part of the *2014 Sydney Airport Master Plan* process, further review options for the airport jet fuel storage facility, including on and off-airport storage options;**

3. **Potential investors in consultation with the NSW Government undertake a review into option 7.1.5 (additional pipelines to on-airport storage facility), taking into account the potential long lead time for the construction of the infrastructure.**

4. **The JUHI operator and the SACL review options beyond the current lease term;**

5. **JUHI members immediately commence discussions with SACL regarding site requirements for future on-airport jet fuel storage options;**

6. **Jet fuel demand projections be considered as part of all future Sydney Airport Master Plans with input from appropriate industry representatives;**

7. **Consideration is given to including jet fuel demand projections in Master Plans for other key airports with input from appropriate industry representatives;**

8. **Sydney Ports Corporation consider bringing forward investment in a third bulk liquids berth if medium term jet fuel demand as projected in this report is realised; and**

9. **The Commonwealth Government monitors the actual jet fuel usage at Sydney Airport against forecast demand and the capacity of Sydney's ports to handle the increasing volumes of imported jet fuel to supplement local refinery production.**

7.4 Conclusions

The key factors affecting the capacity and reliability of the Sydney Airport jet fuel supply system are the capacity of existing jet fuel supply infrastructure to transfer jet fuel into the on-airport storage facility and the ability of the existing bulk liquids berth to receive the projected growth in jet fuel imports.

The Working Group considers that the identified barriers to investment relate to commercial decision making issues involving the commercial parties and that the existing regulatory regimes do not preclude the creation of open access infrastructure to supply jet fuel to Sydney Airport.

The Working Group welcomes the recent decision of Caltex's board to proceed with the second phase upgrade to the Caltex pipeline, 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. The Working Group also acknowledges the announcement by Sydney Ports to commit to the development of a second bulk liquids berth in Port Botany.

Upon completion of the second phase upgrade of the Caltex pipeline and the construction of the second bulk liquids berth in Port Botany, the Working Group considers that Sydney Airport can expect a higher level of jet fuel supply security to 2019.

However, the Working Group believes that further investment in jet fuel supply infrastructure to Sydney Airport, in addition to the above planned investment, will be required to meet projected demand in the medium to long term.

Investment of up to an additional 2.4ML to 6.6ML per day jet fuel supply capacity is required to ensure transfers of jet fuel from off-airport storage facilities to the on-airport storage facility are sufficient to meet demand in 2029. Sydney Ports may also need to consider the ability of the existing and proposed second bulk liquids berths in Port Botany to receive the projected growth in imported jet fuel.

The availability of pre-competitive data in the form of jet fuel demand projections would facilitate consideration of investment decisions by potential investors. The Working Group considers that the inclusion of jet fuel demand forecasts as part of the airport master planning process is the most appropriate mechanism to develop and publish the data. The Working Group further considers that this approach could be utilised on a national basis and would provide useful information upon which to base jet fuel infrastructure investment decisions at all of Australia's major airports.

APPENDIX A

STAKEHOLDER CONSULTATION

Submissions received

A1 Australia Pacific Airports (Melbourne) Pty Ltd

A2 Board of Airline Representatives Australia

A3 Brisbane Airport Corporation

A4 Brisbane Airport Joint User Hydrant Installation (unincorporated joint venture)

A5 Melbourne Airport Joint User Hydrant Installation (unincorporated joint venture)

A6 Mobil Oil Australia Pty Ltd

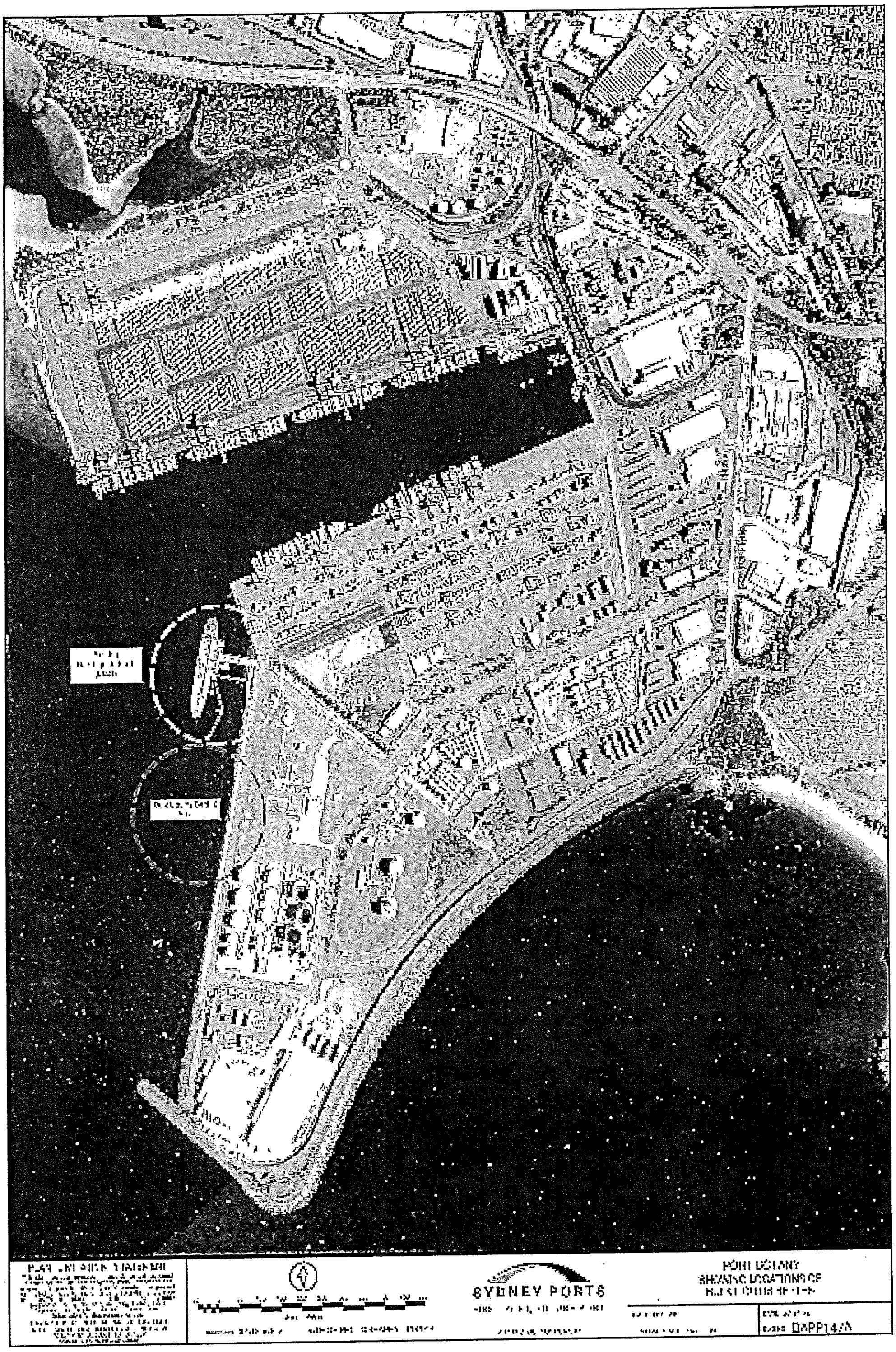
A7 QANTAS Airways Limited

A8 The Shell Company of Australia

A9 Virgin Blue Airlines

APPENDIX B

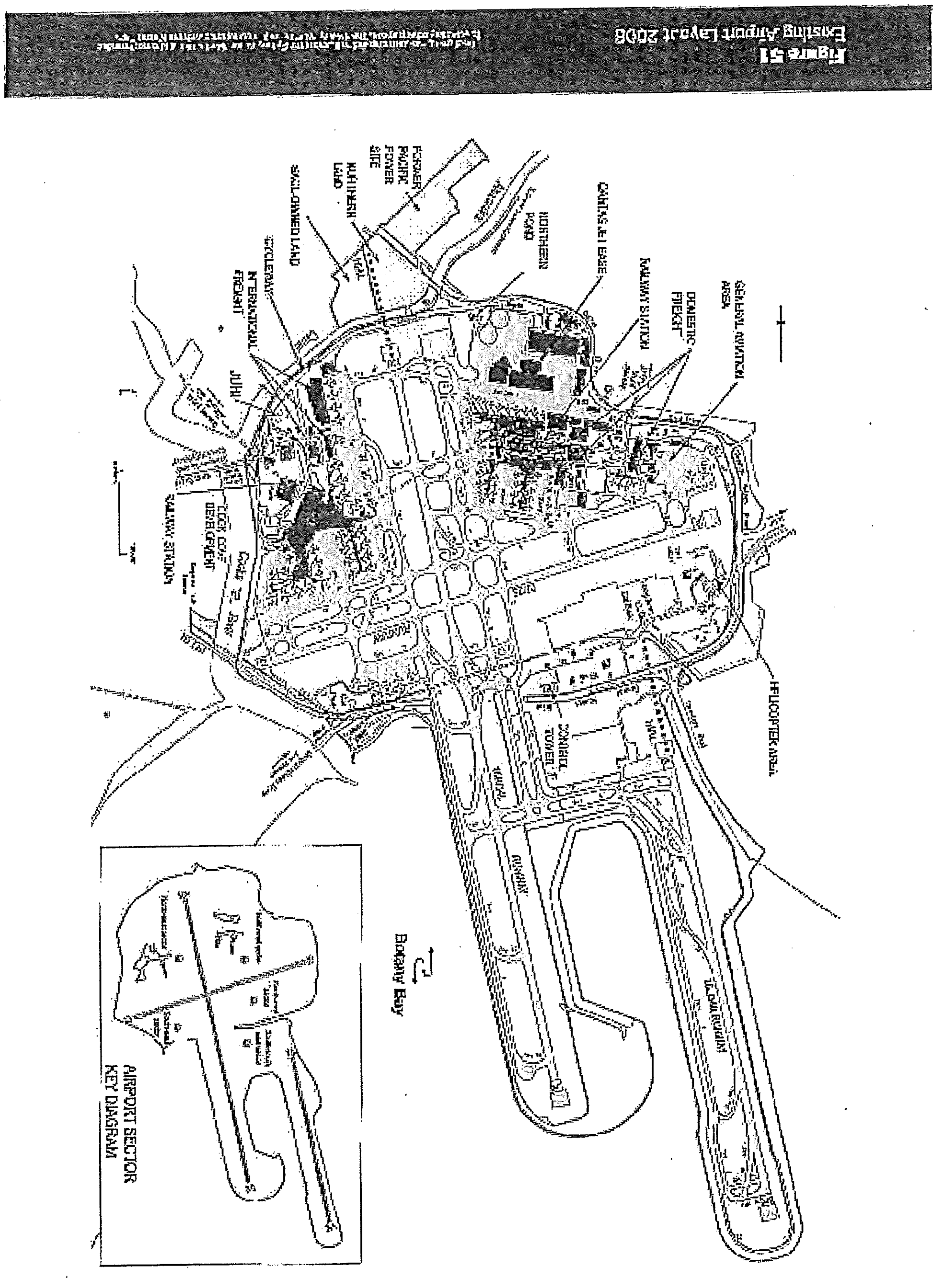
Map showing location of Sydney Ports bulk liquids berths[12]



