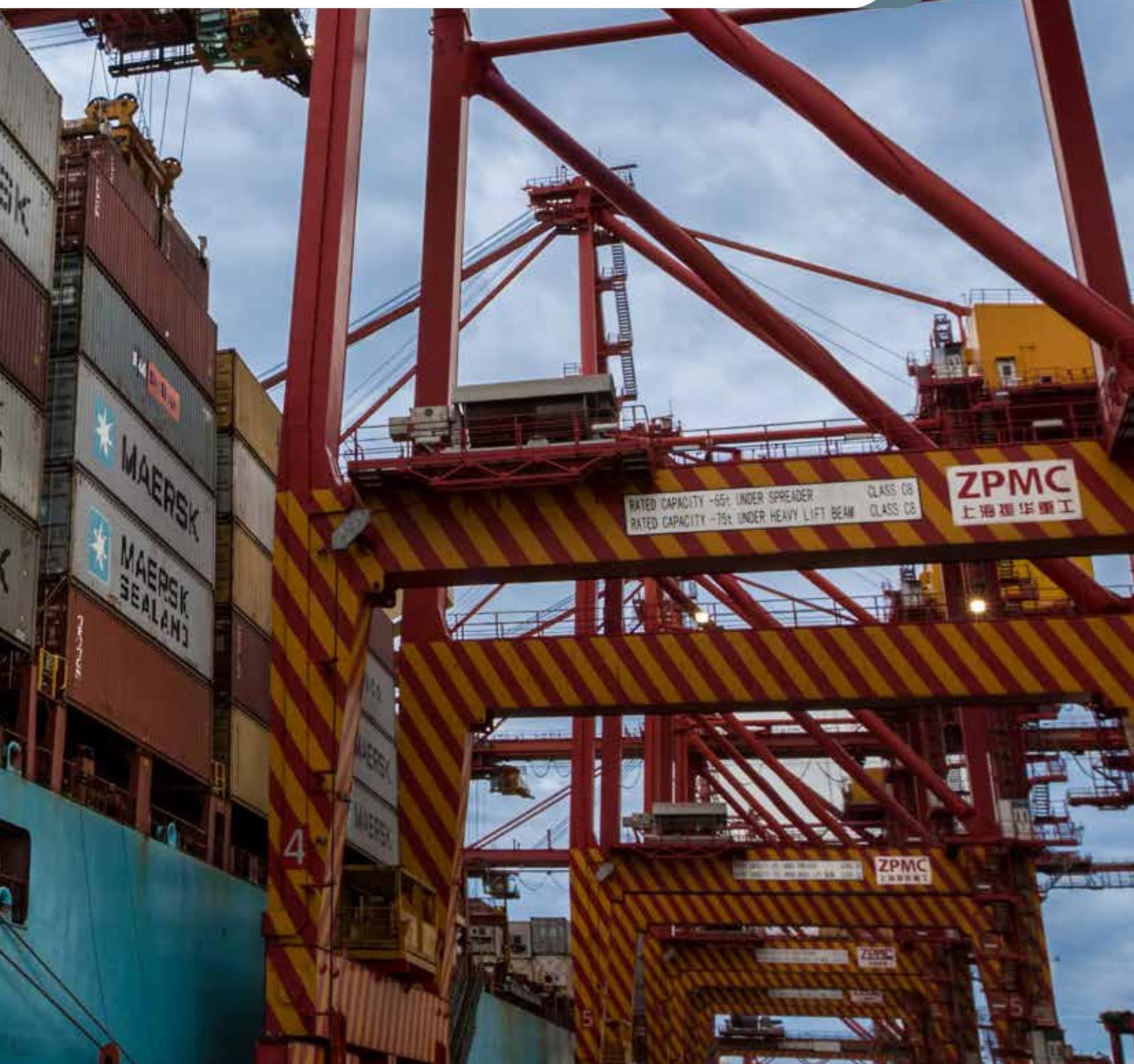


PORT BOTANY: THE NEXT 30 YEARS



Port Botany will remain Australia's premium port and NSW's primary container, bulk liquids and gas port servicing Australia's largest population centre.

Port Botany is central to the future economic growth and prosperity of Sydney and NSW. Facilitating the efficient and sustainable handling of growing trade volumes through the Port will maximise economic benefit for the State and minimise environmental impacts on the local and wider community. Without this, inefficiencies in the port supply chain will result in additional costs borne by consumers and businesses.

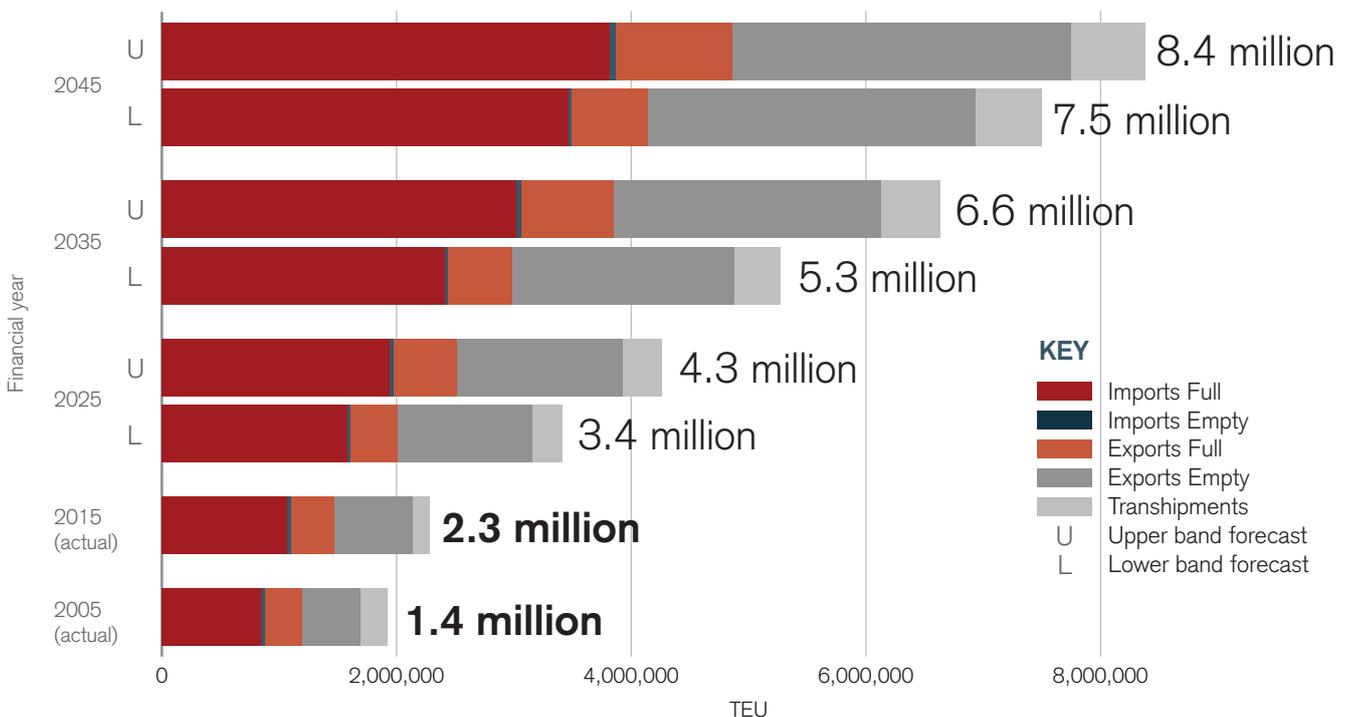
Trade Demand

Containers

The primary form of trade through Port Botany is containers. Port Botany is expected to become Australia's largest container port by volume in the next 30 years. Containers are forecast to grow from 2.3 million TEU now to between 7.5 million and 8.4 million TEU per year by 2045.

