Bi-Modal terminals – Shrinking Urban Freight Exposure through a Quantum Leap in Freight Productivity

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Abstract

The concept for a Bi-Modal terminal was developed in Hassall, 2008 in Australia, and used for "Freight Futures: The Victorian Freight Network Strategy", in December 2008. The concept utilizes the power of Performance Based Standard vehicles as one freight technology combined with rail freight locomotives as the second vehicle technology. The combined power of these technologies, within a closed, or fixed, freight network can generate very significant productivity improvements. A Bi-modal system exhibits aspects of both inter-modal and multi-modal freight systems.

An urban bi-modal network has been proposed for Melbourne and simulation studies of such fixed bi-modal networks, using specific business rules, deliver not only significant cost savings to the freight users but a considerable diminution of "freight exposure" and a significant improvement in the physical productivity of the network freight operation. Besides urban terminals, regional bi-modal terminals have also been proposed. The paper will examine the 2010 proposal for a 'mid corridor connect' bi-modal terminal at Wodonga along Australia's premium freight corridor, the Hume highway. Again significant productivity benefits are forecast. The concept of bi-modalism is examined as the next significant advance in urban and regional corridor freight productivity.

Keywords: Bi-modal transport, freight productivity, performance based standards, freight exposure, urban freight, logistic parks.

Background

Australia's largest cities have often developed around their traditional cargo ports. This is also true for many major cities across most continents from Asia, Europe and the Americas. As globalization and offshore manufacturing has increased over the past 20 years both outbound and inbound container volumes have risen. From an Australian perspective, in Melbourne alone, forecasts for container volumes will rise from 2 million twenty foot equivalent containers (TEUs) in 2007 to 8 million TEUs by 2035. (DoTV, 2008). The impacts of this freight growth on inner urban areas and city arterial roads will be very serious unless a combination of new strategies are implemented.

This problem reflects one of the major questions for both freight and city planners which is 'what will be the necessary policies to handle the future freight task?' Generally from a planning perspective this will be considered in terms number of trucks, tonnes carried, trips and "trip dwell time", being the total time spent travelling and idling, on the urban road network. Although tonne kilometres are cited as a measure of task, it has low value for planning at the micro level.

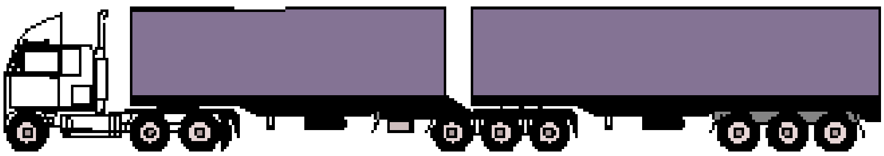
In 1999, Australia reinvigorated the concept of Performance Based Standards (PBS) as a new set of hurdles for developing safer and more productive trucks. These PBS trucks are often referred to as High Productivity Freight Vehicles (HPFVs) and the policy framework for the used of these vehicles was developed by the then National Road Transport Commission (NRTC), now know as the National Transport Commission (NTC), (NRTC 1999a, NRTC 1999b). These new types of PBS vehicles are being trialled in Australia, the Netherlands, Canada and Scandinavia, and they are integral to the operation of Bi-modal terminals.

This paper draws on the results of specific simulation modelling that was used for deriving the benefits of for bi-modal terminals.

What are Bi-Modal terminals?

A 'bi-modal' terminal is defined as a variant of a multi-modal exchange terminal where cargo rail shuttle vehicles supported by high capacity Performance Based Standards (PBS) articulated trucks (Hassall, 2008a). The combination of PBS vehicles and rail cargo shuttles is a more powerful combination than either highly productive individual mode. These new vehicles can be operated on an agreed road network under a new national regulatory framework that allows for more flexible vehicle designs to be operated if the vehicle design complies with some 18 higher level operational and infrastructure performance standards (NRTC, 2003).

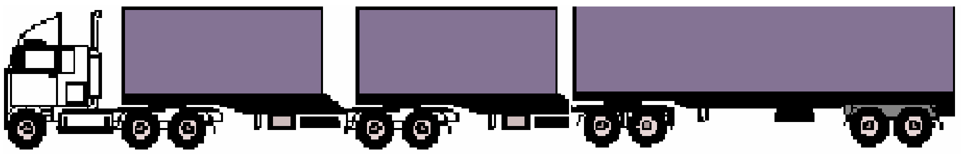
Figure 1: Super B-Double (non quad axle) configuration. A PBS Vehicle



(Length 30 metres, weight 62.5 to 68 tonnes Gross Vehicle Mass)

Source: Hassall,2005

Figure 2: B-Triple Tandem configuration. A PBS Vehicle



(Length 33 to 36.55 metres, weight 82.5 to 90 tonnes Gross Vehicle Mass)

Source: Hassall, 2005

Figures 1 and 2 represent the next generation of vehicles beginning to be used following on from the significant take-up of B-Doubles in Australia. These PBS vehicles have considerable use for bi-modal terminals. Super B-Doubles will be a popular urban vehicle whilst B-Triples will be a preferred line-haul vehicle (NRTC, 2010). Hence the simulation modelling of urban bi-modal operations was focused on Super B-Doubles whilst the line-haul and regional bi-modal terminal modelling was undertaken with B-Triples.

With the rail freight technology used in bi-modal terminals up to 50 x 40 forty foot containers can be hauled by a suitable diesel freight locomotive. Smaller length train units may be more appropriate for some cities where freight trains are operated on the urban passenger network.