[12] Diagram provided by Sydney Ports Corporation

APPENDIX C

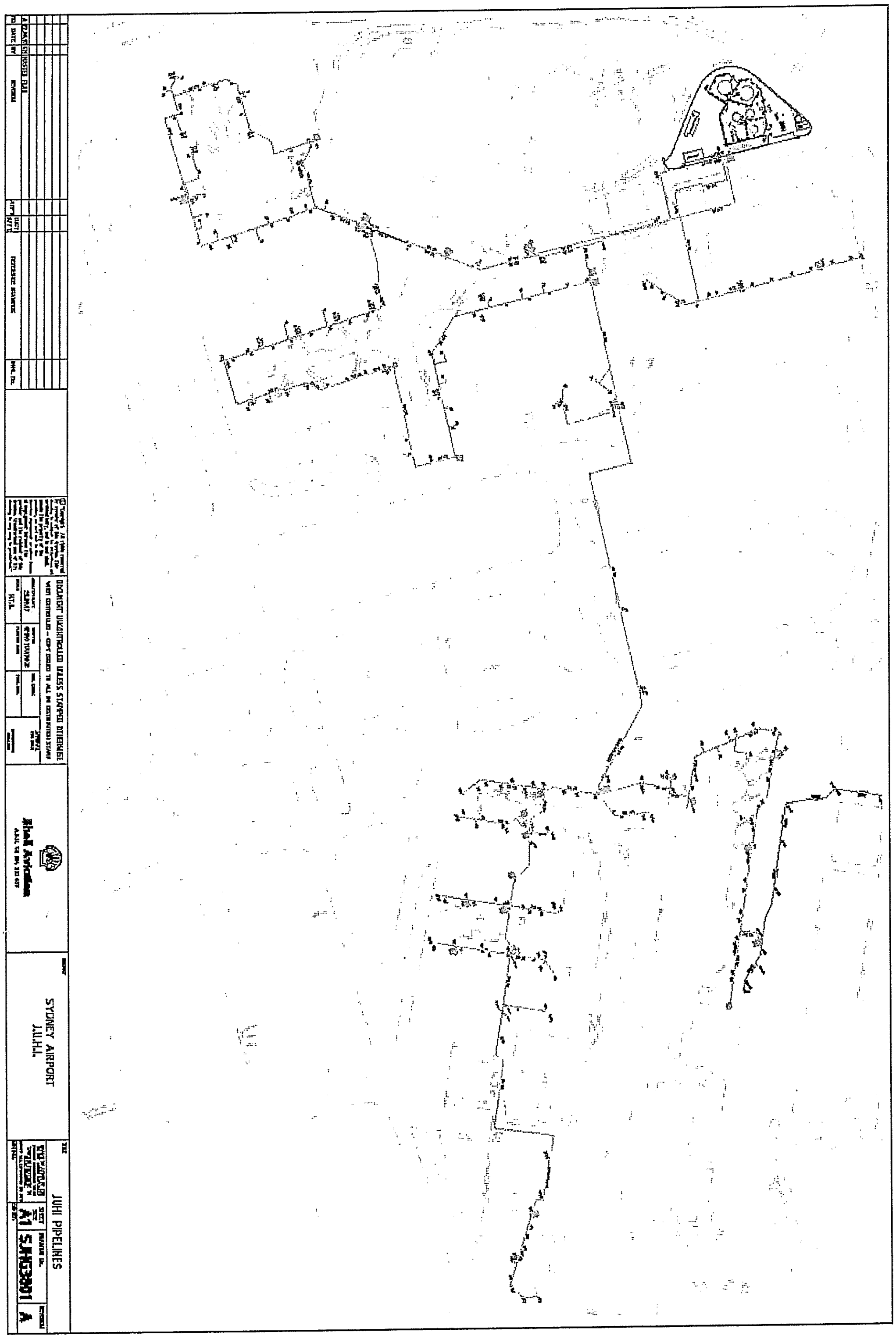
MAP SHOWING JUHI LOCATION ON SYDNEY AIRPORT LAND[13]



[13] 2009 Sydney Airport Master Plan, SACL

APPENDIX D

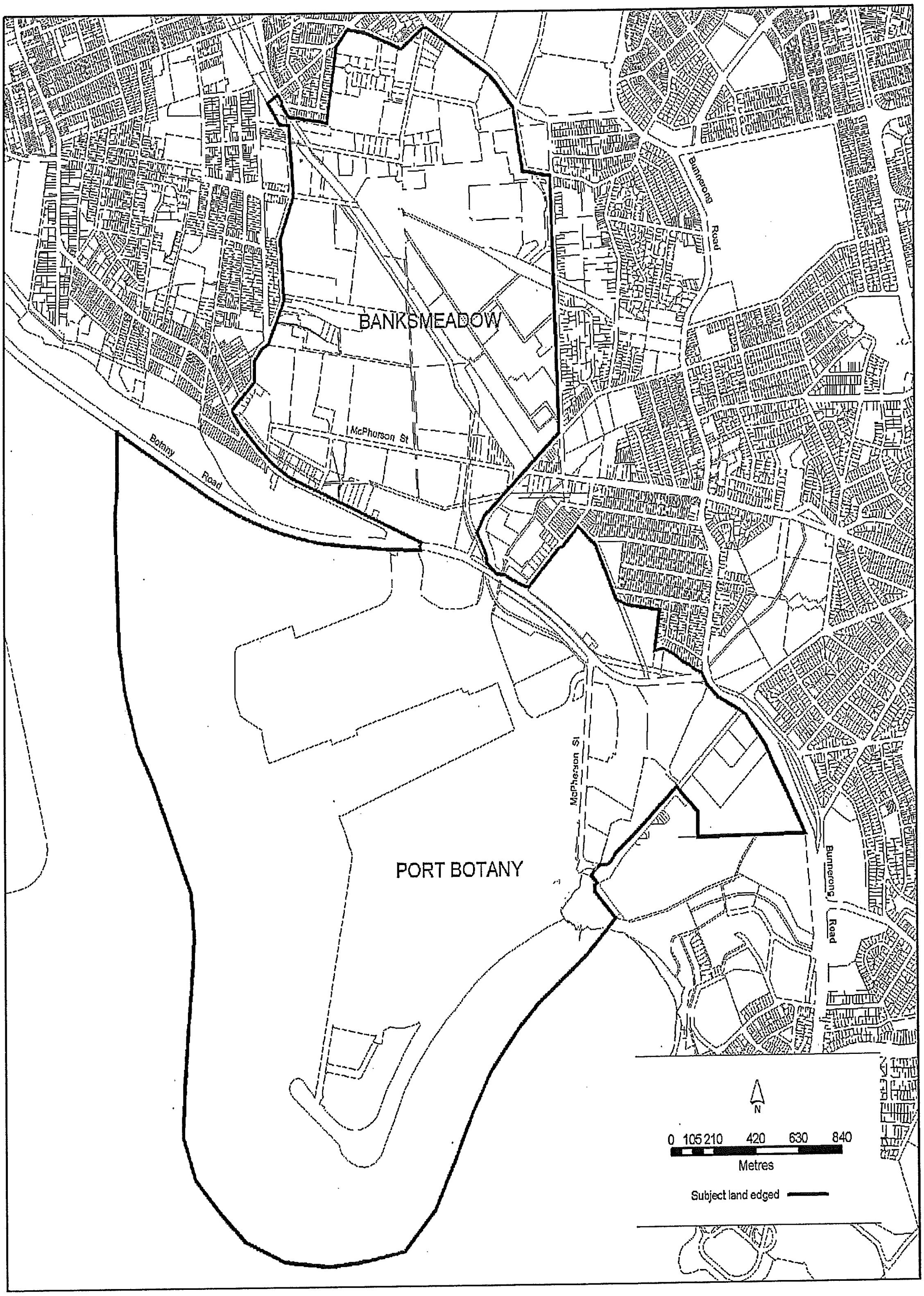
MAP SHOWING SYDNEY AIRPORT HYDRANT PIPELINE NETWORK[14]



[14] Diagram provided by The Shell Company of Australia (as Sydney Airport JUHI operator)

APPENDIX E

MAP OF STATE SIGNIFICANT DEVELOPMENT SEPP - PORT BOTANY[15]



[15] Diagram provided by Industry and Investment NSW

APPENDIX F

OVERVIEW OF RELEVANT LEGISLATION

In 1992, the Commonwealth Government entered into the *Intergovernmental Agreement on the Environment* (the agreement) with Australian States and Territories (States). The agreement sets out roles and responsibilities for the Commonwealth and States regarding the operation of Environmental Law in Australia.

