CHAPTER 19

ROAD FREIGHT ACTIVITY IN PERTH’S GROCERY SUPPLY CHAINS

Tim Hoffman and Courtney Babb

INTRODUCTION

The urban freight task contributes to the effective and efficient function of urban regions. The transportation and logistics industry is responsible for the movement of commodities that support local and regional economies and underpin the quality of life for urban residents. Historically, the movement of freight has been a powerful influence in the spatial development of Perth. The siting of the port at Fremantle and the original settlements at Perth and Guildford reflect these centres’ proximity to freight access via the Swan River. Early suburban industrial areas, such as Subiaco, Bayswater, Bassendean and Cannington, were developed adjacent to the ‘heritage’ railway lines to capitalise on access to rail to transport freight. The development of industrial areas, infrastructure and freight networks over the last fifty years is the result of the expanding metropolitan road network, distinct market forces and trade patterns, along with strong demographic growth associated with recent mineral resources booms (ABS, 2013a).

A better understanding of the geography of freight in Perth is necessary, not only for the management and future planning of efficient movement of essential commodities, but also to ensure the sustainable development of urban growth. The movement of freight can undermine the functioning of urban economies and quality of urban life in a number of ways. As well as transportation operation costs borne by industry, Hicks (1977) outlines three
broader social costs of the urban freight task: external costs borne directly by others; community costs manifest in redistribution of tax revenue to pay for road maintenance of freight routes; and urban and regional structural costs involving the location of freight-related transport infrastructure and facilities.

Given the lack of understanding about urban supply-chain geographies, there is need for research into the freight mobility of key industries active within urban economies. The urban freight task is made up of a number of key industries, each with access to distinctive local and regional markets and driven by differing consumer demands. This chapter describes the impact of the urban freight task on the development of Perth, with particular reference to freight and logistics patterns of the grocery and supermarket industry. The findings are drawn from the first stage of a Planning and Transport Research Centre (PATREC) study describing and analysing supply chain patterns in key industries in the Perth metropolitan economy. Information relating to the freight transport needs and market requirements specific to the major grocery and supermarket firms was elicited through interviews with managers and store operators in the Perth metropolitan area. The findings reflect a high-level analysis of an important component of the urban freight task in Perth.

GROCERY AND SUPERMARKET FREIGHT
Supermarket supply chains provide cities with continuing access to fresh food and goods and contribute to wider economic benefits in the retail, transport and agricultural industries. In Australia, grocery and other supermarket-related distribution represents 51.46 per cent of profits in the wholesaler and retailer segment (ABS, 2013b), which in turn generates 27 per cent of profits of the road freight forwarding industry in Australia (IBISWorld, 2016). Despite their value and importance in the road freight industry, there is limited updated knowledge of grocery and supermarket freight movement in many centres, including Perth, partly due to
the reluctance of retailers and carriers to disclose their organisation’s
records. Competition between firms has led to increased demand
for efficient and highly competitive supply chains.

International research on freight mobility in the grocery and
supermarket sector provides some indication of the characteristics
of these freight movements. However, the variation in the
economic and spatial characteristics of urban and regional contexts
must be acknowledged and these studies may have limited
applicability to informing freight policy in Perth. In his review of
grocery retailing practices across countries, Fernie (1995) observed
that no two countries were the same and that distribution ‘culture’,
as well as geography, were major factors underlying the differences. It is important to look to international research, whilst
understanding the particularities underpinning supply chains and
freight transport in Australia.

Two retailers dominate the current competitive landscape
in Australia: Coles and Woolworths. Wesfarmers (Coles) and
Woolworths, together, account for 70.7 per cent of sales in Australia
(IBISWorld, 2015). Metcash IGA is the next largest retailer at
8.6 per cent of sales. Aldi, a relative newcomer to the market in
Australia, currently accounts for 7.4 per cent of the market share.
The supermarket industry in Australia is forecast to expand, due
to increasing population and predicted increases in consumer
disposable income (ibid.).