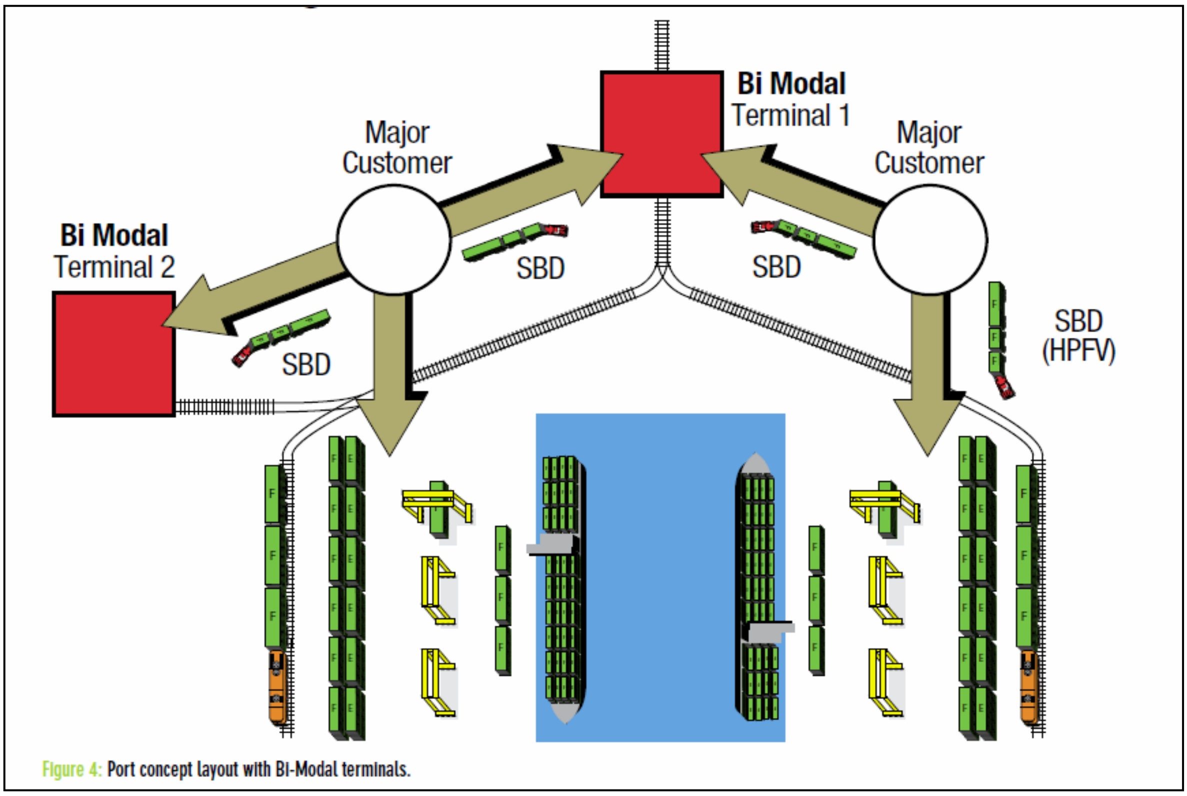
PART 1 – Bi-Modal terminals in an urban environment

For bi-modal terminals to be successful and to deliver large productivity savings there must exist a high degree of appropriate infrastructure and a supporting freight policy framework. Hassall (2008a) identified four elements as being significant:.

1. The existence of a special "premium freight" network for both road and rail tasks.
2. Performance Based Standard vehicles are permitted to operate on a premium urban road network.
3. The existence of the specialized bi-modal terminals, and their ability to use urban rail freight services.
4. The network must be regulated by a controlling authority, whereby the terminal rules for the rail and road operators are adhered to.

The simulations assumed that planned timetables operated without mishap.

Figure 3: Bi-modal terminal concept for container port operations



Source: Industrial Logistics Institute, 2010

The simulations for the city of Melbourne was undertaken with a freight task as at 2030. The technicalities of the simulations are described in detail in Hassall, 2008a.

The basics of the Terminal Operation:

The three terminals modelled for Melbourne run both independent cycles of shuttle trains and PBS trucks.

A Rail Cycle: The rail freight shuttle loads to capacity and delivers up to 50 forty foot equivalent container units (FEUs) to the Port or a major node in the network. It then loads and proceeds back to the originating terminal to unload. A cycle will handle up to 100 FEUs per round trip.

A Road Cycle: The road cycle begins with the pickup of two FEUs or up to 4 TEUs by a PBS vehicle. This vehicle proceeds to the Port, delivers the load and uplifts another equivalent number of containers. The containers are taken to a destination customer within the city area of the destination bi-modal terminal. They are delivered, and a set of outbound containers (full or empty) are picked up and taken to the bi-modal terminal. Road services do an extra revenue-providing hop before returning to the bi-modal terminal. The Super B-Double is an excellent truck for carrying containers. Simulations for PBS port container vehicles suggested that even for existing ports road kilometres travelled by containers and the number of port related fleet vehicles could be reduced by 55%. (NTC , 2010).

Other Terminal Considerations:

The chosen terminal sites must be acquired as a secondary step after planning has been completed. The sites will preferably be zoned with a special industrial zone classification in order to stop residential encroachment that could hinder the surrounding terminal sites from also attracting warehousing, container park facilities, consolidation functions and other complementary freight functions. These complementary functions need to be undertaken in the area around the terminal, although the terminal itself may host a small quantum of these activities within its own at least 16-hectare boundaries. However, it is assumed that the bi-modal terminal will be part of a greater logistic park. These parks range in size from 150 hectares to over a square kilometre.

Many European studies have examined what size the operational terminal size should be (Burciu, et al., 2000) but in this instance the 16-hectare perimeter was advanced by Visser 2004, which also coincided with the median train length of 50 FEUs, which allowed such a rail vehicle to be housed in a 16-hectare precinct. The regulatory environment that supports the inter-modal terminals is described further in Visser and Hassall, 2009. The regulatory experiences in facilitating inter-modal and multi-modal operations in the USA are described in NCIT 2004.

The rail connections:

For Melbourne to deliver an urban rail freight terminal network by 2030 or earlier it will be necessary to have access to the existing rail network, or to land corridors that can be acquired in order to link the rail/road terminals and the container port. The rail services also need to have approved pathways, especially if the freight shuttles are also running on a shared passenger rail network or competing with longer distance freight trains that may also use the network.

Road and Bridge Considerations:

Almost as important as the rail network is the provision of the premium road network. This network must accommodate the mass and the turning circles of the PBS vehicles. It will require a bridge network that will also support these vehicles at speeds equivalent to or lower than conventional motor traffic.