The agreement acknowledges the Commonwealth has legislative powers and responsibilities for among other things, International Treaties, to establish national environmental protection standards, guidelines goals and associated protocols (referred to as measures).

The measures are aimed primarily at pollution control and waste management, protection of native species and marine environments. Principal legislation includes the *Environment Protection and Biodiversity Conservation Act 1999.*

The sections below outline the key State and Commonwealth approval processes and legislation which may apply to future investments in jet fuel supply infrastructure to, or at, Sydney Airport.

NSW Government approval processes

Land use planning and policy are the responsibility of the individual States.

It is likely that a major development of a JUHI facility *off*-site would occur under Part 3A of the *Environmental Planning and Assessment Act 1979 (NSW)* ("the EP&A Act"). On-site development would likely be in accordance with the provisions of the *Airports Act 1996 (C'th), with reference to* the EP&A Act and respective *State Environmental Planning Policy.*

The following key legislative requirements are currently in effect in NSW for land use planning and control of development. In context of this report, this includes the systems for approval of petroleum handling facilities and pipelines. The main application and requirements of the legislation are summarised below with greater detail noted in Appendix E.

Environmental Planning and Assessment Act 1979[16]

The *Environmental Planning and Assessment Act 1979* ("the EP&A Act") is the principal legislative instrument for the environmental assessment and approval of activities associated with the construction of pipelines and related petroleum facilities.

The EP&A Act spells out which undertakings are to be covered by each respective part. Parts 3, 3A, 4 and 5 are relevant in this context and are described below:

- **Part 3** of the Act specifies environmental planning instruments governing the type of development that may be carried out on land subject to those instruments. Their provisions are legally binding on councils and developers. Examples include: *State Environmental Planning Policy* ("SEPP") *and Local Environment Plan* ("LEP").

[16] A copy of the EP&A Act is available for download from: http://www.legislation.nsw.gov.au/maintop/view/inforce/epi%2B641%2B2007%2BFIRST%2B0%2BN/

- **Part 3A** of the Act relates to major infrastructure and other projects such as roads, electricity and gas transmission or distribution, dams water reticulation works, and more recently pipelines. The test is whether in the opinion of the Minister, the infrastructure or development is of State or regional environmental (or economic) planning significance. If only part of any development is a project to which this part applies, the other parts of the development are (subject to conditions) considered included in this part.

- **Part 4** of the Act provides for development assessment and contains a system whereby development proposals are assessed according to their particular nature. For example, local council approval for some developments is defined in this part.

- **Part 5** of the Act provides for environmental assessment. This Part also contains provisions for environmental impact assessment (EIA) and impact statement (EIS). Under this Part and the *State Environmental Planning Policy (Infrastructure) 2007* (SEPP), development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without consent on any land. Other authorities such as the National Parks & Wildlife Service may need to give concurrent approval or be consulted on specific matters.

Under Part 3A of the Act and the *State Environmental Planning Policy (Major Development) 2005*[17], a pipeline development under the *Pipelines Act 1967*, will be considered a Major Project by NSW Department of Planning with prescribed level of environmental assessment and development control. Features of Part 3A project assessments include "Concept approval" and a staged assessment process including revised approval authority provisions. The criteria is also further defined in the *State Environmental Planning Policy (State Significant Development) 2005.*

Petroleum handling installations are generally regarded as Major Hazards Facilities and as such are dealt with under the *SEPP 33 (Hazardous and Offensive Development)*. For an area such as Port Botany, this type of development may be declared major infrastructure or State Significant Development and also covered under Part 3A.

Proponents need to ensure that the requirements for each of the respective legal instruments, both Commonwealth and NSW are met in any application for development approval.

Pipelines Act 1967

The *Pipelines Act 1967* ("Pipelines Act") sets out the principal requirements for pipeline licensees and operators with regard to the planning, construction, operation and maintenance of licensed pipelines and associated activities in NSW.

The principal objectives of the Pipelines Act are to define:

- Which pipelines require licensing;
- Licence approval processes;
- Environmental assessment and land access processes;

[17] The Major Development SEPP is available for download from : http://www.legislation.nsw.gov.au/fullhtml/inforce/epi%2B194%2B2005%2BFIRST%2B0%2BN/#pt.1-cl.1

- Licence holders responsibilities; and
- Regulations for pipeline system design, risk assessment criteria, construction, operation and maintenance.

Pipelines may be also be licensed or regulated under other legislation. Potential investors will need to consider whether the following four Acts, which apply to the construction of petroleum pipelines in NSW, applies to their proposal:

- *Petroleum (Onshore) Act 1991 (NSW)* – Onshore petroleum mining (extraction) plant gathering (wellhead to plant) pipelines;
- *Petroleum (Submerged Lands) Act 1982 (Cwth)* – Offshore petroleum plant gathering pipelines;
- *Dangerous Goods Act 1975*[18] – Processing and storage plant pipelines and short (usually less than 10km) inter-plant pipelines; and
- *Gas Supply Act 1996* – Natural Gas, LPG and other gas distribution pipelines.

State Environmental Planning Policy (Infrastructure) 2007 (NSW)[19]

This SEPP repeals the *State Environmental Planning Policy No 31—Sydney (Kingsford Smith) Airport.*

This SEPP provides for development on Sydney Kingsford Smith Airport without (NSW) consent. The SEPP lists the specific activities or classes of development for which this instrument applies. This instrument needs to be considered in conjunction with the *Airports Act 1996 (C'th) and particularly Part 5—Land use, planning and building controls.*

NSW Department of Planning decides whether an environmental impact statement (EIS) is necessary. The test laid down in s112 of the EP&A Act is whether the proposed activity "is likely to significantly affect the environment (including critical habitat) of threatened species, populations or ecological communities, or their habitats".

Furthermore, the proposer must not carry out an activity in respect of land that is critical habitat, or is likely to significantly affect threatened species, populations or ecological communities, or their habitats, unless a species impact statement (SIS) has been prepared in accordance with the *Threatened Species Conservation Act 1995.*

Where an EIS has been prepared, the public must be notified and given an opportunity to comment on the proposed activity. An SIS is subject to the similar public exhibition requirements. The proposers' must ensure that alternate routes for the pipelines are explored and details are made available for comment during the proposal development / consultation process.

Concurrently, the proponent, through the NSW Planning process, must ensure that the requirements in the Environment Protection and Biodiversity Conservation Act 1999 (C'th) are considered.

[18] *The Dangerous Goods Act 1975* and the *Dangerous Goods (General) Regulation 1999* were repealed in 2000. The requirements which relate to pipelines were included in the Savings and Transitional provisions of the Occupation Health and Safety Act (2001) and *Occupational Health and Safety Regulations 2001* - Schedule 3. Those provisions continue to have effect.
[19] A copy of the SEPP is available for download from: http://www.legislation.nsw.gov.au/viewtop/inforce/act%2B203%2B1979%2BFIRST%2B0%2BN/

Occupational Health and Safety Regulation 2001- Schedule 3

The *Dangerous Goods Act 1975* and the *Dangerous Goods (General) Regulation 1999* were repealed in 2000. The requirements which relate to pipelines were included in the *Savings and Transitional provisions of the Occupation Health and Safety Act (2001)* and *Occupational Health and Safety Regulations 2001 - Schedule 3.* Those provisions continue to have effect.

Schedule 3 of the *Occupational Health and Safety Regulations 2001* is provided below:

3 Saving of certain Dangerous Goods Regulation provisions relating to pipelines

(1) Despite the repeal of the *Dangerous Goods Act 1975* and the *Dangerous Goods (General) Regulation 1999*, the following provisions (which relate to pipelines) continue to have effect:

(a) clauses 192, 193 and 198 of that Regulation,

(b) for the purpose of those clauses, the definition of "pipeline" in section 4 of that Act.

(2) Contravention of a provision referred to in subclause (1) is an offence against this clause.

Maximum penalty: Level 4.

(3) The provisions referred to in subclause (1) do not apply to:

(a) the transport of any dangerous goods by road or rail, or

(b) any associated activity or matter,

to the extent to which the transport, activity or matter is regulated by the *Road and Rail Transport (Dangerous Goods) Act 1997* or any regulations under that Act.

Commonwealth Government approval processes

Airports Act 1996 (Cwth)[20]

Planning control on leased federal airports is vested in the Commonwealth under the *Airports Act 1996* (the Act), as these airports are essential elements of national economic infrastructure, and they are on Commonwealth land.

As part of the planning framework, airports are required to prepare the following:

- **Master Plan:** This is a 20 year strategic vision for the airport site which is renewed every five years. The Master Plan includes future land uses, types of permitted development, and noise and environmental impacts.
- **Airport Environment Strategy:** This sets out the airport's strategy to manage environmental issues within a 5 year period and beyond. It is the basis on

[20] A copy of the Airports Act 1996 is available for download from: http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/all/search/48E3461CE3A65473CA256F7100502D69

which the Commonwealth measures the environmental performance of airports and the document by which airport tenants will determine their environmental responsibilities.