The key drivers of container growth through Port Botany are domestic demand, population growth, the strength of the NSW economy, the value of the Australian dollar, levels of domestic manufacturing, government trade policies and the location of key distribution centres.

Container forecasts



What's in the box? Items we import and export in containers.

Import categories



Export categories



Note: Based on 2014 financial year data.

Growth of full import containers over the next 30 years will be stronger than full export containers, resulting in an increase in empty container exports from 62 per cent of exports now to more than 74 per cent by 2045.

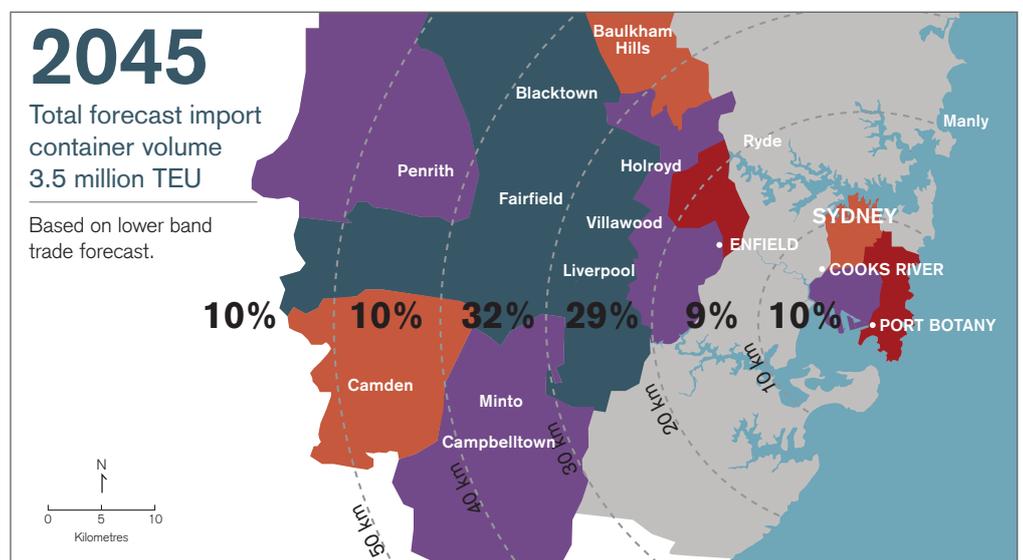
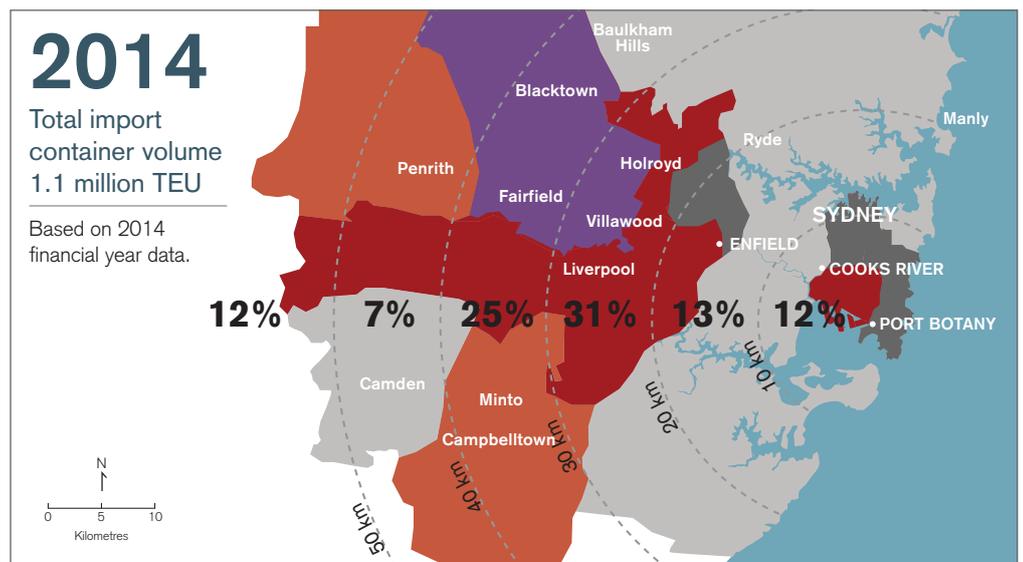
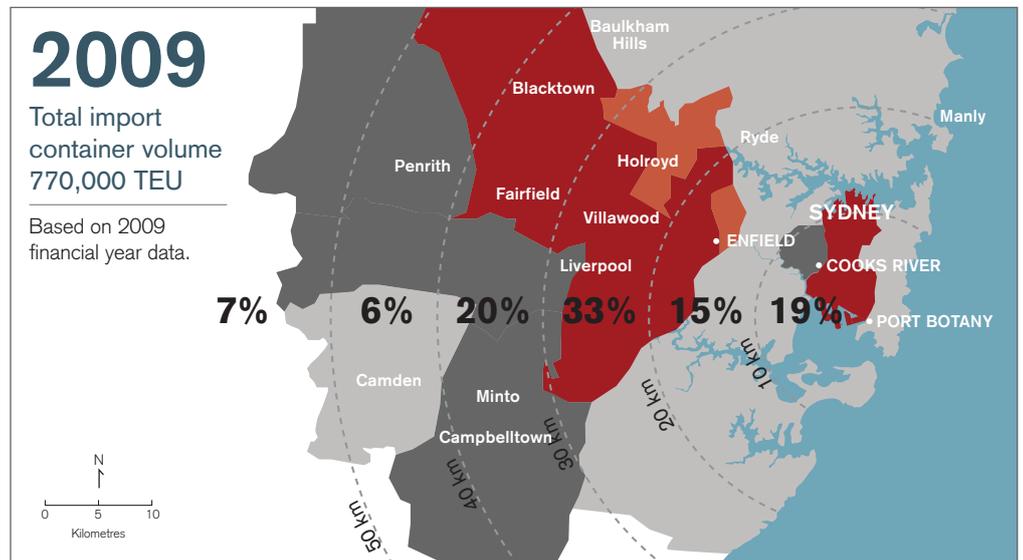
Container trade from Asia dominates container imports and exports through Port Botany. This is expected to remain for the next 30 years, with direct European services expected to be replaced with transshipments via Asia.

Over 80 per cent of import containers through Port Botany are delivered within a 40 kilometres radius of the Port, remaining within metropolitan Sydney. The goods associated with those 80 per cent of import containers are either destined for the Sydney market or are unpacked at Sydney-based distribution centres, repackaged, and distributed to regional NSW or interstate.

While we expect this trend to continue, there will be an upward shift in the proportion of containers destined for Sydney's western and south-western suburbs, especially to the local government areas of Blacktown, Fairfield, Holroyd and Liverpool, due to the availability of large parcels of land and the lower cost of land for the development and operation of distribution centres in these local government areas.

Distribution of import containers

Over 80 per cent of import containers through Port Botany are delivered within a 40 kilometre radius of the Port and this will remain over the next 30 years.



KEY

- Greater than 170,000 TEU
- 80,000 to 170,000 TEU
- 45,000 to 80,000 TEU
- 30,000 to 45,000 TEU
- 20,000 to 30,000 TEU
- 0 to 20,000 TEU
- % percentage of imported containers within 10 kilometre radius bands.

Note: Distribution mapped by local government area.