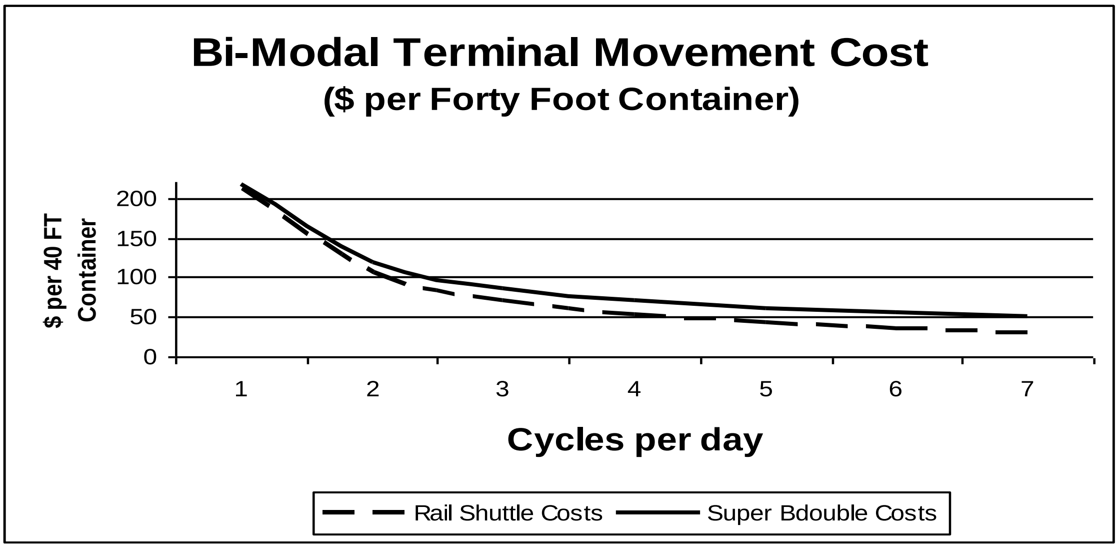
Simulation Model Findings in Brief

The Melbourne freight task in terms of tonnes is estimated to grow by 88% by 2030 (DoTV, 2008) and this is possibly conservative. If left unchecked, this task will need to be handled by 66% more conventional semi-trailers and four times as many B-Doubles in 2030. This is a considerable increase in community freight exposure to more trucks, more trips, more emissions and more truck hours on local and arterial residential roads.

Impact on Costs

The terminal costs per FEU are done against existing costs as if the terminals were currently operating. It is expected that rail cycles will reach 5 cycles per day and road up to 7 cycles per day. So by comparing these two very high vehicle utilization strategies, rail is still marginally cheaper. However, this does not take into account any externality costs or amenity impacts of significantly high truck movements if rail were never to eventuate.

Figure 4: Simulation outputs vehicles and trips 2007 and 2030



Source: Hassall 2008a

Converting the current fleet mix to 65% PBS vehicles, and implementing 7 rail cargo shuttles onto the 2030 freight task, will have a profound impact with falls in trip and truck levels to lower than even 2007 activity levels. From a strategic perspective, the combination of both PBS and Rail Shuttles has a major effect on future freight exposure as observed by the public and other road users.

Table 1: Costs per 40 foot container for Rail Shuttles and PBS Road Vehicles

Container Delivery Cost from/to Bi-Modal Terminal by Mode							
Trip Cycles per Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Road $ / 40’ Container	218.1	120.0	87.2	70.7	61.1	54.5	49.8
Rail $ / 40’ Container	211.3	105.7	70.4	52.8	42.3	35.2	30.0
Difference $/Container	**$6.8**	**$14.3**	**$16.8**	**$17.8**	**$18.8**	**$19.3**	**$19.8**

Note: Estimates are based on costs for a 2008 base year. Source Hassall, 2008a.

The unit costs for a closed network are related to the utilization of the terminal vehicles. With a high number of cycles per day for both the rail and road fleets the unit cost of getting an FEU to and from the port is significantly lower than most prices offered by port transport operators although this claim is not defended in this paper.

Table 2: Simulation outputs for Melbourne freight metrics at 2030

Future Melbourne Bi-modal Network Benefits at 2030			
		Scenario	
Freight Metric	**Do nothing Current Fleets**	**PBS Fleet Only**	**PBS with Bi-Modal Terminals**
Trucks Saved	0%	-23%	-43%
Vehicle Movements	0%	-28%	-51%
Network Kilometres	0%	-30.5%	-42%
Fuel Use	0%	-13%	-13%

Source: Industrial Logistics Institute, 2010

Against a business as usual approach the implementation of urban freight shuttle trains, operating to port and other principal freight areas, as well as allowing high productivity PBS vehicles into these same areas, can offer significant advantages in terms of all metrics presented in Table 2. If the development of a Freight Exposure Index was undertaken (DoTV, 2008, Hassall 2008b) then there would be a significant freight activity diminution through the use of the combination of PBS and urban rail shuttles. The physical productivity of the network is equally significant to the freight customers, enabling reductions in freight rates and gains in productivity.

PART 2 – A regional bi-modal terminal – Logic Park

The concept for bi-modal terminals is not just for urban operations. The possibility for using them within a regional environment, especially on a major freight corridor is very much an unexplored option in Australia. The following initiative, however, is being pursued and will potentially bring a third freight option to the Hume highway.