- **Major Development Plan:** There is a requirement under the Airports Act for a MDP for any major airport development as defined under section 89 of the Act. This section captures developments with a significant environmental impact and provisions of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The purpose of a Major Development Plan is to establish the detail of a major development at the airport and to establish whether it is in line with the airport lease, and the final master plan for the airport.

The Australian Government's National Aviation Policy White Paper provides a coherent and strategic policy and planning framework for the aviation industry. The White Paper recognises improved planning at Australia's airports is necessary for better integration and coordination with off-airport planning and continued investment in Australia's airport infrastructure and land transport links.

As part of the White Paper, the Australian Government is initiating amendments to the Airports Act to support more effective public consultation and better alignment with other planning jurisdictions.

Environment Protection and Biodiversity Conservation Act 1999 (Cwth)[21]

Under the *Environment Protection and Biodiversity Conservation Act 1999 (Cwth)* ("the EPBC Act"), actions that have, or are likely to have, a significant impact on a matter of national environmental significance require approval from the Australian Minister for the Environment, Heritage and the Arts.

The eight matters of national environmental significance protected under the EPBC Act are:

- world heritage properties;
- national heritage places;
- wetlands of international importance (listed under the RAMSAR convention);
- listed threatened species and ecological communities;
- migratory species;
- the Great Barrier Reef Marine Park; and
- nuclear actions (including uranium mines).

[21] A copy of the EPBC Act is available for download from: http://www.legislation.nsw.gov.au/maintop/view/inforce/epi%2B641%2B2007%2BFIRST%2B0%2BN/

APPENDIX G

MELBOURNE AIRPORT

Melbourne Airport is located 22km north west of Melbourne and is owned and operated by Australia Pacific Airports Melbourne Pty Limited (APAM). QANTAS indicates that Melbourne is the most economic alternative fuel supply point to Sydney in the event of a disruption[22].

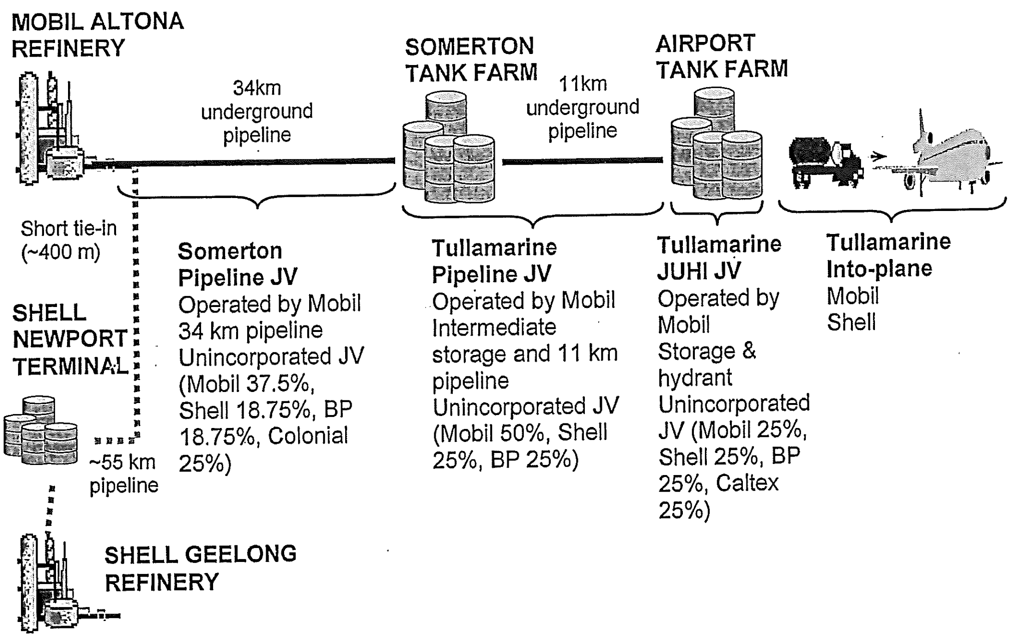
In 2008/09, Melbourne Airport experienced overall passenger growth of 2.1%[23]. The *2008 Melbourne Airport Master Plan* projects that total aircraft movements will grow from 180,200 in 2006/07 to between 263,200 and 316,500 movements annually in 2027/28, which indicates year-on-year growth of between 1.8% and 2.6%.

Average daily jet fuel demand at Melbourne Airport is 3.5ML (3.0ML to 4.0ML per day) and over 250 refuellings (via the hydrant system) take place each day. Jet fuel demand projections are not available from Melbourne Airport or Tullamarine JUHI operators.

1. Existing jet fuel infrastructure and logistics arrangements

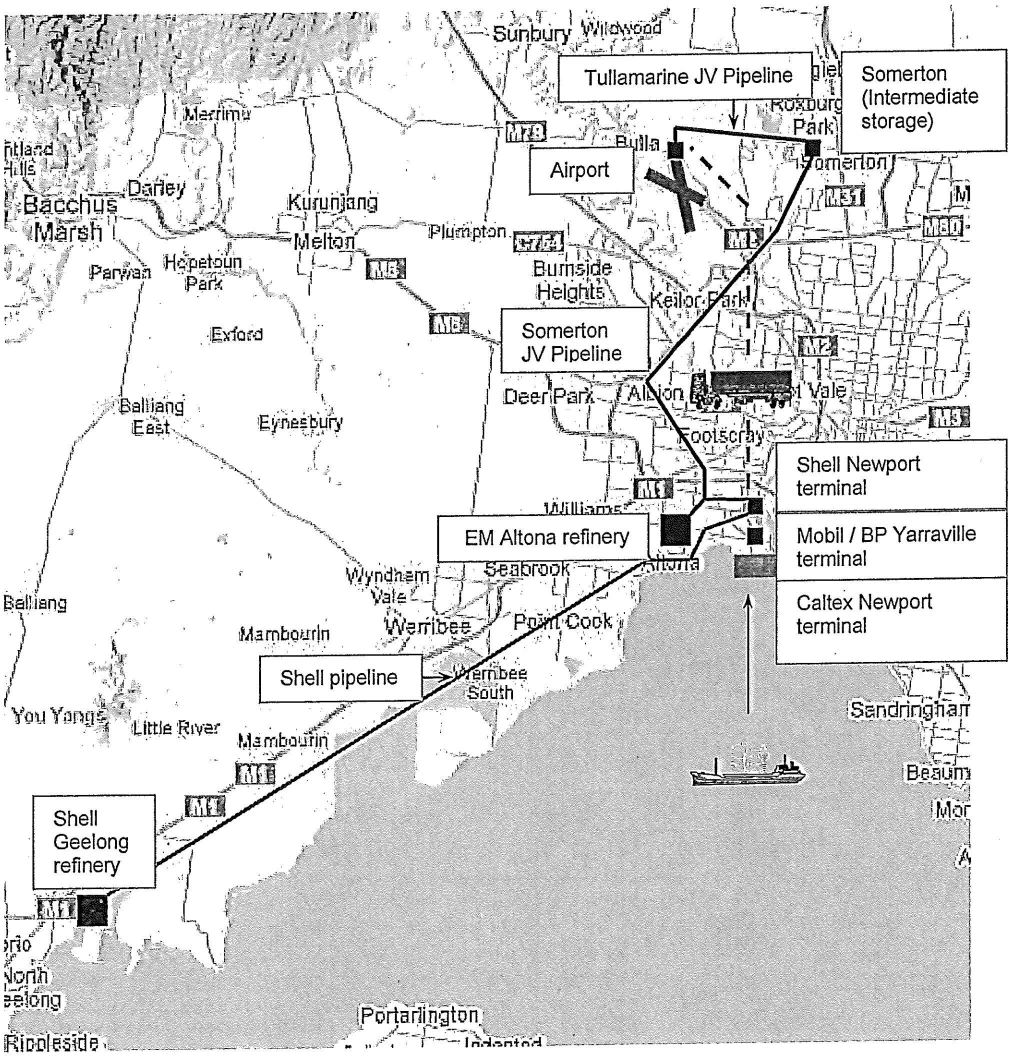
The jet fuel supply infrastructure to Melbourne Airport is shown schematically in Figures G1 and G2.

Figure G1: Jet fuel pipeline supply infrastructure network to Melbourne Airport[24]



[22] QANTAS submission, refer Appendix A7.
[23] Australia Pacific Airports Corporation Ltd, *Annual Report 2009*.
[24] Melbourne Airport, presentation slide provided to the working group on 7 April 2010.

Figure G2: Jet fuel supply chain to Melbourne Airport[25]



Notes:
(1) Competitor facilities and infrastructure based on public domain information
(2) Pipeline & terminal locations indicative

Mobil Oil Australia Pty Ltd (Mobil) operates the Tullamarine JUHI on behalf of the joint venture participants, consisting of Mobil, Shell, BP and Caltex. Mobil also operates the Somerton Pipeline Joint Venture, the 34km underground pipeline from Mobil's Altona refinery to Somerton; and the Tullamarine Pipeline Joint Venture which includes the Somerton tank farm and the 11km underground pipeline from Somerton to the Tullamarine JUHI.

The Somerton pipeline has a theoretical maximum pumping rate of 8.4ML per day. The submission lodged on behalf of the joint venture participants indicates that the utilisation and current pumping rates are well below design limits as it was originally designed for the carriage of multiple products.