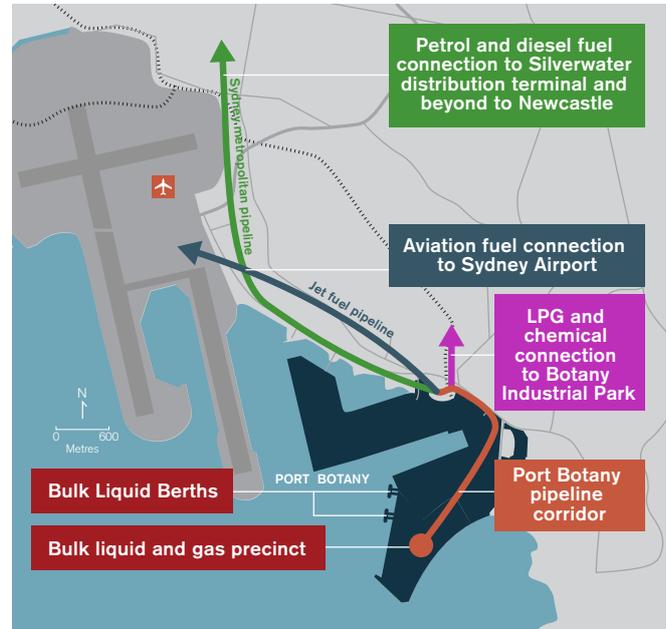
Bulk Liquid and Gas

The Port Botany bulk liquid precinct handles 4.7 million kilolitres of bulk liquids and gas each year and is forecast to handle 7.3 to 8.3 million kilolitres a year by 2045, primarily driven by growth in refined petroleum imports.

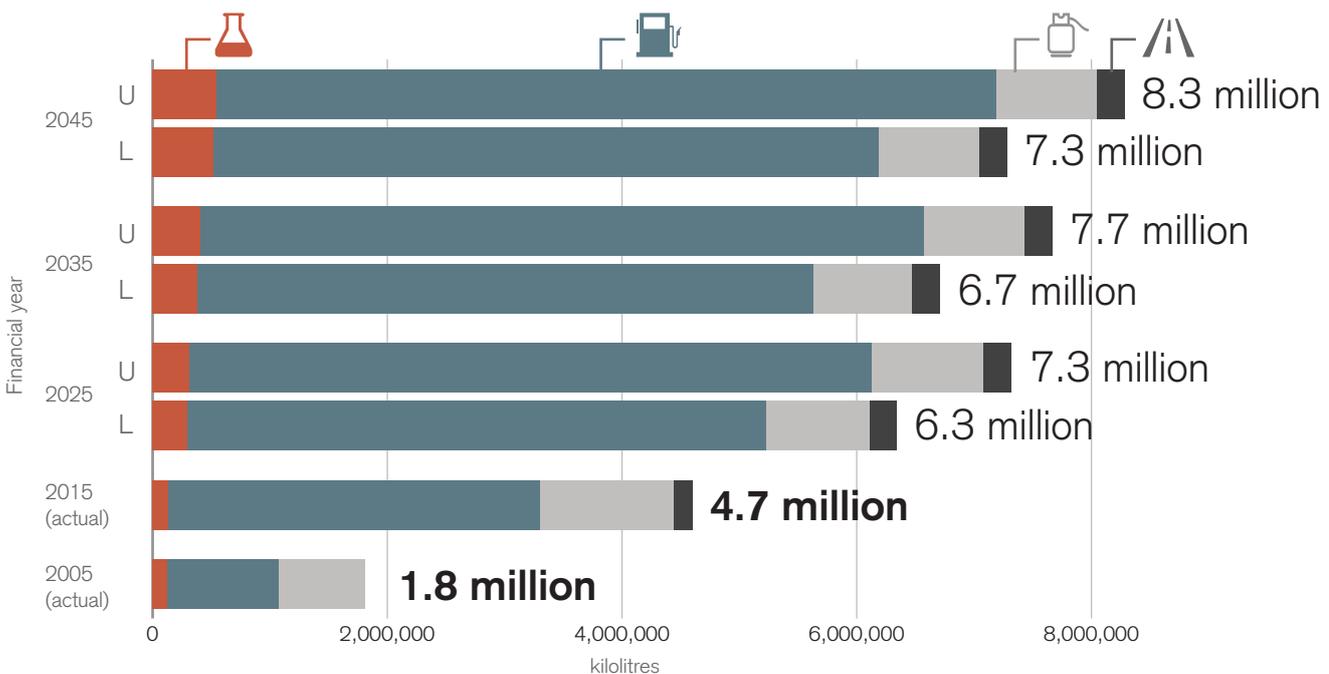
Bulk liquids handled at the Port include: refined petroleum, ethanol and biodiesel, which are used to fuel vehicles, machinery, ships and aircraft; bitumen, used for pavements and road surfaces; and chemicals, used in manufacturing to produce detergents, plastics, soap products, paint and other products. Bulk gas handled at the Port includes propane (LPG) which is used as feedstock for plastics manufacturing and fuel for homes, barbecues and the autogas industry, as well as butane, which is used in aerosols.

Bulk liquids and gases are shipped to Port Botany from international and national locations then pumped directly from the ships at berth to storage tanks or the 130,000 cubic metre LPG underground storage cavern within the Port Botany precinct. Products are distributed from the storage tanks and the cavern to customers either by pipeline connections, road tanker trucks or smaller vessels.

Port Botany pipeline routes (diagrammatical representation)



Bulk liquid and gas forecasts



KEY

- Chemicals
- Liquid Fuels
- Gas
- Bitumen
- U Upper band forecast
- L Lower band forecast

Future Vessels

As trade volumes through Port Botany continue to grow, the number of vessels arriving at the Port, the volume of product carried on each vessel and the size of vessels will increase.

Container vessel sizes are increasing due to the steady increase in the international container freight task and the consolidation of freight by shipping lines to achieve economies of scale. As vessels on key east-west shipping routes between Asia, Europe and North America are replaced by new and larger vessels, existing vessels are redeployed to the smaller north-south routes and regional markets like Australia.

We expect to see larger container vessels visiting Port Botany in the future and will ensure shipping channels and berthing areas have the capacity to manage these larger vessels. As these vessels typically visit the ports of Melbourne and Brisbane on the same voyage, the size and the timing of their deployment to Australia may depend on available infrastructure and water depths at those ports.

The largest container vessel currently calling at Port Botany has a capacity of 6,500 TEU – we expect this to increase to 8,000 TEU by 2025 with vessels of 10,000 TEU capacity or larger thereafter. The timing for the arrival of larger vessels could be earlier than indicated where there is further consolidation of shipping line consortia, reduction of calling frequency, increase of transshipment or use of partial loading of vessels.