Background - Logic Park Wodonga

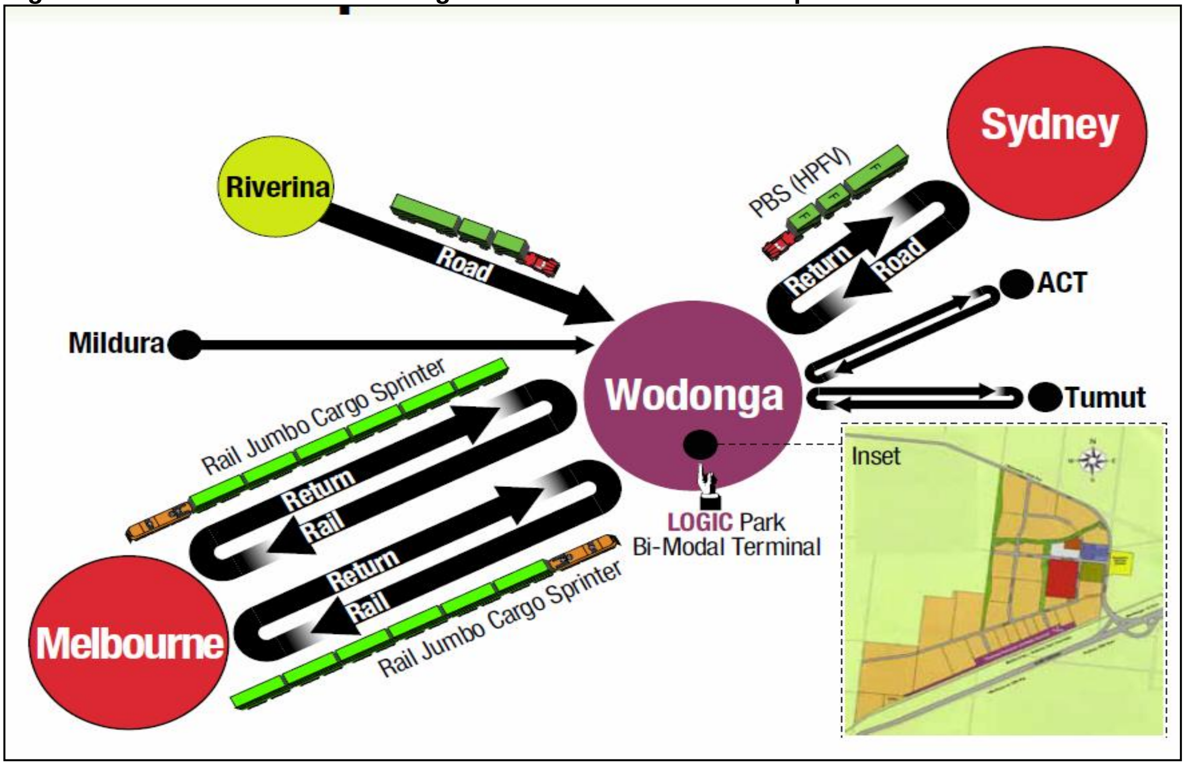
Logic Park in Wodonga was established in 2004 when council rezoned 440 hectares of land at Barnawartha from rural land to zone 1 Industrial property. The current Logic Park holdings are around 610 hectares. The vision is for Logic Park is to be an industrial distribution hub for South East Australia whilst supplying industrial land in Wodonga for 20 – 30 years and create economic development opportunities including employment. This terminal is based strategically on Australia's premium freight corridor, the Hume

Highway and houses some significant logistic clients already. The terminal is roughly based some 290 kilometres north of Melbourne, and can be used to bring a third land freight option to the Hume highway. Currently there is a major business initiative being pursued that will see existing road freight customers being offered the following:

A 15 hour, door to door customer service, from Sydney to Melbourne and Melbourne to Sydney, at freight rates equivalent to road B-Doubles but carrying the equivalent of 2 x FEUs instead of 3 TEUs.

This is equivalent to a 25% productivity gain for the same price as a road B-Double service, with the downside is that it is customer door to door service in a slightly longer 15 hour delivery window.

Figure 5: The Mechanics of the Logic Park rail/road bi-modal operation



Source: Industrial Logistics Institute, 2010

Diverting business from the Hume highway for a Logic Park service

All Hume highway road freight traffic will not be targeted for diversion through Logic Park Wodonga. Initially no bulk cargoes will be targeted and only three specific vehicles types are being targeted for the substitute Logic Park services:

- B-Doubles
- Single Articulated (semi-trailers), and
- Rigid trucks in combination.

Where these vehicles are:

- Curtain siders
- Cubic freight carriers,
- Refrigerated (reefer), or
- Flat-tops (with or without containers)

These criteria are seen as being contestable cargoes for the Logic Wodonga Operation.

Table 3 presents the results of the first pilot survey the *“general cargoes and vehicle types”* survey. In brief some 66% of specific truck movements are potential contestable as Logic Wodonga transfer freight. Certainly cubic and flat-top freight would be ideal as rail cargoes. The pilot survey of *“general cargoes and vehicle types”* examined vehicles types operating on the Hume Highway two distinctive four hour periods on weekdays. One day viewed northbound traffic and the second viewed southbound traffic.

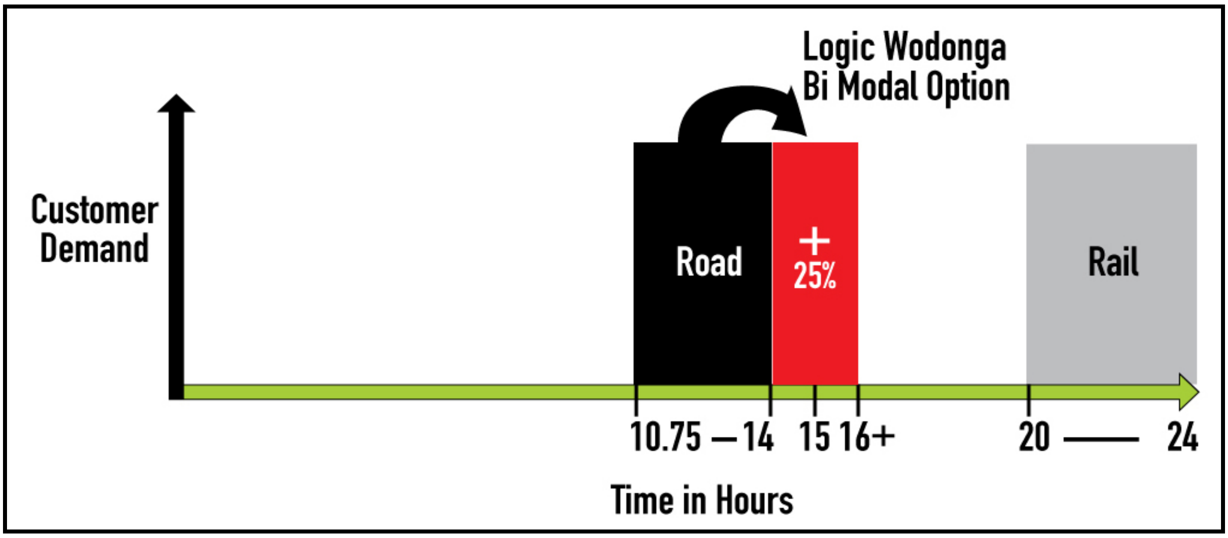
Table 3: Hume Highway Fleet and Commodity Survey 2010