In Australia, Hensher and Puckett (2005) found that there
was a high degree of cooperation between retail supply-chain actors – producers, suppliers, distribution centres, and retailers – to
reduce transaction and transport costs. The effective management
of supply chains for the supermarket industry is vital, in part
due to the high volume of perishable commodities being trans-
ported – fresh vegetables and fruit, meat and dairy – and issues of
uncertainty, such as the influence of weather on the production of
fresh food. Better management through cooperation is achieved
through alliances, partnerships and the vertical integration of
supply chains.
One of the most significant changes in retail and grocery freight movement over the last four decades has been the shift from manufacturer-led to retailer-led supermarket supply chains. In the late 1980s, Quarmby (1989) identified this shift, noting that there were several benefits to greater retailer control of the supply chain. These included improved capacity for interface with the entire retail network provided by technology; consistent documentation and coordinated commodity-handling processes; better matching of the volumes of commodities stored and retail market activity; and flexibility in response to changing market conditions. A higher degree of control over distribution centres (DCs) and freight network provides retailers with more control over commodity flows and storage and enables these to better match retail markets. Despite the improved management of grocery and supermarket supply chains, there are still uncertainties and delays. In a comparison between Fast Moving Consumer Good (FMCG) supply chains in the UK and South Africa, Sanchez Rodrigues and Potter (2013) found that uncertainties in the supply chain were based on delays caused by road congestion and loading bay queues, variable demand in consumer markets due to demand forecast inaccuracy, delivery restrictions due to rigid delivery windows, and lack of supply chain coordination.

Although over 95 per cent of road freight in Australia is carried by heavy vehicles (BITRE, 2014), changing consumer patterns in the grocery and supermarket sector are leading to the emergence of new freight transport geographies. The increasing affluence in Australian society over the course of the ‘long boom’ has led to increased demand by consumers for a wider range of goods than have traditionally been on offer in supermarkets and grocery stores. The development of niche markets in response to changing patterns of demand has led to the increase in smaller freight vehicles and more flexible freight services. Bridge and Dowling (2001) found that the gentrification and growth of wealth in inner urban Sydney had produced increasingly diversified economic capital flows in and between neighbourhoods, mainly driven by demand
for ethnic, local, organic and diet foods. These new trends have created novel consumptive spaces and will continue to influence freight activity at the micro-level in Perth.

The shift to small road haulage – a result of increasing densities in urban centres and the need for flexible, demand-responsive freight services – poses questions for the future planning of freight centres and infrastructure. Fernie and McKinnon (2003) elaborated on the efficiency in distribution in the UK, based largely on the regional DCs previously developed in that country (Fernie, 1995). They found strong evidence that centralised DCs would continue to grow in size and importance, with inventories at stores and smaller DCs decreasing. However, smaller freight carriers have different travel preferences compared to larger freight carriers (Feng, Arentze & Timmermans, 2013). The shift towards diverse inner-urban supermarket goods markets has implications for the distribution of freight within the broader urban region. For instance, in a study in Gothenburg, Sweden, Olsson and Woxenius (2014) found that the heterogeneity of freighted commodities within small road-haulage freight limited the effectiveness and need for large, regional freight consolidation centres. This means that different models of distribution may be required for increasingly diverse and dense commercial and retail areas.

Recent trends in consumer behaviour show higher demand for pick-up and home delivery services. These changes may provide opportunities for policy makers, planners and supply chain managers to explore the potential efficiencies and sustainability of better managed ‘last mile’ and household delivery services. Lyons (2002) considered the other side of information technology: the direct impact on customers. He questioned the capacity of teleshopping to displace personal viewing, selecting, touching and smelling of products, but noted that Tesco’s online supermarket operation offered access to frozen food and fresh produce. In a later paper, Durand and Gonzalez-Feliu (2012) showed that e-grocery shopping has considerable potential for reducing private
car traffic (in France), particularly when deliveries are made from warehouses.