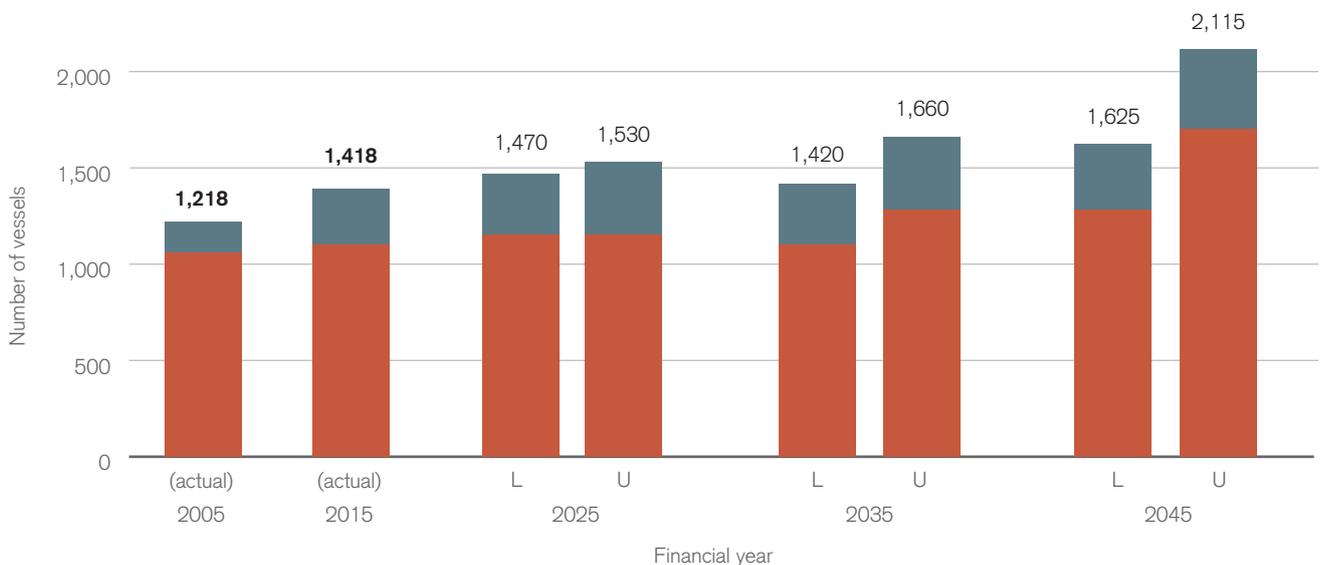
As the exact timing for the arrival of larger vessels is difficult to predict, we will continue to liaise with the shipping industry to plan and prepare accordingly to cater for the vessels calling at Port Botany.

The number of container vessels forecast to call at Port Botany is expected to rise from about 1,100 per year to between 1,300 and 1,700 per year in 2045, depending on the shift to larger vessels.

Bulk liquid and gas vessels calling at Port Botany range from small tankers to Long Range 1 tankers and Large Gas Carriers. Trade growth will largely be catered for within this range of vessels, with increasing volumes of product carried per vessel. It is possible that Long Range 2 tankers will arrive within the next 30 years.

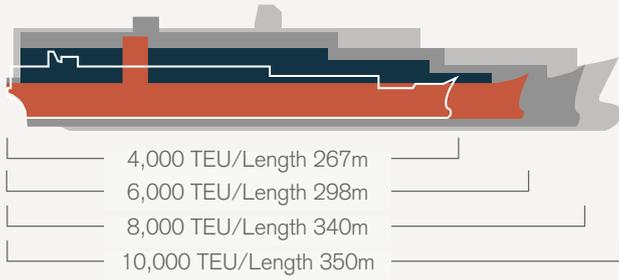
The number of bulk liquid and gas vessels forecast to call at Port Botany is expected to rise from about 315 vessels a year to between 345 and 415 vessels a year in 2045.

Forecast vessel numbers



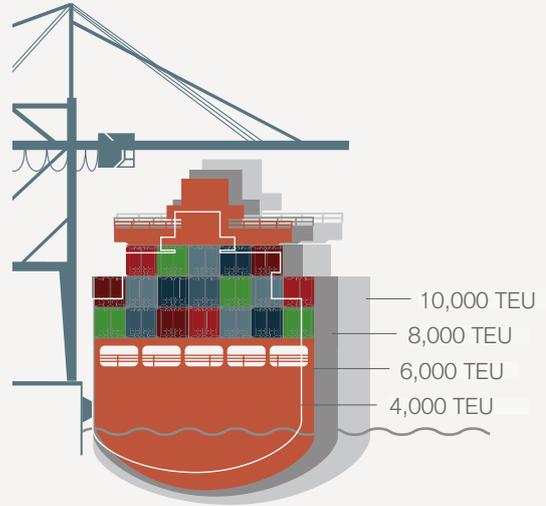
KEY ■ Container vessels ■ Bulk liquid and gas vessels U Upper band forecast L Lower band forecast

Changing container vessel size

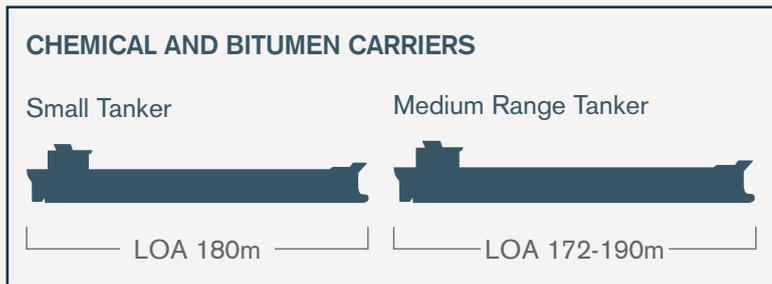


Vessel Capacity (TEU)	4,000	6,000	8,000	10,000
Dead Weight Tonnage (DWT)	50,000	70,000	110,000	125,000
Length overall (LOA)	267m	298m	340m	350m
Beam	32m	41.8m	43.2m	45.6m
Draft – fully loaded	12.5m	14.0m	14.5m	15.0m

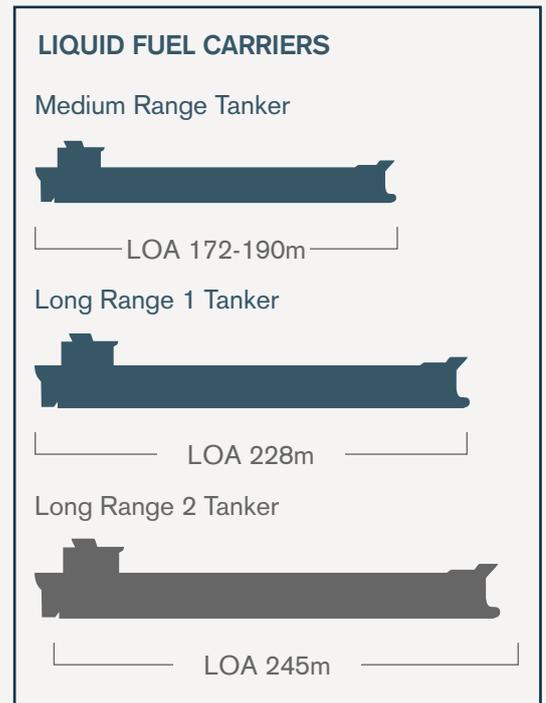
Note: Typical dimension indicated. Dimensions will vary.



Bulk liquid and gas vessel sizes



Note: LOA = length overall of a vessel.



Vessel Type	DWT	LOA (m)	Beam (m)	Draft (m)
Small Gas Carrier	20,000	100	18	6.5
Large Gas Carrier	70,000	225	36	12.5
Small Tanker	22,000	180	17.5	10
Medium Range Tanker (MR)	45,000	172-190	32	12.2
Long Range 1 Tanker (LR1)	75,000	228	32	13
Long Range 2 Tanker (LR2)	110,000	245	42	15.5

Note: Typical dimension indicated. Dimensions will vary.

Bulk liquid and gas trade growth will largely be catered for within the current range of vessels, with increasing volumes of product carried per vessel.

KEY Current size range Future increase in size range

Infrastructure Capability

Providing for forecast trade volumes will require, in priority order:

1. Improved efficiency of port operations
2. Optimised use of existing infrastructure
3. Provision of new infrastructure.

Maximising the use of existing port-related infrastructure, before investing in new infrastructure, is essential for a sustainable port supply chain. New infrastructure will still be required to cater for forecast trade growth; however, the enhanced use of existing infrastructure needs to be pursued first.

Shipping Channel and Berths

Unlike most ports, Port Botany’s deep shipping channel and berths do not require regular sediment removal. The Port Botany shipping channel has not required maintenance dredging since it was originally constructed in the 1970s. Only a small number of seabed levelling campaigns have been undertaken at Brotherson Dock since 1980, mainly to level high spots caused by ship propeller action.