The Tullamarine Pipeline is currently operating close to its maximum capacity of 3.2ML per day. The submission on behalf of Tullamarine Pipeline JV advises that the joint venture participants recently approved a pumping upgrade that will allow an increase in throughput rate of approximately 35% (i.e. to 4.5ML per day).

[25] Melbourne Airport presentation slide provided to the working group on 7 April 2010.

The Somerton tank farm contains two 12ML tanks and the Tullamarine JUHI storage depot contains 7ML of storage capacity. The JUHI operator advised that jet fuel transferred through the pipeline from the Somerton tank farm to the Tullamarine JUHI storage does not require recertification.

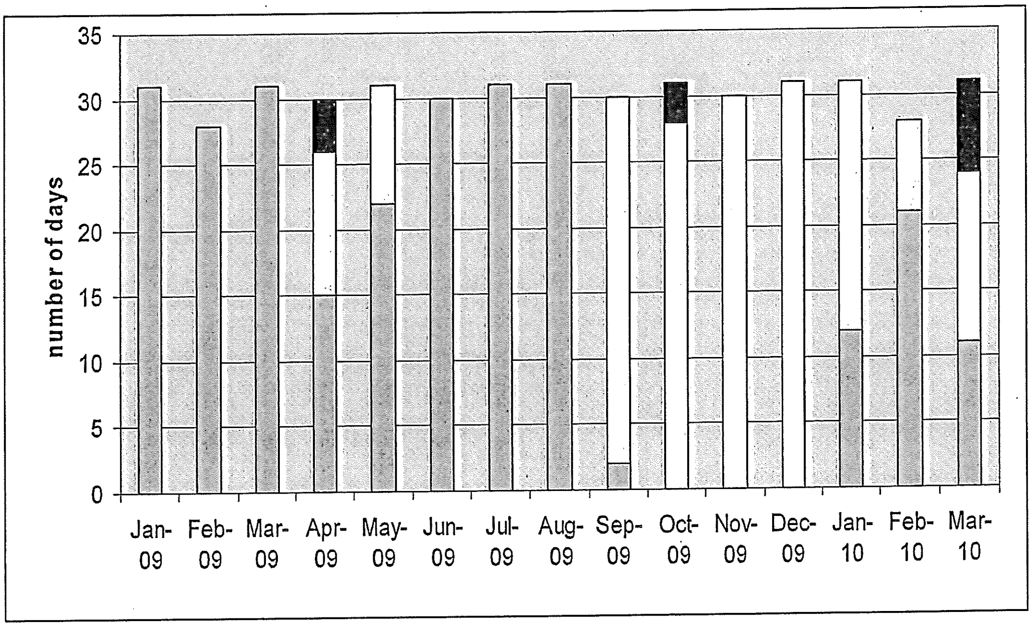
Pipeline supply is supplemented by product trucked to Melbourne Airport from the Mobil/BP Yarraville terminal and Caltex Newport terminal, located in Melbourne's inner-west. Fuel supply within the airport is dependent on hydrant infrastructure and the operators of Melbourne Airport view that tankering is not a viable option, except to supply a very limited supply of fuel into aircraft.

A stakeholder advised that imports of refined petroleum products via the Port of Melbourne currently occur at the rate of one shipment every three days and, given a number of these vessels do not currently carry jet fuel, the volume of jet fuel imported could be increased.

2. Status of jet fuel supply assurance at Melbourne Airport

Jet fuel supply assurance at Melbourne Airport has generally been stable; however there has been a significant increase in amber and red traffic lights since September 2009 (refer Figure G3).

__Figure G3: Traffic light colours posted for Melbourne Airport – January 2009 to March 2010__



The primary reasons for these amber and red lights include:

- a planned refinery turnaround taking place in September 2009;
- inability of one of the two Victorian refineries maintaining full production of jet fuel during October 2009 and December 2009;
- planned shut down of one refinery during the period October to November 2009;
- planned, non discretionary repair of two storage tanks at the Tullamarine JUHI Storage facility during November and December 2009; and

- delay in production and transfers following severe weather event in early March 2010.

Throughout the period the strategies of increasing imports, trucking and throughput of supplying pipelines were utilised to supplement and maintain sufficient jet fuel stocks at the Tullamarine JUHI storage facility.

3. Adequacy of jet fuel supply infrastructure

In its submission, APAM comments that the current jet fuel supply infrastructure is *"adequate to support current needs"*, and notes the following risks to the jet fuel supply chain:

- Low redundancy - Fuel supply to the airport could be compromised by any number of single point failures. For example, there is a single pipeline from the Somerton Depot to the JUHI depot and the JUHI depot holds only two days fuel supply.

- Reliance on one option for refuelling - Fuel supply within the airport is dependent on hydrant infrastructure as tankering is not a viable option.

- Future investment decisions - The longer term growth of Melbourne Airport is conditional on JUHI making investment decisions in line with APAM, and being given the appropriate investment signals.

APAM notes that substantial disruption to both domestic and international operators would be experienced if a single point failure or if an event disrupting the hydrant supply lines occurred. For example, refuelling of aircraft would need to be severely rationed and airline operators would need to refuel many of their aircraft at alternate ports.

The submission lodged on behalf of the joint venture participants advises that the utilisation and current pumping rates of the Altona to Somerton pipeline are well below design limits. The joint venture participants note that this underutilisation is due to the pipeline having been originally designed for carrying multiple products, rather than just jet fuel. Based on current infrastructure, future investment plans and Melbourne Airport Authority's projections in passenger and aircraft numbers, the joint venture participants consider there are no significant, unmanageable issues with current or future supply of jet fuel to Melbourne Airport.

QANTAS indicated they would support the expansion of the Somerton to JUHI pipeline and the directional change of the Altona pipeline to the Yarraville terminal to allow direct transfers of imports. QANTAS recommends that in the long term there should be increased or open access to the Somerton terminal and the Somerton to JUHI pipeline.

4. Emerging supply chain issues

The NOC commentary during October 2009 noted that the only strategy used to meet the increase in demand was an increase in trucking from the nearby storage terminals to the Tullamarine JUHI storage facility. This indicates that there may be an emerging constraint with the Somerton to Tullamarine pipeline capacity.

The above comment supports the 2009 ACIL Tasman finding that the pipeline capacity to the Tullamarine JUHI *"is somewhat constrained and may require augmentation to its capacity in the near future"*[26].

The Working Group notes that an expansion of Tullamarine Pipeline's capacity has already been approved by Tullamarine Pipeline JV participants.

5. Concluding remarks

Based on the information provided and the strong views communicated by the key stakeholders of Melbourne Airport, the Working Group considers that the existing jet fuel supply infrastructure is sufficient to meet current demand.

As jet fuel demand projections and information on the adequacy of the existing infrastructure to meet longer term demand is not available at this time to enable a full assessment, the working group can only comment with limited confidence about potential action required to reduce the risk of supply shortages in the longer term.

Stakeholders with an interest in jet fuel supply to Melbourne Airport may wish to consider:

- increasing capacity (or duplication) of the Somerton to Tullamarine pipeline (Tullamarine Pipeline pumping upgrade investment has already been approved by Tullamarine Pipeline JV participants);
- reviewing available options to make better use of currently under utilised pipeline capacity to Somerton and reduce dependence on trucking fuel to the airport in the future.

The Working Group considers that the application of Recommendation 5 should be extended to Melbourne Airport to enable the assessment of potential future infrastructure needs. As noted in chapter 7, the availability of jet fuel demand projections may lower the investment risks and encourage potential investors to commit to necessary jet fuel infrastructure investments in a timely fashion.

Therefore, the Working Group recommends that:

10. Jet fuel demand projections be determined by appropriate industry representatives as part of all future Melbourne Airport Master Plans.

[26] ACIL Tasman, *Petroleum Import Infrastructure in Australia*, 2009.

APPENDIX H

BRISBANE AIRPORT

Brisbane Airport is located approximately 13km from the central business district and is owned and operated by the Brisbane Airport Corporation Pty Limited (BAC). QANTAS views Brisbane as the second most important alternative fuel supply point (following Melbourne) in the event that fuel disruption events at Sydney Airport result in support being required.

In 2009, Brisbane Airport experienced overall passenger growth of around 2% to just over 19 million passengers[27]. The *2009 Brisbane Airport Master Plan* projects international movements will grow at an average of 3.9% annually over the next 20 years, with domestic movements growing at 4% annually over the same period. By 2029, Brisbane Airport is forecast to be handling approximately 358,000 annual aircraft movements.

Table H1 contains the jet fuel demand projections to 2029/30 provided by BAC in its submission.

Table H1: Average daily jet fuel demand projections – Brisbane Airport

	2008/09	2014/15	2019/20	2029/30
Average daily International demand (ML per day)	1.35	1.75	2.0	2.55
Average daily Domestic demand (ML per day)	1.35	1.74	2.44	2.84
Total jet fuel demand (ML per day)	**2.7**	**3.49**	**4.44**	**5.39**

1. Existing jet fuel infrastructure and logistics arrangements

Brisbane Airport currently has two major jet-A1 fuel installations. The primary storage facility is on Hakea Street between the domestic and international terminals and includes three above ground tanks with total 6ML storage capacity. The secondary storage facility is located on the corner of Lomandra Drive and Viola Place and contains one storage tank of 2.5ML storage capacity.

The secondary facility is due for decommissioning following the expiry of the current lease in April 2012. It is proposed that the 2.5ML storage capacity will be removed and a new 4ML storage tank will be constructed at the primary JUHI, which will result in an effective total increase in storage capacity of 1.5ML at Brisbane Airport.