Although the impacts of e-grocery and vendor-managed inventory (VMI) are yet to be settled, the literature on grocery distribution suggests that international practice is less diverse than was observed by Fernie (1995). Australian cities, including Perth, may well be typical in terms of grocery distribution in advanced countries – without the focus on traffic reduction evident in France – but there is extreme industry concentration. This is the central topic of the paper by Sutton-Brady, Kamvounias and Taylor (2015), starting from the fact that Australia’s two major supermarket chains have a 73 per cent share of the grocery market. They speak not only of aggressive price wars, but also of the power impact of the private brands, which Fernie (1995) had regarded as a way of challenging domination by suppliers. In contrast, Sutton-Brady et al. (2015) found, on the basis of evidence at public hearings, that the two Australian supermarkets are seen by most suppliers as having almost unlimited power over them.

The effects of the Australian industry structure on grocery distribution in the Perth market can be seen in the presentation of the logistic activities and freight patterns in the following sections.

FREIGHT INDUSTRY INFORMATION

Research into urban supply chains and freight transport is challenged by the paucity of reliable data. Sea freight details are reported in customs declarations and are measured and collated by port authorities. Rail freight volumes and origin–destination pairings are measured by track providers and reported to some extent. By contrast, road freight activity is very difficult to measure and analyse relative to rail and sea freight (Ortúzar & Willumsen, 2011). There are no legal requirements on truck operators or freight generating companies to declare the nature of their goods and the details of their trips in any means that could generate a centralised database. More basic methodologies, such as
observational surveys and vehicle counts, have been used to gather general data about road freight in the grocery and supermarket sectors (McCormack & Bassok, 2011). The lack of data and lack of adequate methods to capture data has led to a situation where policy and strategies for urban freight are made without adequate knowledge of the spatial distribution of freight (Kuzmyak, 2008; Alho, Lee, Blanco, Zegras & Abreu e Silva, 2015).

The collection of available information on road freight typically requires extrapolation and interpretation of statistical data collected by Commonwealth agencies and other unrelated state government sources, such as vehicle registration data and traffic count information, in order to generate a general picture of the scale of freight activity. This does not lend itself to analysis of road freight activity in any specific geographical space (such as the Perth metropolitan area). Road freight is a very competitive industry and trucking companies and their clients are also generally unwilling to share information regarding their activities at any level of detail.

For this analysis, therefore, a series of interviews were held in March and April 2015 with nineteen middle managers in the grocery logistics sector (both face to face and by telephone) in order to develop a comprehensive overview of their management of the trucking fleets involved, illustrated by the viewing of their fleet management systems. Some informal discussions at store management level were also held to expand on this understanding. Data already available from Main Roads WA’s permanent metropolitan traffic count network, along with some purpose-designed temporary counts, will also be compared with ‘bottom-up’ analysis to generate a comprehensive understanding of the metropolitan freight task.

The locations of distribution centres (DCs) and stores are readily identifiable and a general picture of road freight activity in this sector in Perth can thus be estimated. However, the analysis does depend on data captured in this rather informal manner and care must therefore be used when generalising and applying it.
for any practical or policy purposes. To provide background for the presentation of grocery-sector freight patterns in Perth, the following section presents a brief review of studies dealing with developments in grocery distribution.

**FREIGHT INDUSTRY INFRASTRUCTURE IN PERTH**

Perth is well known in popular culture as the ‘most isolated city’ in the world (Bryson & Titlebaum, 2001). Whether this is strictly true is arguable, but the sentiment is apt. Perth is certainly now a major city, even if still small by world standards. Perth is growing rapidly relative to its environment (Davies, 2008; Hugo, 2014) and, as a comparison, Perth now has more than two million residents (ABS, 2015), which represents 80 per cent of the state’s population, whereas Kalgoorlie, over 600 kilometres east by road, numbers 31,000 people and Bunbury, 150 kilometres south, has 70,000. In terms of isolation, the nearest cities of similar or greater scale are Adelaide (2,700km), Melbourne (3,400km) and Darwin (4,000km).