Vehicle Loads	Operation		Vehicle Type				
	H & R	Ancillary	BD	Single Semi	Heavy Rigid	Other Rigid	Sub-Total
Curtain Sider	✓	✓	✓	✓	✓	X	
Cubic	✓	✓	✓	✓	✓	X	
Reefer	✓	✓	✓	✓	✓	X	
Flattop	✓	✓	✓	✓	✓	X	
Sub-Total	58%	8%	23%	32%	11%	X	66%
Bulk	X	X	X	X	X	X	
Tankers	X	X	X	X	X	X	
Livestock	X	X	X	X	X	X	
Timber	X	X	X	X	X	X	
Furniture	X	X	X	X	X	X	
All Other	X	X	X	X	X	X	

Source: Industrial Logistics Institute, 2010
Note: ✓Considered, X Not Considered

A second pilot survey was undertaken for the City of Wodonga to examine the proposal that for many users there was a critical transit time for the Hume corridor that transit time was outside the normal driving regulations. Generally elapsed shift times for road transport can range from 10.25 hours to 12 hours work with a further 30 minutes to 1 hour for breaks. It is not transport company practice that discounts be given for transit times (driving plus rest breaks) that are more than 14 hours. In fact under prescriptive legislation this limit is usually 13 hours, 12 hours work and 1 hour rest.

Figure 6: Customer Hume Corridor Transit Times preferences by mode



Source: Industrial Logistics Institute, 2010,, Auslink,(2007)

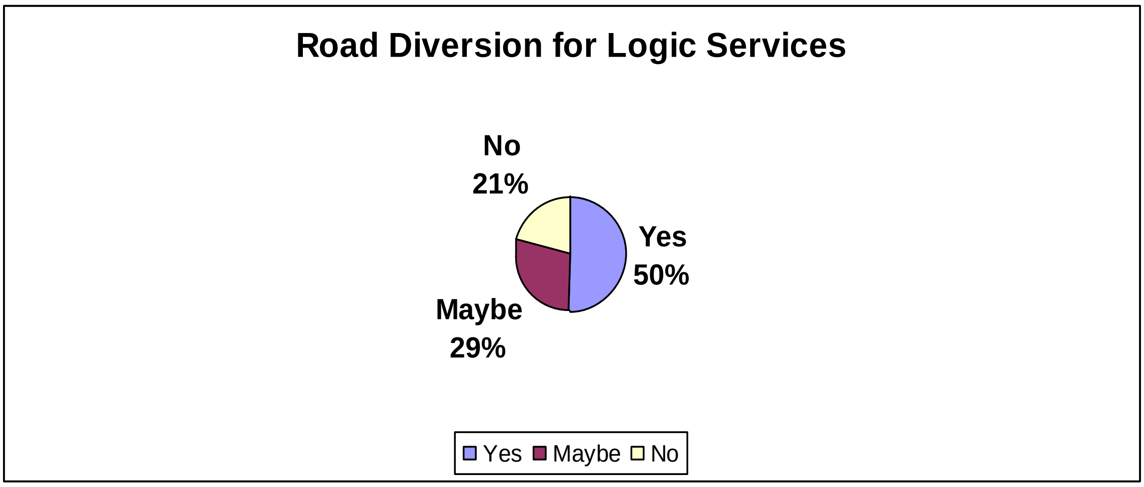
The advantage of the Logic Park rail/road combination proposal is that there is a critical time window on the Sydney to Melbourne corridor that requires a less than 16 hour door to door service for many customers. These customers are currently using a road only service. Logic

Wodonga would supply a service, door to door, potentially slightly less than 15 hours, which is one hour less than the corridor critical threshold of 16 hours. The plan for future fast Sydney to Melbourne rail freight services, with proposed 11 hour terminal to terminal transit times, delivered by 2 kilometre long trains, could not achieve this critical 16 hour customer to customer requirement, if terminal operations do not turnaround container cargoes within 1.5 hours in each capital city terminal.

Figure 6 reflects that at least 25% (or 1/4) of Hume customers would be satisfied with a greater than 14 hour door to door service and could choose a rail only option.

However, if a transit time is less than 15 hours and also comes with a productivity benefit, for example, two forty foot containers for the price of a road B-Double service, (three twenty foot containers), then a significant part of this 25% of the existing road market is interested in this new Logic Wodonga service. Figure 6 suggests that it is probable that at least half of this 25% of demand would be satisfied with the proposed Logic Wodonga services, and more than this level again with the combination of service time and productivity benefits. This survey was undertaken with Hume highway freight customers directly and not with freight forwarders.