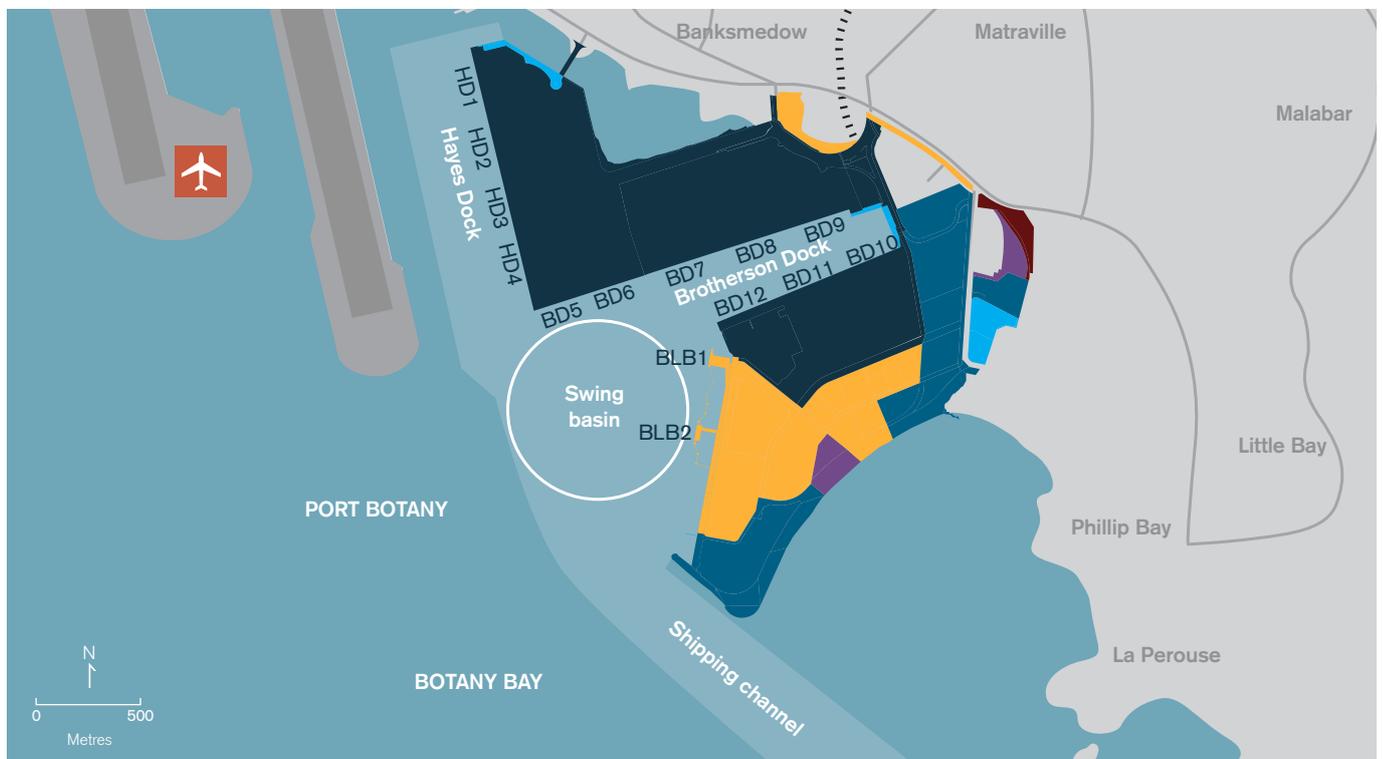
Port Botany is capable now of receiving fully-loaded container vessels of 6,500 TEU capacity, Large Gas Carriers and Long Range 1 tankers without tidal or infrastructure restrictions. It can accommodate fully loaded 8,000 TEU and Long Range 2 tankers at select berths 95 per cent of the time in a year using tidal windows for shipping channel movements.

With targeted dredging within Brotherson Dock and at isolated locations in the shipping channel, Port Botany could accommodate 10,000 TEU vessels or larger and Long Range 2 tankers without tidal restrictions. Dredging would not be required in Hayes Dock or the swing basin for these vessels.

The implementation of a dynamic under-keel clearance system would enable further operational shipping improvements at Port Botany. This could delay the need for dredging or reduce the volume of dredging required.

Our aim is for channel and berth depths at Port Botany to be capable of receiving larger vessels. Required dredging works will be undertaken in line with demand from container vessel growth.

Port Botany shipping access and current land utilisation



KEY	● Shipping channel	● Container facilities	● Empty container parks
	● Bulk liquid and gas facilities	● Container logistics and warehousing	● Vacant land
	● Port services and other infrastructure	BD# Brotherson Dock berth number	HD# Hayes Dock berth number

Container Facilities

Port Botany’s three container terminals have 3.6 kilometres of quayline and 147 hectares of land. Each is accessed via a different intersection off Foreshore Road and Botany Road.

Container terminal capacity is sensitive to factors such as terminal operating practices, vessel scheduling, vessel size, container dwell times and truck arrival patterns.

We have assessed the container handling capacity of Port Botany’s combined container terminals to be at least 7.2 million TEU per year.

Our assessment accounts for realistic planning buffers; variations in terminal operational behaviour; seasonality and other peak demands; and inherent real-life fluctuations and randomness in vessel, truck and train schedules and fleet mixes.

Achieving Port Botany’s container handling capacity requires investment by container terminal operators in additional equipment, improved terminal layout configurations, improved gate operations, increased rail usage, expanded on-site container storage facilities and technological improvements to reach the following performance levels:

- berth productivity – 2,000 TEU/m/annum
- crane productivity – 200,000 TEU/crane/annum
- yard productivity – 49,000 TEU/ha/annum
- average dwell time – 3 days
- 24/7 operations.

Access to additional land and/or berth length for stevedoring operations will be required to accommodate the 30 year container trade volume forecasts. Options exist to facilitate additional container handling capability at Port Botany and we will progress development of a container terminal at Port Kembla, giving NSW capacity to meet container growth requirements well beyond 2045.

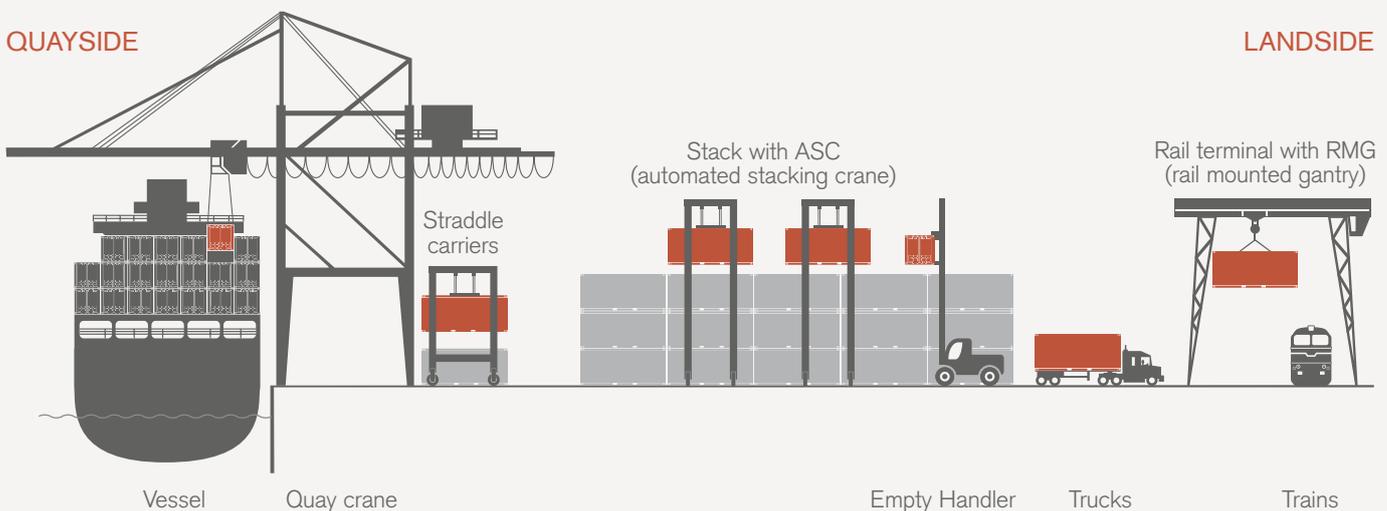
The nature and timing for additional capacity will align with actual container growth. Current growth forecasts indicate additional capacity is not required within the next 20 years.