The scale and dominance of Perth in a sparsely populated state have great significance on the nature of its trading connections. Perth draws a high proportion of its fresh food needs from farming areas to its north, east and south. Basic building materials such as sand, stone and timber are also produced in reasonably close range. Nearly everything else consumed in the city, however, must be brought in over long distances by sea, road and rail transport.

This heavy dependence on long-distance transport was first experienced through the location of the settlement around Fremantle and the rapid development of the port there. Fremantle has been the point of export for large volumes of raw and refined bulk materials and for the import of goods for the domestic economy; from both international and Australian origins. Consequently, road and rail links between Fremantle, Perth, industrial and suburban areas are strong.
Road and rail links to eastern Australia are even more significant. Limitations on domestic (coastal) shipping in recent decades have coincided with efficiencies and investment in land transport infrastructure. A majority of general freight consumed in Perth is now delivered by road and rail and, of this, rail is the dominant mode (Department of Transport, 2012).

The standardisation of rail gauge in the 1960s allowed for the seamless transfer of goods along the Trans Australian corridor and also opened up a large area in Perth’s east for logistics and distribution activities. Containerisation became the standard mode of carrying general freight by seas and this technology transferred very well to road and rail operations. The standard gauge line was extended from Midland to Cockburn to provide access to industrial and import/export facilities at Kwinana and Fremantle (BITRE, 2014; Gregory, 2003). A new rail terminal precinct was built on the northern side of the existing industrial area at Kewdale, while the long Forrestfield rail yards were developed as the central shunting, marshalling and maintenance location for the state-owned freight rail authority (WestRail).

Rail freight progressively became the dominant mode for Western Australian interstate trade freight. Interstate rail-freight operations were consolidated in the 1980s under a National Rail entity, which was jointly owned and operated by the state railway authorities, and ‘intermodal’ freight activity continued to grow (Commonwealth Department of Infrastructure and Regional Development, 2015). When rail activities were progressively commercialised, de-regulated and privatised commencing in the 1990s, long-distance rail freight became cheaper and more efficient under competitive conditions. There are now three significant operators competing for this freight in and out of Perth. Two are based at terminals in Forrestfield (Aurizon and Specialised Container Transport, SCT), while Pacific National (PN), the dominant carrier, remains in the Kewdale terminal area.

These three operators run a total of twenty-eight to thirty trains in each direction per week.¹ Trains are up to 1.8 kilometres
in length. Due to the extremely long haulage distances, road transport is generally uncompetitive with rail, except for some specialist freight tasks (such as bananas from Queensland and northern NSW). Rail controls well over 85 per cent of the land-transport freight market according to most estimates (Department of Transport WA, 2012).

DEVELOPMENT OF RETAIL LOGISTICS ACTIVITIES IN PERTH
The increasing dominance of the rail yards as the source of incoming freight to the burgeoning Perth economy led to the emergence of major new industrial zones to the north of Kewdale. The proximity of the Perth Airport and several critical highway connections amplified the value of this region for the development of a zone for logistics, warehousing and distribution facilities (Freight and Logistics Council of WA, 2014). This development was encouraged through the sale of public land between the airport and Abernethy Road by LandCorp and by the development of large areas on the airport itself (Department of Planning, 2012). More recently, the focus of development has moved north into Hazelmere. A long and extensive area from Welshpool to Hazelmere is now heavily occupied by firms specialising in the storage and movement of goods in supply chains between the rail yards, highways, retailers and customers (refer to top right corner of Figure 1).

The region also supports the large-scale staging of equipment and vehicles used in the minerals extraction sector, largely due to the strong highway links between the Port of Fremantle, rail yards and the mining regions in the Goldfields and Pilbara.