BP and Caltex produce jet fuel at their respective refineries, Bulwer Island and Lytton. Shell and ExxonMobil have terminals that provide for the receipt of jet fuel from local or overseas refineries. Jet fuel is transferred from these facilities via pipeline to the on-airport storage facilities (refer Figure H1). All facilities and assets associated with the on-airport storage and hydrant system is owned and operated by an unincorporated joint venture, in which BP, Caltex, ExxonMobil and Shell participate. Shell is the joint venture operator and the assets are operated under operating lease and license arrangements with the Airport and the joint venture's working protocols.

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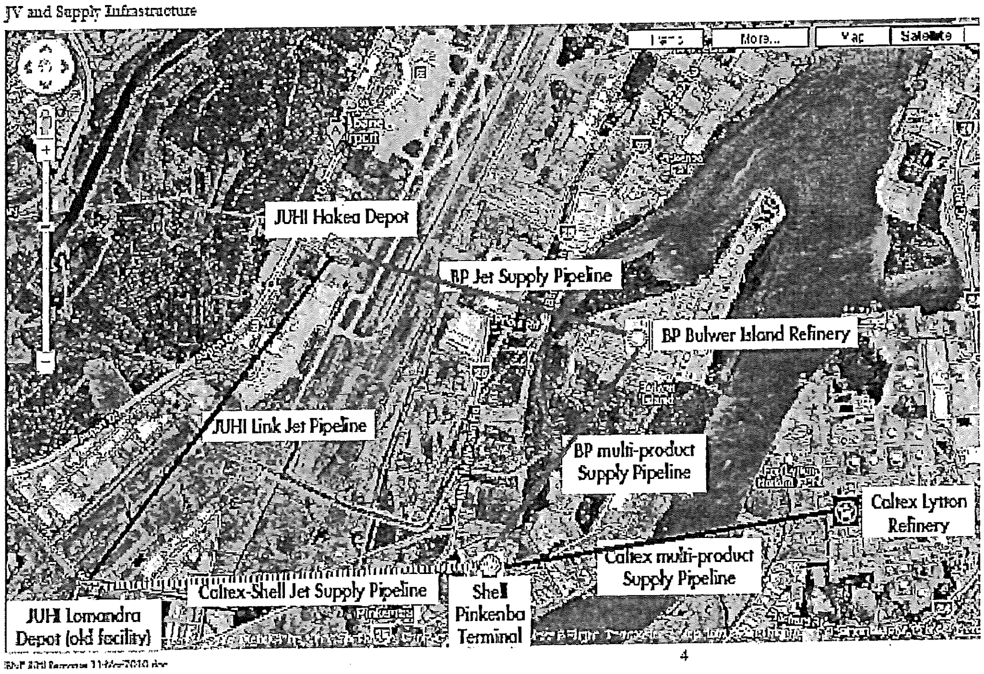
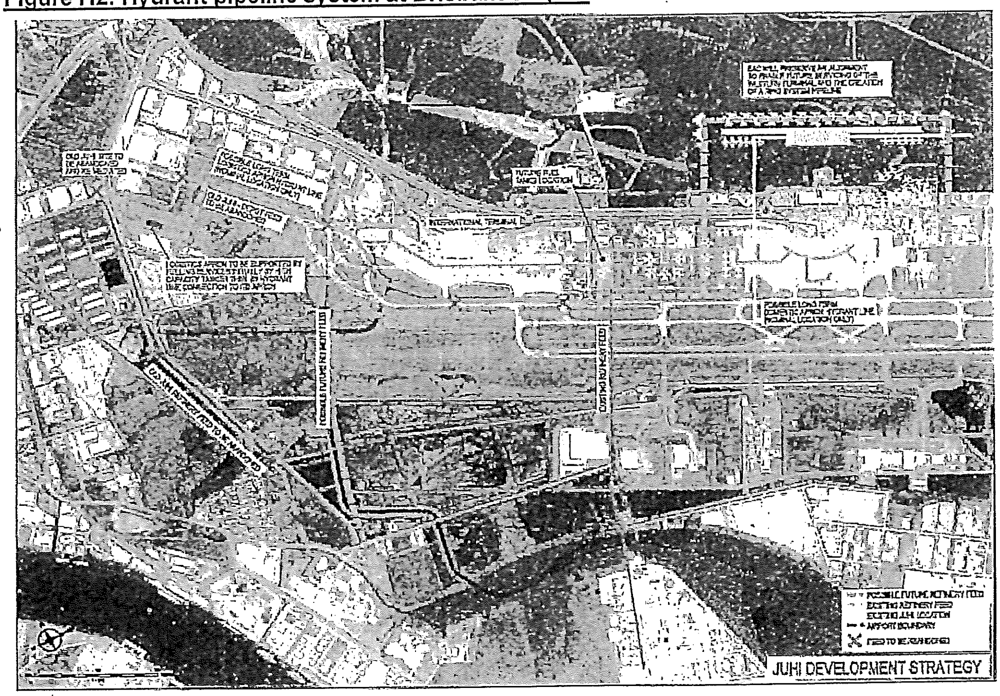
27 BAC Holdings Limited 2009 Annual Report

Figure H1: Jet fuel supply infrastructure to Brisbane Airport



The International and Domestic aprons are serviced by pipelines from the Hakea Street JUHI (refer Figure H2). There are seven hydrant pumps at Hakea Depot, each with capacity of 3800 litres/minute, the pipeline to the International apron is a high capacity 600mm pipeline, and the pipeline to the Domestic apron is a medium capacity 450mm pipeline. The Logistics apron and the regional aircraft and remote stands on the Domestic apron are serviced by tanker fuelling.

Figure H2: Hydrant pipeline system at Brisbane Airport



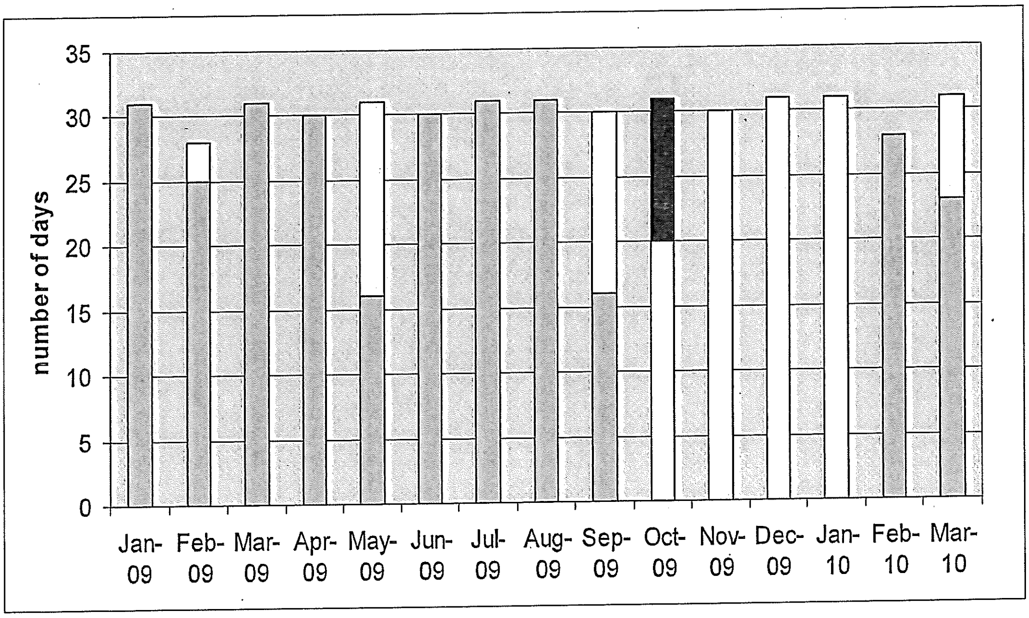
Submission to the Sydney Jet Fuel Infrastructure Working Group
Brisbane Airport Corporation Pty Limited, March 2010

The Ground Service Equipment (GSE) and airside vehicles refuelling requirements (diesel and unleaded fuel) are addressed by several facilities with airline leased and licensed areas. Due to the Domestic apron works, the QANTAS GSE fuelling facility has been removed and road tanker based servicing introduced for a select area of the apron to temporarily fulfil aviation equipment needs.

2. Status of jet fuel supply assurance at Brisbane Airport

Jet fuel supply assurance at Brisbane Airport has generally been stable. However, amber lights have been posted on an on-going basis during the period September 2009 to January 2010 and red lights were posted in October 2009 (refer Figure H3).

Figure H3: Traffic light colours posted for Brisbane Airport – January 2009 to March 2010



The primary reasons for the amber and red lights include:

- low stocks at supplying terminals in anticipation of imports and a supplying terminal having a conductivity issue with a jet fuel batch in September 2009;
- one of the local refineries being unable to maintain full production due to ongoing maintenance during October 2009;
- one of the local refineries being unable to maintain full production due to a quality issue during the period October 2009 to December 2009;
- scheduled tank cleaning at one refinery during November 2009;
- one rundown tank being out of service at a supplying refinery during the period November 2009 to January 2010;
- potential crude-related quality issues (requiring optimisation of crude slate to minimise impacts on production) and production problems flagged at one refinery during the period December 2009 to end of January 2010; and
- both refineries flagging potential production problems during January 2010.

Throughout the period the strategies of sourcing alternate supply from interstate and international sources was utilised to supplement and maintain sufficient jet fuel stocks at the on-airport storage facilities at Brisbane Airport. The NOC traffic light reports indicated to stakeholders that the above issues were not expected to impact on the level of jet fuel stocks at Brisbane Airport.