Port Botany’s container terminal wharf structures are in good condition. The Hayes Dock wharf structures were completed in 2011 with a 100-year design life and the Brotherson Dock wharf structures were completed in 1979 with at least a 50-year design life. Both are capable of accommodating the expected larger container vessels, including berth deepening and heavier quay cranes required for such vessels.

Works will be required on the Brotherson Dock wharves in the short to medium term to protect the concrete structures from corrosion and preserve their integrity beyond 2045.

A review of operating procedures for the berthing and mooring of vessels at Brotherson Dock will ensure loads do not exceed the capability of the fenders and bollards, particularly during storm conditions. Upgrading fenders and installing additional bollards on the Brotherson Dock container wharves by the respective terminal operators will provide further capacity and operational flexibility to receive the larger vessels.

Indicative cross section – Container terminal



Bulk Liquid and Gas Facilities

Port Botany's bulk liquid and gas facilities are serviced via two dedicated common user berths, linked to storage terminals and 4.8 kilometres of pipeline corridors. Bulk Liquid Berth 1 (BLB1) was completed in 1979 with a 50-year design life, and was recently refurbished to extend its life. Consistent with structures of this type, refurbishment works will be required every 10 years or so to preserve its longevity. The second bulk liquid berth (BLB2) was completed in 2013, with a 50-year design life.

The capacity of bulk liquid and gas facilities is sensitive to factors such as product type, product volume, pumping rates, pipeline capacity and product turnover within tanks.

Based on the forecast bulk liquid and gas product mix, at least 8.3 million kilolitres per year can be transferred across the two Port Botany bulk liquids berths. While the two berths will be capable of handling the forecast trade to 2045, terminal operators will need to install additional transfer infrastructure and improve rates of product transfer to storage tanks by removing bottlenecks in transfer systems.

Productivity improvements over the next 30 years should at least achieve the following product transfer rates per vessel (average pumping rate):

- refined fuel – 1,600 kilolitres per hour
- chemicals – 300 kilolitres per hour
- gas – 980 kilolitres per hour
- bitumen – 400 kilolitres per hour.

Port Botany has space for a third bulk liquids berth, which would only be built once vessel scheduling and product transfer rates are optimised by the bulk liquid and gas operators to maximise utilisation of existing infrastructure.

Land allocated to bulk liquid and gas storage facilities is expected to be sufficient to cater for forecast trade volumes.

Indicative cross section – Bulk liquid berth transfer to storage facility

QUAYSIDE

LANDSIDE



Land Use and Utilisation

Land at Port Botany is allocated for container terminal operations; bulk liquid and gas storage facilities; and support and ancillary services such as tugs, lines boats, bunkering (vessel refuelling), pilot and emergency response operations, customs and quarantine.

Land within the Port Botany precinct is in demand and scarce. It is typically leased for 10 to 30 year periods, depending on the level of capital investment required, resulting in limited turnover of land. Our focus is to improve the productivity and use of underutilised, vacant or underperforming parcels of land.

We will continue to prioritise the allocation of land for uses that require direct connection to berths to facilitate import and export trade. If additional land is required for direct importing and exporting activities, existing uses that do not need direct berth access may become displaced. Where proximity to the Port is a requirement or advantage, these uses would ideally relocate to the area immediately adjoining the Port precinct, contingent on suitable land for these uses being available in the area around the Port.

Over the next 30 years, we expect that existing container logistics land will be re-allocated to container terminal handling operations. Sufficient land has been allocated to bulk liquid and gas storage facilities.

We will also investigate opportunities to enhance the Port's public areas with uses such as a café on Prince of Wales Drive.

Port Services

Existing pilot, tug, lines boats and bunkering facilities in Port Botany are largely adequate to service forecast growth. Repositioning of existing facilities may be required to accommodate other port activities.

The Hayes Dock Services Area will be developed as a common-user facility accommodating lines boats and tugs as well as temporary occupation by work barges, vessel servicing barges and lay-up of small vessels as required.

Border protection and biosecurity services are located within the Port. Additional services may be required to manage forecast growth.

Container Logistics and Warehousing

Container logistics businesses provide facilities for receiving, storing and distributing containers; packing and unpacking containerised goods; storing inventory; and quarantine processes.

These businesses are located within the Port Botany precinct, in adjoining industrial lands and elsewhere throughout Sydney, particularly in freight logistic precincts.

Container logistics facilities located close to the Port provide hubs to stage containers overnight for morning goods delivery across Sydney. The supply chain benefits from these facilities being close to the Port.

With the decline of suitably-sized industrial lands around Port Botany, and the high price of the remaining industrial land, many container logistics businesses have relocated to western Sydney where larger, cheaper parcels of land are available.

Availability of land within the Port for container logistics businesses will decline over the next 30 years as we prioritise port activities requiring direct wharf access. Retention of suitable industrial lands in the areas around the Port for these uses is required to cater for forecast growth.

Empty Container Parks

Over the next 30 years, empty container exports will grow from about 670,000 TEU to up to 2.9 million TEU as the volume of full import containers grows at a faster rate than full export containers.

Empty container parks provide storage for empty containers before they are transported back to the port for repositioning overseas or to regional NSW for packing with exported goods. The growing empty container task requires reforms to the empty container supply chain, including:

- shipping lines repositioning empty containers overseas at a faster rate to reduce their dwell time in empty container parks
- de-hiring empty containers at intermodal terminals, with empty containers then transported to regional areas for re-packing or returned by rail to the stevedores at the Port for overseas repositioning
- prioritising full collections for trucks arriving at the Port with an empty container, to increase the two-way loading of trucks.

Both the Cooks River and Enfield intermodal terminals have the ability to operate empty container storage areas to provide for the transfer of empty containers to the Port by rail.

Over the next 30 years, we will facilitate opportunities to locate empty container parks within or adjacent to stevedore terminals. This is a sustainable outcome that will facilitate return of empty containers by rail and internal gate transfer, to minimise truck movements on internal and surrounding port roads.

Road and Rail Connectivity

Improving the landside connectivity of Port Botany to metropolitan Sydney and regional NSW will be essential for efficiently moving the growing NSW freight task.

Inefficient road and rail connections to and from Port Botany would adversely impact on the competitiveness of the State's importers and exporters and could limit the Port's growth before the ultimate capacity is achieved. Congestion on Sydney's road network and the relatively low rate of containers moved by rail must be addressed if we are to meet our objectives for a more sustainable and efficient port supply chain.

Maximising the capacity of Port Botany requires a combined investment in, and optimisation of, road and rail networks. Investment in just one mode will not suffice.

The Sydney road network is already subject to congestion at peak times. Road investment is needed to improve efficiency of key port access routes and connections.