The retail sector is heavily represented in this area. Both the supermarket sector (groceries) and the consumer goods sector are strongly focussed on distribution facilities located in this region. Retailing in Perth depends to a large degree on shipping and railways, as there is little local food processing or manufacturing.
Grocery chains rely on rail for about 80 per cent of their stock. Consumer goods retailers are more likely to rely on the port, since high shares of their stock (e.g. clothing, appliances, furniture) are imported from Asia. Some such imported stock comes to Perth via national distribution networks centred on Sydney and
Melbourne (Tim Hoffman Advisory, 2014). However, there has been a significant move by some retailers to capitalise on scale and technological improvements in supply chain management to use Asian distribution ‘hubs’ and direct shipping in place of these national set-ups. This in turn has led to a plateauing in rail volume since 2013. One such example is that of clothing retailer Target, one of the Wesfarmers group retailers. This company closed its national distribution centre in Melbourne in 2013 and opened regional centres in Perth and other eastern states. These centres are supplied directly via sea freight from Asian suppliers via a new hub near Port Klang in Malaysia, saving time, freight and inventory costs in the fast-changing fashion industry. Target now consolidates its imported clothing through Fremantle, via a third-party warehouse and logistics provider in Hazelmere. Stock is held for short periods at this facility before distribution to WA Target stores.

<table>
<thead>
<tr>
<th>Rail Terminals</th>
<th>Woolworths</th>
<th>Coles</th>
<th>Metcash IGA</th>
<th>Total</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN</td>
<td>300</td>
<td>300</td>
<td>70</td>
<td>670</td>
<td>78%</td>
</tr>
<tr>
<td>Aurizon</td>
<td>50</td>
<td>50</td>
<td>15</td>
<td>115</td>
<td>14%</td>
</tr>
<tr>
<td>SCT</td>
<td>40</td>
<td>15</td>
<td>15</td>
<td>70</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>390</td>
<td>365</td>
<td>100</td>
<td>855</td>
<td>100%</td>
</tr>
<tr>
<td>Share</td>
<td>45%</td>
<td>43%</td>
<td>12%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1: Estimated daily truck movements between rail terminals and supermarket distribution centres.*

**GROCERY-SECTOR FREIGHT PATTERNS**

The two major supermarket companies, Coles and Woolworths, have their DCs in the Airport precinct. The third player, Metcash IGA, is established next to the Perth Market Authority in Canning Vale. Metcash/IGA is an organisation of independent, smaller supermarkets and stores, each of which has some autonomy.
regarding the products it sells and carries in addition to a core Metcash catalogue. The emerging fourth player, Aldi, is building its DC at Jandakot Airport. This choice of site reflects the likelihood that Aldi will import a larger percentage of its processed foods via Fremantle, compared to its competitors.

All of these DCs are built on land with good strategic access to sources of supply of goods and with highway links to their networks of stores in Perth and the south west. The distribution of grocery goods in Perth involves a highly concentrated set of activities in the Forrestfield/Airport industrial zone. Heavy volumes are moved between the three rail terminals and the two main DCs in the Airport industrial zone, with lesser volumes hauled to Metcash/IGA at Canning Vale. These large-scale freight operations are carried out by fleets of semi-trailers operated by large contractor companies closely integrated into the supermarket companies’ management structures.

Freight vehicles meeting this demand make heavy use of the road network linking the rail yards with the DCs and the highways that connect the area to other parts of suburban Perth. This highway network includes the Tonkin, Leach, Roe, Reid and Great Eastern highways.

Figure 2: Simplified representation of supply chain structure for Coles and Woolworths supermarkets in Perth. Note: Differences are highlighted in red dotted lines for Woolworths supply chain.
Estimates of freight vehicle activity linking rail terminals with supermarket DCs are summarised in Table 1. The data shows that two supermarket ‘majors’ represent 88 per cent of the activity and 78 per cent is through the PN terminal. (These broad estimates are based on information informally provided by the companies referenced and are a guide to freight activity only.)