3. Adequacy of jet fuel supply infrastructure

Storage capacity

The BAC submission infers that the current on-airport storage capacity is equivalent to approximately 3.5 days of current average demand and would equate to 1.5 days of average demand in 2029/30.

BAC further note in its submission that, once the planned additional storage capacity is constructed following the decommissioning of the Lomandra storage depot, on-airport storage capacity will be sufficient until 2015.

Based on current joint venture infrastructure and projected demand growth for Brisbane Airport, the JUHI joint venture participants consider there is an urgent need for additional and centralised jet fuel storage at Hakea Depot to maintain future operational and supply integrity.

Jet fuel supply infrastructure (pipelines) to Brisbane Airport

BAC understand that the throughput rate of the supplying pipeline to the Hakea storage depot needs to be increased in the medium term to align with future jet fuel demand.

Whilst QANTAS does not view any logistical or infrastructure issues for aviation supply in Brisbane, QANTAS indicated that the recent production issues and reliability incidents in Brisbane have lowered production and highlighted the reliance of the Sydney aviation market on Brisbane production levels.

Hydrant system

The submission on behalf of the JUHI joint venture participants indicates there is space in the current location for the installation of three further pumps in the future.

4. Emerging supply chain issues

In its submission, BAC indicates that the following investments will be required in the short to medium term (i.e. next 10 years) to align with projected jet fuel demand growth:

- modified and new facilities at the Common User Domestic Terminal;
- an additional primary apron hydrant feeder route to the apron expansion areas to the northern apron of the Domestic apron;
- new facilities at the International Terminal;
- the installation of additional storage tanks at the Hakea storage depot and at locations that do not encroach further towards the 01/19 parallel taxiway system;

- additional larger capacity aircraft refuelling vehicles or preferably the reinstatement of an in-ground fuel hydrant system at the logistics apron over the next 5 years;
- the possible medium-term installation of a replacement higher capacity feed line from the Shell Pinkenba facility to the Hakea storage depot in a long-term secure alignment airside; and
- for ground fuels, the establishment of suitable common user GSE and airside refuelling facilities within a functional operating distance of the major apron areas.

In the longer term (10+ years), BAC anticipates that the Hakea storage depot will be retained and a long-term reservation within the *Future Aviation Facilities Area* of sufficient size for an additional or consolidated storage depot will be allocated. BAC views it is appropriate that investment costs for future jet fuel facilities are borne by the JUHI joint venture participants.

The JUHI joint venture participants indicated that they cannot remediate the Lomandra facility or surrender the Lomandra depot lease, and maintain reliable supply without the proposed new storage tank at Hakea Depot. The JUHI joint venture participants further advised that investment in new joint venture facilities is contingent upon the joint venture securing a long term lease for the Hakea Depot.

BAC additionally noted that implications of development of the International Terminal in the vicinity of the Hakea storage depot might become more critical in the medium term. BAC believe that the JUHI joint venture participants should demonstrate that it has adequately and carefully considered all safety and security hazards and factors relevant to retaining existing and proposed new jet fuel storage facilities at the Hakea depot.

BAC suggested that an independent report on safety and security matters (including any required exclusion zone around the Hakea depot) should be provided. BAC alternatively suggested that the aviation industry should consider providing safety and security standards or recommendations for fuel facilities on Airports.

5. Concluding remarks

The Working Group acknowledges that jet fuel demand projections have been developed by BAC and provide a robust basis for assessing the adequacy of current jet fuel supply infrastructure and identifying future jet fuel supply infrastructure needs. However, the jet fuel demand projections are not included in the *2009 Brisbane Airport Master Plan*.

As discussed in the report in respect to Sydney and Melbourne Airport, the Working Group considers that the availability of jet fuel demand projections to potential investors will reduce investment risk and encourage investment decisions.

Therefore, the Working Group recommends that:

11. Jet fuel demand projections be determined by appropriate industry representatives as part of all future Brisbane Airport Master Plans.

Based on the information provided by Brisbane Airport stakeholders, it is apparent that infrastructure decisions will be needed in the short, medium and long term to ensure the jet fuel supply infrastructure is adequate to meet projected demand to 2030.

However, and as with Sydney Airport, security of tenure of the on-airport storage facility is an issue that needs to be resolved in the very near term to allow potential investors with the required certainty to make decisions.

The Working Group notes that the BAC has drafted a Memorandum of Understanding that suggests longer term tenure for the Hakea storage depot post 2012. The Working Group encourages BAC and the JUHI joint venture participants to conclude negotiations in a timely fashion to allow investment decisions and necessary infrastructure build to occur with minimal negative impact on the security of jet fuel supply at Brisbane Airport.

Annexure 2: *SYDNEY AIRPORT MASTER PLAN* (2009)

Sydney Airpor
Master Plan

2009

Foreword

I am pleased to present Sydney Airport's Master Plan 2009.

The plan updates Sydney Airport's previous Master Plan and outlines our vision for the operation and development of Australia's premier airport to the year 2029.

Efficient airports are an essential part of the transport networks for all successful modern economies. Sydney Airport is no exception – it is Australia's international gateway and connects Sydney – Australia's only global city – to other global cities and to other parts of Australia.

As one of Australia's most important pieces of infrastructure, the $8 billion of economic activity Sydney Airport generates annually is equivalent to 6% of the NSW and 2% of the Australian economy. This substantial economic contribution translates into well-paid jobs for Sydneysiders. In fact, Sydney Airport provides or generates more than 75,000 jobs and about 131,000 jobs indirectly, making a total of around 206,000 jobs.

Sydney Airport's proximity to the Sydney Central Business District also provides our vital tourism, major events and conference industries with a unique advantage. However, in fulfilling this vital role, we must strike the right balance between the economic benefits that Sydney Airport delivers and its environmental impacts. In particular, managing climate change and aircraft noise impacts are key challenges, not just for Sydney Airport but for all major airports. Technological innovation will help drive environmental improvements at Sydney Airport. The global fleet of commercial aircraft is undergoing a significant technological transformation. As a result, aircraft are now quieter, cleaner, more efficient and consume less fuel.

Over the 20 year planning period to 2029, we will see further technological innovation and environmental improvements both in aviation and in changes to the built environment of, and transport links, to the Airport.

The Master Plan shows how Sydney Airport will invest in new infrastructure over the next 20 years to sustainably accommodate the forecast growth in airline travel. This will ensure Sydney Airport continues to deliver employment growth and economic wealth to the people of Sydney, NSW and Australia.

Russell Balding, AO

Chief Executive Officer
Sydney Airport Corporation Limited

APPENDICES

FIGURES

TABLES

9.0 Aviation Support Facilities and Utilities – Master Plan Concept

There are a range of aviation support activities at Sydney Airport that support the core airline business of transporting passengers and freight. Facilities to support these activities include supply, storage and distribution of aviation fuel, aircraft maintenance, ground support equipment storage and maintenance, and flight catering. Support utilities include electricity, gas, telecommunications, water supply, sewerage and stormwater drainage.

9.1 Aviation fuel

The safe and continuous supply of on-time and economically delivered jet fuel is a critical component of airport operations. Any disruption to the fuel supply chain can have significant flow-on effects to all aircraft movements and passengers. Sydney Airport's aviation fuel requirements currently represent approximately 40 per cent of the national aviation fuel market.

9.1.1 Existing facilities

Jet fuel is supplied to Sydney Airport by two underground pipelines owned by Shell and Caltex from their respective refineries. BP and ExxonMobil supply fuel from their bulk storage terminal using the Caltex pipeline.

Jet fuel supplied from these underground pipelines is stored at the Joint User Hydrant Installation (JUHI) located at the northern end of the International Precinct. The JUHI is an unincorporated joint venture currently comprising BP, Caltex, ExxonMobil, Shell and Qantas. Shell operates and manages developments for the facility on behalf of the participants.

A number of the GA and helicopter operators have small refuelling storage facilities and equipment located in close proximity to their main facilities, either operated by the oil companies or by the operators themselves. Qantas also has some onsite storage at the Jet Base.

Jet fuel is distributed across the Airport from the JUHI storage facility, via a number of underground pipelines, to apron hydrant outlets located adjacent to aircraft gates.

'Into-plane' dispensing is undertaken directly by the fuel companies or by other entities established by the oil companies. Specialist hydrant refuelling vehicles are used for this task and their administrative and maintenance support is accommodated as part of the JUHI facility.

Bulk tanker vehicles are used for the fuelling of regional, GA aircraft and helicopters where hydrant access is not available. These mobile tankers and dispensers are parked at a number of locations on the Airport in close proximity to aircraft aprons, but receive maintenance and servicing at the JUHI facility.

9.1.2 Current capacity

The current Shell and Caltex supply pipelines are assumed to be capable of delivering a combined capacity of 8.8 million litres per day. The current storage capacity at the JUHI facility is 28.2 million litres contained in five bulk tanks. In practice, the operational reserves will be less than this total capacity as not all tanks can be 'on line' at any given time. This limitation is the result of fuel quality control procedures and required separation of fuel receival and supply actions. The arrangements provide for two to three days reserve capacity at current consumption rates.

9.1.3 Future demand and development concept

The forecast increase in aircraft movements, coupled with a general increase in aircraft size across the fleet, will result in the need for additional supply and pump capacity and augmentation in storage.

9.1.4 Pipeline supply

Caltex is upgrading the capacity of the supply pipeline between Botany and Sydney Airport. To provide additional capacity an additional pipeline may be constructed.