Figure 7: Pilot Survey Response to a new Transit Time and Productivity



Source: Survey for City of Wodonga 2010

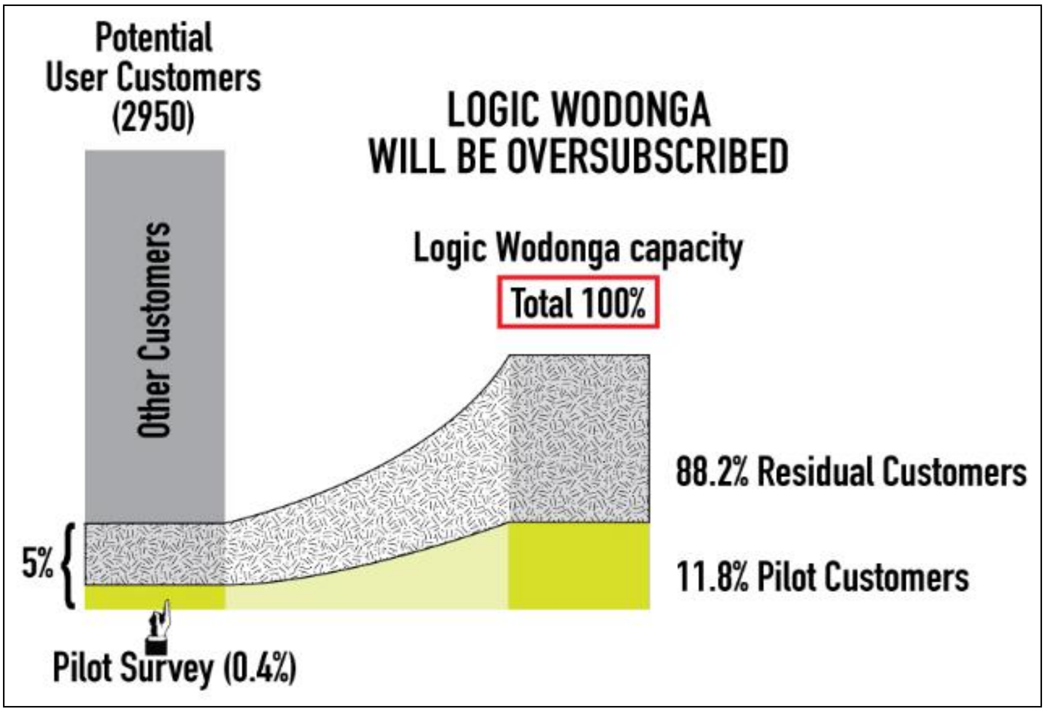
Figure 8 reflects preliminary results from the pilot survey of potential Logic Park customers.(City of Wodonga, 2010 *forthcoming*) Currently an estimated 0.4% of the estimated total market (the pilot survey) would be willing to take-up 11.8% of the maximum Logic Wodonga capacity, as the transit times and productivity initiatives are seen as suitable business propositions.

On this basis the Logic Wodonga service would require only 5% of the estimated Hume corridor, and local customer base, to run at full daily capacity. This service would be oversubscribed even for a 60 unit train option, very early after the rail terminal is activated.

What is the target market for tonnes and truck movements

Table 4 presents the estimated non bulk forecasts for the Hume highway road freight. The business case for Logic Wodonga has been based on non bulk freight being transferred to the bi-modal road/rail service.

Figure 8: Initial Pilot Survey Response to Logic Wodonga services



Source: City of Wodonga unpublished 2010

Hume corridor growth is expected to remain higher than 3% per annum which is the projection for regional Victoria to 2020 (DoTV, 2008). Recent BITRE forecasts are optimistic for all NSW to Victorian corridor freight transfers which see the period 2025 to 2030 with an even stronger freight growth rate rising to 3.9% per annum.

Table 4: Hume Highway Non Bulk Forecast to 2030 ('000 tonnes)

1999	2007 (est)	2010 (est)	2025	2030 (est)
6,270.9	9,476.0	10,354.7	16,013.8	19,389.7

Note: Mel-Syd, Syd-Mel only. Est: Estimate
Source: BTRE Working Paper 66, 2006; BITRE (forecasts)

On a daily basis Logic Wodonga would have to entice the equivalent of:

- 6.9% of equivalent Hume corridor non bulk truck movements to fill the four proposed 40 x 40 foot rail container services a day on the Wodonga link, or
- 10.6% of equivalent semi-trailer non bulk tonnages to fill the four proposed 40 x 40 foot rail container services a day from Logic Wodonga.

Both these scenarios are considered achievable.

Table 5: Logic Park Wodonga target non bulk activity 2010 (estimates)

Logic Wodonga Hume Target (tonnes)	Logic Wodonga Hume Target (movements)
1.6667 (million tonnes p.a)	**160** (BD movements per day)
Total Hume (non bulk tonnes)	Total Hume (non bulk movements)
10.355 million tonnes	**2310** total non bulk daily movements
Proportion Logic Wodonga **16.1%**	Proportion Logic Wodonga **6.9%**

Source: Industrial Logistics Institute, 2010

The new Hume highway operations explained

The type of network proposed for Logic Wodonga operations is a circular dual modal interchange loop network, as in Figure 9. These networks are very efficient method for minimizing kilometres, time and costs for long distance operations.

The eventual mature freight network will run a sprinter train to Logic Wodonga connecting with high productivity vehicles (HPFVs) to Sydney. See Figure 10. There will be two return rail services per day from Logic Wodonga to Melbourne. At Logic Wodonga freight will be rapidly cross loaded to HPFVs and despatched northwards. Drivers will unload and in most cases reload with southbound freight that will be brought back to Logic Wodonga for the rail leg to Melbourne. Drivers will travel from Logic Wodonga to Sydney and return in one driving shift, possibly under a 'Basic Fatigue Management' program. This national program allows for a shift of 15 hours, 14 hours of which can be driving. Full road duplication of the Hume Highway will occur in 2012 and it will be likely that all HPFVs combinations will need State permits, unless a national position on access is agreed on this corridor.