All categories of grocery product are stored and transported centrally in this way by the two supermarket ‘majors’. These include dry or ‘ambient’ goods, frozen and chilled products, and fresh produce. Fresh produce is sourced directly from large supplier farms in the horticultural zones to the north (Gascoyne and Gingin areas) and the south (Pemberton area) of the city, though Coles uses a separate warehouse in southern Perth operated by a contracted logistics and transport firm for its fresh produce.

Figures 2 and 3 present the supply chain structure for the three major grocery players: Woolworths, Coles and Metcash IGA. Supermarket stores receive their stock either distributed directly from the suppliers or from the distribution centres. Whereas the supply chains for Woolworths and Coles are very similar (Figure

Figure 3: Metcash/IGA supermarket supply chain structure.
2), they are substantially distinct from the Metcash IGA supply chain (Figure 3). The two mass retailers tend to rely on the expertise of third-party logistics services providers. Their stores are often located in big shopping centres and their stores are commonly accessed through dedicated delivery bays where they are daily re-supplied from the DCs or specialised suppliers.

Perishable goods, such as milk, bread and meat products, are generally distributed directly from the suppliers, e.g. three local milk processors, two bread bakers and several meat and poultry suppliers, although some of this produce is stored for short periods at the DC. These suppliers are located in industrial zones such as Malaga, Osborne Park, Balcatta and Welshpool. As Figure 2 indicates, Coles secures its meat supply from a range of suppliers such as Harvey Beef and Linley Valley Pork, whereas Woolworths centralises its supplies of red meat at a warehouse attached to a major abattoir in Bunbury and delivers to stores directly from there.

Another difference between the two big supply chains is the link between farms and stores: in the Coles supply chain this is via Costa Logistics Jandakot and for Woolworths, the produce is consolidated, and possibly stored, at the Airport DC before its distribution.

Unlike Woolworths and Coles, Metcash/IGA does not store fresh produce in a centralised way and individual stores organise and make their own purchases from the Perth Markets next door to the DC, as shown in Figure 3.

This differentiation between independent and chain retailing has been documented in the literature (see for example Dablanc 2011; Dablanc, Giuliano, Holliday & O’Brien, 2013; and Dablanc & Rodrigues, 2014). The significant number of smaller stores (often single-owner stores) as well as complementing retailing activities, such as street markets and stalls, means that supply is often organised by the store owner who may have a direct relationship with a specific supplier. The deliveries involve mostly small vehicles.
Distribution to stores from the major DCs is handled by truck fleets of more variable size. Coles and Woolworths use semi-trailer-sized vehicles for the majority of moves, since most of their supermarkets have inwards docks and access roads designed for this size of vehicle. Metcash IGA stores, however, along with smaller inner-city Coles and Woolworths stores, are served by fleets of smaller rigid vehicles, suited to the more cramped delivery conditions faced at these stores.

Coles and Woolworths stores are served solely by the large truckloads arriving from their central DCs. On average, each store receives only two to four truckloads per day and trucks usually only deliver to one store per trip from the DC. Daily deliveries of milk, bread and meat products augment these large truckloads. Metcash IGA stores, however, receive a significant share of their produce from non-aligned sources, i.e. not from the Metcash DC. As already indicated, the scale of this type of goods varies from store to store, depending on the affluence of the area, neighbourhood characteristics and the demand for niche food products. In some parts of Perth, up to 50 per cent of store sales (by value) can be made up of supplies from these smaller sources. Deliveries of these small volumes are usually made by much smaller vehicles operating on daily circuits, involving up to twelve stores per trip throughout the metropolitan areas. These vehicles range from light rigid vans to converted cars.

Companies providing these products are either small-scale processors based in Perth or elsewhere in Australia or importers of specialty goods. Their distribution premises are spread across the industrial zones of Perth (from Malaga, Balcatta, Osborne Park, Bayswater, Canning Vale to Henderson). They are often small units in minor industrial areas and therefore tend not to be found among the larger warehouses and logistics centres that characterise the Forrestfield/Airport zone.