The Sydney metropolitan rail system is currently underutilised for freight transportation. Investment in, and optimisation of, rail will provide a high-volume freight dedicated link from Port Botany to Sydney's intermodal terminals and distribution centres. This will reduce the volume of port trucks on the roads around the Port.

With a focus on improved rail and road networks, capacity of Port Botany can be optimised. Without improvements to the road and rail connections to Port Botany, the Port will not achieve an annual container throughput of over seven million TEU.

Even with a focus on growing container movements by rail, trucks will continue to be the primary means of moving containers to and from Port Botany over the next 30 years. We will advocate for investment in road infrastructure that provides efficient access to the Port to meet forecast growth in the face of growing background traffic.

Road

Truck volumes at Port Botany are forecast to increase from 3,900 to between 6,300 and 6,900 trucks per day in 2045.

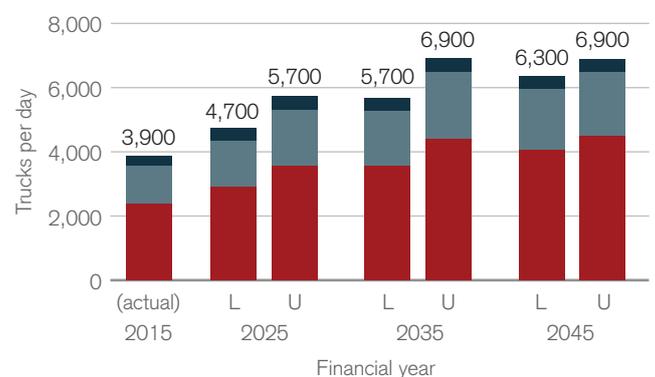
Growth in trucks will be managed through a gradual increase in rail mode share to 40 per cent and greater use of higher productivity vehicles with increased two-way loading to grow truck capacity utilisation to 80 per cent so that the number of TEU carried per truck to and from the Port grows and trucks do not travel empty. Without these improvements, truck volumes would be higher, growing to between 8,800 and 9,900 trucks per day.

We will also manage impacts on peak congestion if we can achieve more uniform truck distribution over 24/7 operations.

Since the introduction in 2011 of mandatory performance standards for trucks at Port Botany, truck turnarounds at the stevedore terminals have reduced to an average of 30 minutes, helping to limit truck queuing and congestion. We will advocate for these mandatory road-based performance standards to be retained, reviewed and updated to reflect trade volumes, changes in truck capacity and terminal productivity improvements, and to facilitate two-way loading of trucks.

With the exception of Bumborah Point Road, we manage all roads within the Port precinct. These will be able to accommodate forecast traffic volumes with minor work to address pinch points and facilitate traffic flows as volumes increase.

Forecast daily truck numbers at Port Botany



- KEY**
- Bulk liquid
 - Empty container park and logistics operation
 - Container facilities
 - L Lower band forecast
 - U Upper band forecast

Container truck types at Port Botany

Rigid 20' or equivalent (1 TEU)



1%

Length 12.5m

Semi-trailer or equivalent (2 TEU)



70%

Length 19m

B-double or equivalent (3 TEU)



13%

Length 26m

Super B-double or equivalent (4 TEU)



16%

Length 30m

Note: % = Proportion of truck types currently accessing Port Botany container facilities.

The roads and intersections immediately surrounding the Port, including Bumborah Point Road, are managed by the NSW Government. Within the next 10 years, critical intersections immediately adjoining the Port at Foreshore Road/Botany Road/Penrhyn Road and Botany Road/Bumborah Point Road will require upgrades to accommodate forecast traffic growth. Road widening works for Foreshore Road and Bumborah Point Road, together with other traffic upgrade works on Bumborah Point Road, will also be required within 10 to 20 years.

Any new high traffic-generating non-port developments, such as higher density housing and retail developments, could adversely impact road service levels around the Port. We will encourage planning authorities to consider these developments carefully and only in the context of suitable road upgrades to accommodate such developments.

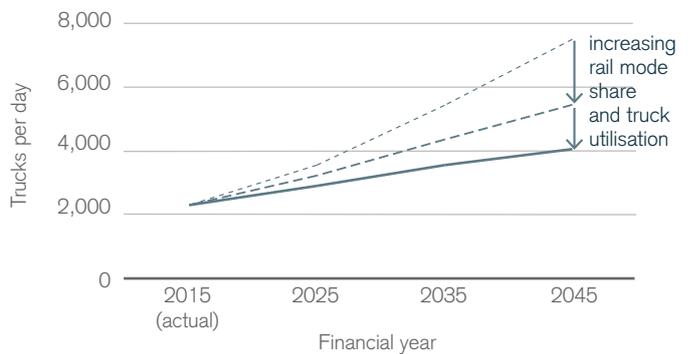
We need to cater for higher productivity vehicles in and around Port Botany and to key off-site locations to reduce the growth in truck numbers and transport costs. We will work with authorities to promote the benefit of higher productivity vehicles in the supply chain and on the road network.

We will continue to work with the relevant authorities to increase mass limits to 109 tonnes on roads in and around the Port precinct including the strengthening of the Bumborah Point Road bridge over Bunnerong Canal, Botany Road bridge and several culverts. These high mass limits currently only apply to a section of the southern port precinct (Simblist Road, Friendship Road and sections of Bumborah Point Road).

We will work with the relevant authorities to capture comprehensive port truck volume data as inputs into Sydney-wide traffic models to identify when and where road improvements are needed.

Container truck numbers to stevedore terminals can be reduced by increasing rail mode share and increasing truck utilisation.

Effect of rail and truck utilisation on container truck volumes



- KEY**
- No change to current rail mode share or truck utilisation
 - - - Gradual increase in rail mode share to 40%
 - Gradual increase in rail mode share to 40% with improved truck utilisation

Despite the perception that port traffic contributes to traffic volumes and congestion, the proportion of port trucks to total traffic volume quickly reduces as trucks travel away from the Port. On the M5 East Motorway, port trucks account for two per cent of traffic in peak hours and this is forecast to increase to up to four per cent in 2045.

The intersection of General Holmes Drive and Foreshore Road constrains the movement of port traffic in peak periods. Specifically, high traffic volume and associated congestion on the M5 East heading west causes congestion and delays on Foreshore Road. More than 90 per cent of all traffic destined for the Port passes through this intersection.

Improvements to the General Holmes Drive/Foreshore Road intersection, additional capacity on General Holmes Drive and the M5 East, and an efficient connection to the M4 Motorway are the highest road priorities for Port Botany's efficiency.

The WestConnex project will benefit the port supply chain and will facilitate improved connections between the Port, the M4 Motorway and western Sydney. However, in terms of the effect of the project on the critical port connection between Foreshore Road and General Holmes Drive/M5 East, the project is likely only to reduce the rate of growth of vehicles on General Holmes Drive and the M5 East, which are already congested roads at peak times. Reducing the growth rate would simply reduce the rate at which the problem worsens rather than provide a solution.

We believe the scope of the WestConnex project should be expanded to meet the needs of the port freight supply chain for the Sydney metropolitan area. We will therefore advocate for the intersection between Foreshore Road and General Holmes Drive (both left and right turns in and out of the Port) to be improved to achieve suitable truck linkages from Port Botany to the M5 East and the new WestConnex. Ideally a freight dedicated corridor would provide a link to the main road corridors.