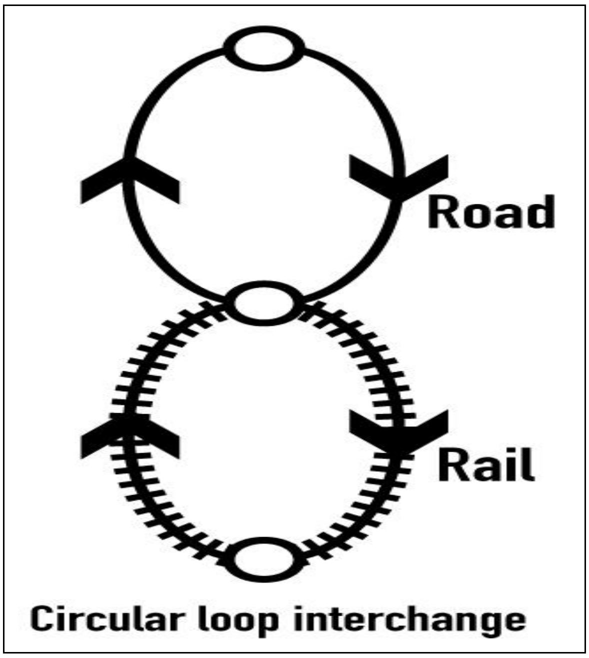
Logic Wodonga will have the ability to provide a freight service to about a quarter of the 25% of existing road freight users that do not require a 14 hour, or less, road service between Sydney and Melbourne. Logic Park Wodonga will target to secure 16% of the non bulk tonnages on the Hume corridor, and 7% of the non-bulk freight movements. This would be equivalents to 150,000 TEUs a year without any further expansion.

This type of operation that is intended for deployment from Logic Park will generate significant freight productivity benefits for its customers as both freight vehicle types can generate large efficiencies

Figure 9 reflects the operation in a more stylised way. Figure 10 is indicative of how the mature freight network will operate from Logic Wodonga. A pair of rail freight locos and HPFV trucks will perform the high productivity freight task although there may be a phase in period for this specific technology as mentioned above. This mature operation gives greatest benefits to the customers and profitability to the operator.

The future 2 kilometre long fast rail freight services, on the Sydney to Melbourne main rail line, can compete at the outside margin for 16 hour customer door to door freight services.

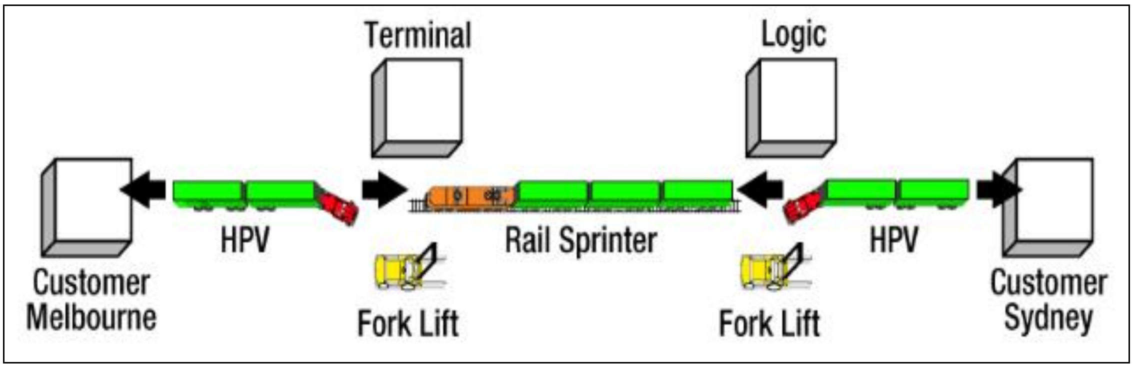
Figure 9: The Mechanics of the Logic Wodonga Rail/Road Bi-Modal Operation



Source: Industrial Logistics Institute 2010

Generally slow terminal throughput and the eventual termination of these interstate services in Victoria at the Donnybrook/Wallan terminal , and not Dynon, (DoTV, 2008) will not help the longer trains in achieving a critical 16 hour time window for a customer to customer service.

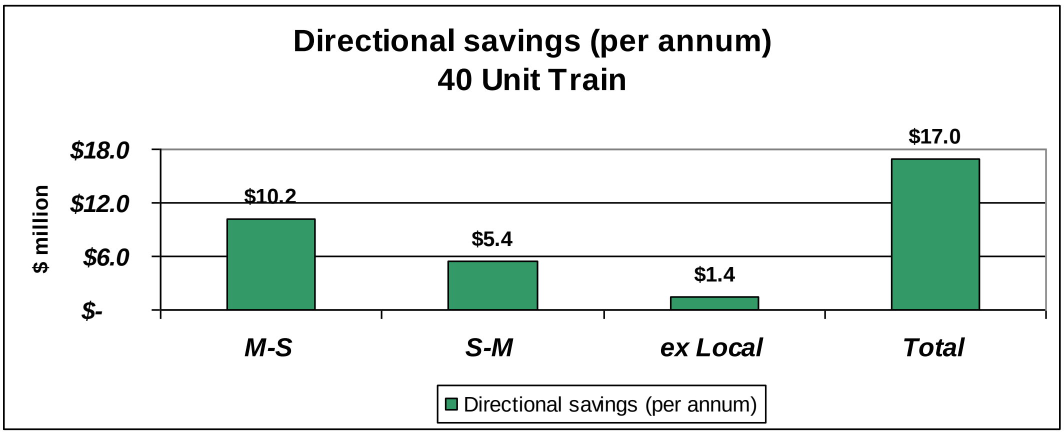
Figure 10: The mature Logic Wodonga road/rail Operation



Source: Industrial Logistics Institute 2010

The Logic Wodonga freight task will be 95% domestic freight and an estimated 5% that will be export bound. It is probable that any successful Logic Wodonga Transport operator will have arrangements for southern terminal services to the Port of Melbourne.

Figure 11: The nominal savings p.a through Logic Wodonga – 40 Unit Train



Source: Industrial Logistics Institute 2010

In nominal terms the 40 unit train and high productivity vehicle fleet would bring customer benefits of $17 million in nominal savings per annum. This is presented in Figure 11.

Estimating the Safety Benefits of a Bi-Modal Hume

The safety benefits arise from the savings in articulated kilometres, and accidents that would otherwise have happened under a Hume highway business as usual scenario. The Logic Wodonga terminal proposal would be operated initially with B-Doubles, then HPFV trucks, and the rail and HPFV performing a complementary freight operation.