9.1.5 Storage

Storage is currently catered for in the existing JUHI facility. This site could physically fit another two large tanks, possibly requiring the relocation of existing GSE facilities including refueller parking areas, workshops and support buildings.

The current JUHI storage facility can remain in its current location in the medium to longer term, until the development of T1 requires its relocation. In the interim, the existing JUHI site will be retained and developed to meet forecast demands. Sydney Airport and JUHI are working together to determine the most effective solution for the provision and storage of fuel.

For the longer term, offsite storage opportunities are possible. Offsite storage would provide flexibility in storage volumes, system redundancy and other issues.

9.1.6 Hydrant system

The expansion of the apron areas and additional and modified aircraft gates may require augmentation of the on-airport hydrant distribution pipelines. This may extend to the provision of fuel to some of the international stands particularly in the South-west sector and at the Northern Pond to enable fuelling of aircraft operating from remote gates. The existing apron hydrant systems are proposed to be extended incrementally to serve the expanded T2 and T3 gates.

9.1.7 JUHI maintenance and tanker parking areas

If additional fuel storage tanks are installed at the existing JUHI site the vehicle maintenance and administrative buildings and the tanker parking areas may need to be relocated. The administrative and maintenance facilities could be relocated to the South-east Sector adjacent to the SACL Airport Operations and Maintenance Depot. Dedicated tanker parking and refilling depots would be provided near T2/T3 to facilitate efficient aircraft refuelling.

9.2 Aircraft maintenance

9.2.1 Range of maintenance facilities

The provision of facilities to conduct aircraft maintenance is an important component of operating a safe and efficient airline business. Mandatory provisions apply to many aspects of aircraft maintenance.

There are three main types of aircraft maintenance activities:

- line/station maintenance – this occurs during transits and turnarounds and can be performed at the aircraft gate;
- base maintenance – this requires ground-time in a hangar with simple access docking, or at a gate away from the terminal. Some non-routine maintenance and supplemental checks can be carried out at an aircraft parking position in favourable weather conditions. Ground-time periods can range between 20 and 36 hours; and
- heavy maintenance – this requires significant ground-time in a hangar with extensive docking capability. Ground-time periods can range between 6 to 50 days depending on the type of heavy maintenance being performed.

In addition to hangars, there is a need for support functions such as workshops, component stores and engine run facilities.

9.2.2 Existing facilities and current capacity

Existing dedicated maintenance hangar facilities are all located in the North-east sector. Aircraft maintenance activities undertaken at Sydney Airport consist of the first two of the categories listed above. Sydney Airport is the home base for the Qantas international and domestic network and there is significant aircraft ground-time that can be used to undertake aircraft maintenance.

Qantas currently holds a long term lease (expiring within the planning period) over a large area in the northern part of the North-east sector, known as the Qantas Jet Base. The Jet Base has a range of line and base maintenance facilities, including two engine run bays adjacent to the Northern Pond. Qantas also undertakes maintenance work for other carriers.

Over time, the activities performed in the Jet Base have expanded with non-essential aircraft interface activities being performed on land beyond the Airport boundary. This trend to off-airport locations will continue as demand increases for aircraft parking areas on the airfield.

Aircraft maintenance is also currently undertaken in the General Aviation Precinct in conjunction with fixed base operator (FBO) functions. Regional Express also has an aircraft maintenance presence in this Area.

9.2.3 Development concept

The development concept provides for line and base maintenance facilities in four locations:

- Qantas Jet Base area – six aircraft hangar bays can be retained and redeveloped in their existing locations. A new 'hush' hangar is proposed to replace the existing two ground running bays. A further two aircraft hangar bays could also be developed in this area;
- North-east sector – Three wide-bodied aircraft hangar bays are proposed along Ross Smith Avenue;

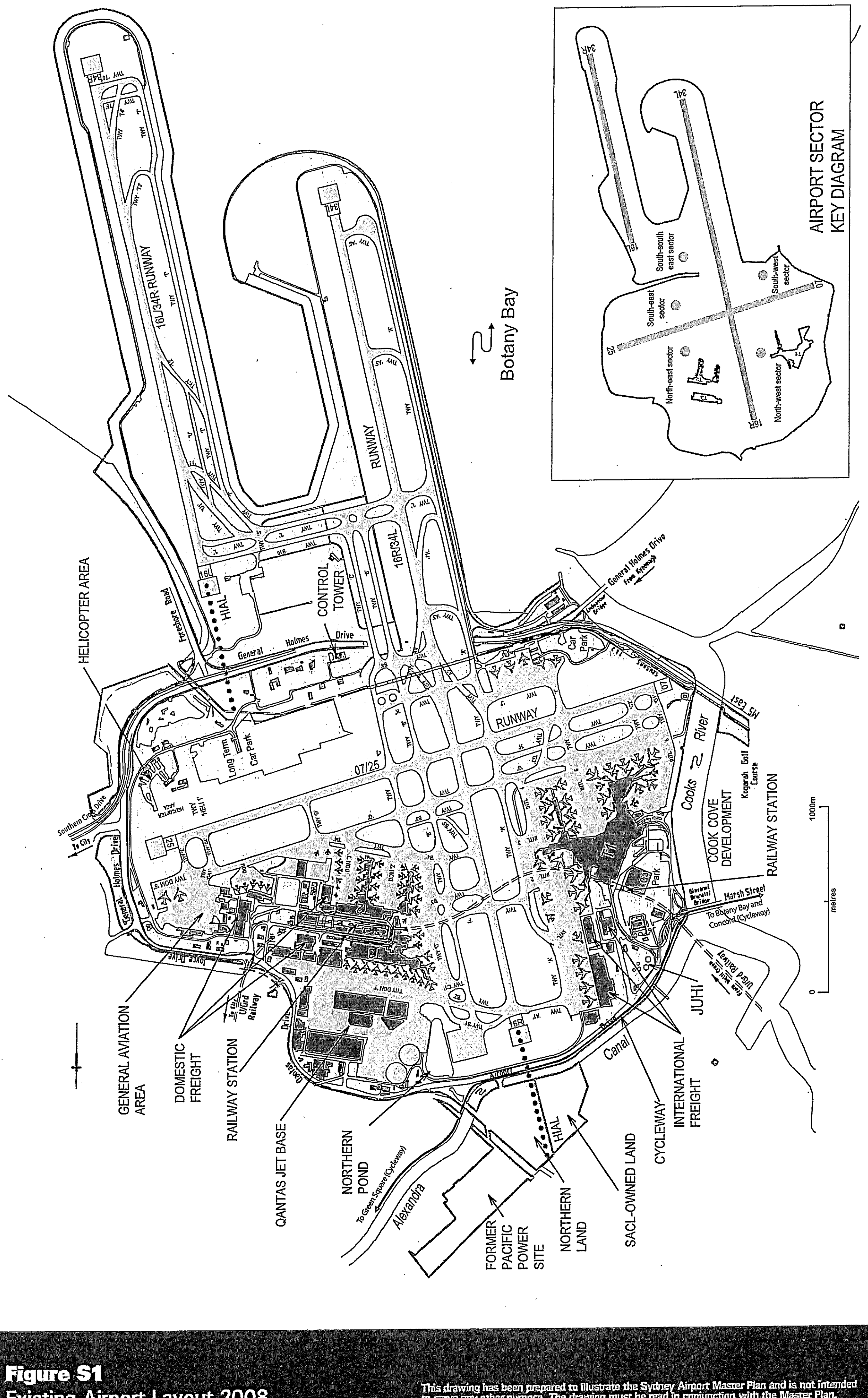


Figure S1
Existing Airport Layout 2008

This drawing has been prepared to illustrate the Sydney Airport Master Plan and is not intended to serve any other purpose. The drawing must be read in conjunction with the Master Plan.

Annexure 3: SHELL PRESS RELEASE – Proposal on future of Clyde Refinery - 12 April 2011

MEDIA RELEASE

Proposal on future of Clyde refinery

12/04/2011

Shell today announced a proposal to convert its Clyde Refinery and Gore Bay Terminal in Sydney Australia into a fuel import terminal.

If accepted by the relevant Shell Australia boards, the proposal would see the end to refining operations at the site, with Clyde converted to a competitive fuel import terminal, well located to supply the New South Wales market and the growing western suburbs of Sydney.

The proposal recognises the 75,000 barrel per day Clyde Refinery is no longer competitive against new mega-refineries in the region – and requires significant investment including a maintenance turnaround scheduled for mid 2013.

Employees at Clyde and Gore Bay have been informed of the proposal and a period of consultation with them and their representatives will be undertaken before a decision is made on the proposal.

"The proposal to convert Clyde into a terminal is consistent with Shell's strategy to focus its refining portfolio on larger integrated assets, and to build a profitable downstream business here in Australia," said Shell vice-president, Andrew Smith.

"Shell acknowledges the valuable contribution made by local employees in servicing the New South Wales market for more than 100 years. We commit to a timely consultation process and to providing support to our employees during this period," added Mr Smith.

Shell's commitment to growth and investment in its Australian downstream business includes recent announcements, such as:

- construction of new diesel storage in Mackay, Newcastle, Kalgoorlie and King Bay in WA;
- $47 million investment in a water processing plant at the Geelong Refinery;
- $27 million investment in bitumen facilities at the Geelong Refinery and in Brisbane;
- construction of a new wharf on the Brisbane River; and
- an $80 million investment in retail sites – Shell's largest ever investment in service stations.

Over the next ten years Shell anticipates being one of Australia's largest investors – with Australia underpinning Shell's next tranche of global LNG growth.

- Ends -

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