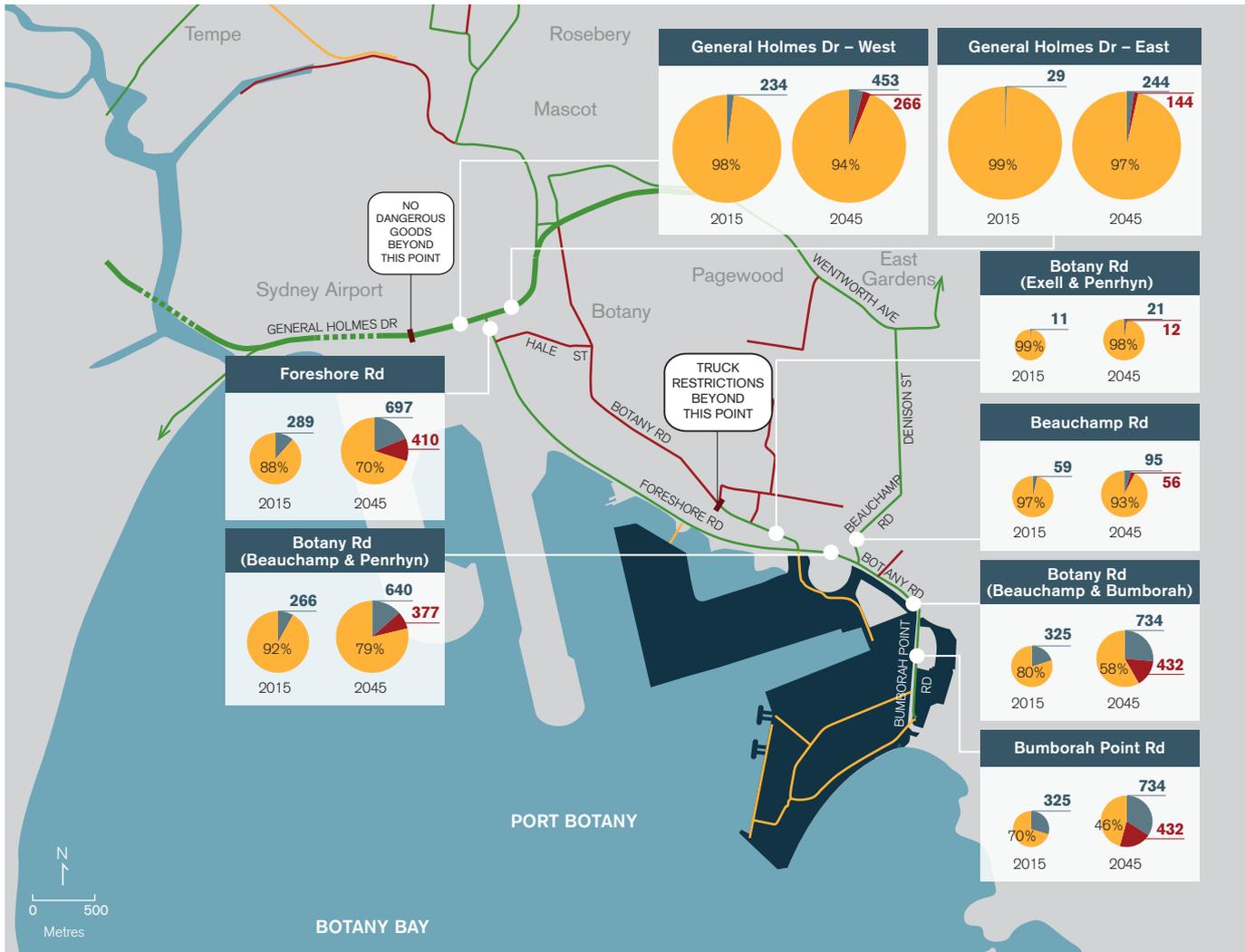
In addition to Foreshore Road and General Holmes Drive, Beauchamp Road and Denison Street provide an important access route to the Port with around 10 per cent of port-related trucks using Beauchamp Road/Denison Street to travel to and/or from Port Botany. This truck access route is becoming increasingly important for bulk liquids trucks travelling to and from the north and needs to be maintained for port-related traffic.



The cost of urban transport congestion in Australia's capital cities has been forecast to increase from about \$14 billion to \$53 billion a year by 2031 unless there is significant infrastructure investment and better planning.²

² Infrastructure Australia (2015) Australian Infrastructure Audit.

Proportion of port trucks to total traffic on surrounding road network – Morning peak hour



- KEY**
- Port Botany precinct
 - NSW Government managed road
 - Local government managed road
 - NSW Ports managed road

- PIE CHARTS** (size indicative of traffic volumes)
- # Port trucks (lower band forecast numbers)
 - # Additional port trucks (upper band forecast numbers)
 - % Background vehicles under upper band (%)

Note: Assumes delivery of WestConnex.

Rail

Movement of freight by rail rather than road allows large volumes to be carried, in one movement, by each train on freight-dedicated transport corridors. To benefit from the high productivity capable of being achieved by rail movements, the freight rail system needs to be improved to ensure it has capacity to handle larger volumes and be a reliable and cost effective mode of transport.

Increasing the movement of containers by rail to and from Port Botany is essential for the Port to accommodate forecast container growth efficiently and sustainably.

About 290,000 TEU per year are currently transported by rail to and from the three stevedoring terminals at Port Botany. Additional rail volumes are handled at the adjoining intermodal terminal on Botany Road.

Our goal is for three million TEU per year to be transported by rail by 2045 – around 40 per cent of forecast container volumes. This can be achieved by:

- improving rail operations, including train scheduling, on-time running, window availability, dedicated trains for each stevedore with standardised length and train back-loading
- improving rail lift rates at stevedore terminals
- building additional rail sidings and procuring additional container handling equipment, such as rail mounted gantry cranes, at stevedore terminals
- creating additional infrastructure on the freight rail line, including duplication and passing loops
- creating additional intermodal terminal capacity in metropolitan Sydney.



Every one million TEU moved by rail reduces the number of trucks on the roads around Port Botany by more than 900 trucks each day.

To grow the volume of containers moved by freight rail we need to begin by resolving operational issues and make rail more reliable and cost-effective.

The introduction of mandatory performance standards for rail service providers and stevedores will address current operational issues provided they cover minimum lift rates at stevedore terminals, on-time running of trains, window availability, standardisation of train lengths, dedicated trains and minimum train utilisation.

The existing rail infrastructure at Port Botany has capability to handle one million TEU based on realistic productivity levels. Allocation of additional equipment and labour to rail operations, together with the required improvement in rail operation performance, will allow this capacity to be realised.

Growing capacity at the Port can be achieved through staged investment in additional rail sidings and the use of rail mounted gantry cranes. Rail mounted gantry cranes span over a number of sidings while maintaining lift rates and train turnaround times, thereby increasing the overall capacity of the rail facilities. Sufficient port land is available to develop the stevedores' rail terminals to cater for three million TEU on rail.

While each stevedore currently has its own dedicated rail sidings which connect to the Port Botany Freight Line, stevedores may choose to share rail facilities in the future to maximise efficiencies.

Moving three million TEU per year by rail will require up to 56 port shuttle trains over a 24 hour period arriving and departing the Port via the Port Botany Freight Line. Currently about 16 trains per day use this line.

We understand from work conducted by ARTC that the Port Botany Freight Line will have capacity to cater for the forecast port shuttle volumes once the line has been duplicated between Port Botany and Mascot and operational improvements on the line have been implemented.

Duplicating the line between Port Botany and Mascot is an important element of securing increased capacity and reliability of the freight rail network. Duplication work needs to be progressed as a priority to ensure there is redundancy for the existing single line but also to minimise the impact to rail operations during the works. As the duplication works are complex and will occur in an operational and narrow rail corridor, undertaking the works before rail volumes significantly grow, is essential.

Capacity improvements on rail beyond the Enfield Intermodal Logistics Centre, for example passing loops near Warwick Farm on the Southern Sydney Freight Line, will also be required to cater for the growth of the Moorebank Intermodal Terminal and future intermodal terminals in western Sydney.