Safety benefits can accrue through several reasons: speeding, fatigue, inappropriate driving for the conditions, poor vehicle maintenance etc. Saving in freight task kilometres can proportionally reduce truck crashes and fatalities. Table 6 presents the fatal crash rates per 100 million kilometres. As the Logic Wodonga initiative will save on articulated kilometres, the savings across the period 2012-2031 will be multiplied by the crash rates to estimate the saving in fatalities.

Table 6: Fatal Crash and Fatalities rates by vehicle type

Truck Type	Fatal Crashes per 100m kms	Fatalities per 100m kms
Rigid Trucks	0.90	0.96
Articulated	2.09	**2.55**

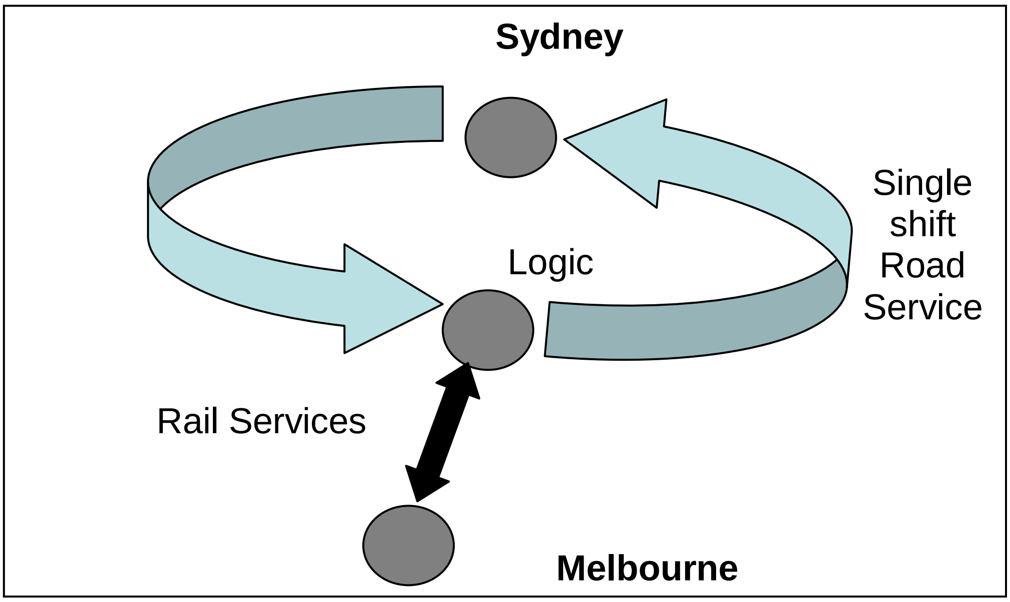
Source: NTC (pers comm)

Fatigue Management and Chain of Responsibility

Fatigue is a major contributor to truck accidents. For the Hume Highway ***72% of heavy vehicle accidents were fatigue related*** (NTI, *pers comm*). In 2001 the National Road Transport Commission instigated the first steps in new regulations that later became known as “The Chain of Responsibility” legislation which allocated serious accident causality to the offending areas within the transport chain, be it loading, despatching, illegal scheduling etc.

The proposal for Logic Wodonga to be a freight despatch hub for Sydney with the second leg of the driving shift returning to Logic Wodonga will provide a significant Fatigue Management environment for drivers. Figure 12 describes the single shift loop that will significantly improve fatigue management practices on the Hume corridor. Drivers leave Wodonga travel to Sydney, drop off and pick up and return to Wodonga in one driving shift.

Figure 12: Single Loop 'Basic Fatigue Managed' driving shift



Source: Industrial Logistics Institute 2010

Logic Park customer savings

The benefits of the bi-modal terminal at Logic Park are significant when examined over a 20 year period. As presented in Table 7 the direct customer benefits and safety benefits range between $470 million to $522 million over this time. The benefits were examined under two scenarios for different fleet types. These savings arise from 1 train set and 20 PBS vehicles.

Table 7: Total Direct Benefits of Logic Wodonga (2012 – 2031)

Logic Park Savings	PBS Only	40 Unit Train + PBS
1. Transport Corridor Savings $M	$416M	$456M
Estimated fatalities saved	11.5	14.1
2. Fatality Benefit Nominal $M	$53.8M	$66.5M
Emissions (000 tonnes CO2)	192.6	287.3
Total Nominal Benefits $M (1+2)	$469.8M	$522.5M
Logic WodongaTransport Operator Profitability $M	*positive*	*Positive*

Source: Industrial Logistics Institute (unpublished)

Conclusion

The concept of bi-modal terminals, which are high productivity terminals, operate co-jointly with Performance Based Standard Vehicles and rail shuttles. This is a new concept where shuttle rail services are used in conjunction with PBS vehicles. The impacts of such terminal operations, when both technologies are used are significant, whether they be in an urban or long distance corridor environment. Such terminals have been proposed for the Melbourne container task (DoTV 2010). Urban truck movements for the port container task can be reduced by 50% by using these specialized terminals. In a non urban context the proposal for a regional bi-modal service, operating from Logic Park Wodonga, can potentially offer a new dual mode freight service for customers using the Hume highway. The large customer base that is satisfied with a 15 hour door to door service can be serviced with a 25% productivity benefit because of the inherent productivity of the rail shuttle combined with a fleet of direct customer PBS vehicles. The benefits of bi-modal terminals provide the next truly quantum leap in both urban and long distance freight productivity. Both of these types of bi-modal terminals can also minimize freight exposure and improve safety outcomes.

Abbreviations

BD B-double
BFMS Basic Fatigue Management Scheme
BT… B-triple
BITRE Bureau of Infrastructure Transport and Regional Economics
COW City of Wodonga
DoTRS Department of Transport and Regional Services
DoTV Department of Transport (Victoria)
GCM Gross combination mass
GVM… Gross Vehicle Mass
HPFVs High Productivity Freight Vehicles
H&R… Hire and Reward
NCIT National Centre for Intermodal Transport (USA)
NTC… National Transport Commission
NTI National Truck Insurance Pty Ltd
NRTC…National Road Transport Commission
p.a. Per Annum
PBS Performance Based Standards
SBD Super B-double
SMVU Survey of Motor Vehicle Use

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