Some Metcash IGA stores have designated days of the week on which these non-aligned deliveries can be scheduled – and have up to fifty such separate deliveries on those days. Many of
these consignments are single cartons carried into the store via the front door rather than the delivery dock. Consignments of the Metcash products are delivered in one to two larger truckloads on the other days.

Table 2 is a consolidation of estimates of daily truck movements associated with the supermarket and grocery sector. The overall pattern of freight vehicle usage by the grocery sector is characterised by:

- concentrated volumes of freight covering small distances between rail terminal and DCs;
- systematic use of semi-trailers operating point to point between DCs and supermarkets, augmented by separate bread, milk and meat deliveries; and
- large numbers of small commercial vans and trucks from suburban suppliers to IGA stores and smaller retail outlets on circuits throughout the suburbs.

### Table 2: Estimate of daily return truck movements associated with the grocery sector in metropolitan Perth

<table>
<thead>
<tr>
<th>Nature of Transport Operation</th>
<th>Woolworths</th>
<th>Coles</th>
<th>Metcash IGA</th>
<th>Small Retailers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulk Transfers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail Terminal</td>
<td>Forrestfield/Kewdale</td>
<td>DC</td>
<td>Airport, Canning Vale</td>
<td>170</td>
</tr>
<tr>
<td>Rail Terminal</td>
<td>Forrestfield/Kewdale</td>
<td>3PL</td>
<td>Hazelmere, Malaga</td>
<td>10</td>
</tr>
<tr>
<td>3PL warehouse (dry goods)</td>
<td>Hazelmere</td>
<td>DC</td>
<td>Airport, Canning Vale</td>
<td>10</td>
</tr>
<tr>
<td>Local manufacturers/ importers</td>
<td>Malaga, Bibra Lake, Canning Vale</td>
<td>DC</td>
<td>Airport, Canning Vale</td>
<td>5</td>
</tr>
<tr>
<td>Fresh produce farms</td>
<td>Gingin, Pemberton</td>
<td>DC</td>
<td>Airport, Canning Vale</td>
<td>40</td>
</tr>
<tr>
<td>Meat processors</td>
<td>Harvey</td>
<td>DC</td>
<td>Airport</td>
<td>2</td>
</tr>
<tr>
<td>Meat processors</td>
<td>Harvey</td>
<td>DC</td>
<td>Airport</td>
<td>3</td>
</tr>
<tr>
<td>DC</td>
<td>Airport, Canning Vale</td>
<td>Stores Metropolitan Perth</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>3PL warehouse (fresh produce)</td>
<td>Jandakot</td>
<td>Stores Metropolitan Perth</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Meat processors</td>
<td>Harvey</td>
<td>Stores Metropolitan Perth</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Meat processors</td>
<td>Harvey</td>
<td>Stores Metropolitan Perth</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Bakery</td>
<td>Malaga</td>
<td>Stores Metropolitan Perth</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Perth Markets</td>
<td>Canning Vale</td>
<td>Stores Metropolitan Perth</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Speciality Suppliers</td>
<td>Various</td>
<td>Stores Metropolitan Perth</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Estimate of daily return truck movements associated with the grocery sector in metropolitan Perth.
these consignments are single cartons carried into the store via the front door rather than the delivery dock. Consignments of the Metcash products are delivered in one to two larger truckloads on the other days.

Table 2 is a consolidation of estimates of daily truck movements associated with the supermarket and grocery sector. The overall pattern of freight vehicle usage by the grocery sector is thus characterised by:

- concentrated volumes of freight covering small distances between rail terminal and DCs;
- systematic use of semi-trailers operating point to point between DCs and supermarkets, augmented by separate bread, milk and meat deliveries; and
- large numbers of small commercial vans and trucks from suburban suppliers to IGA stores and smaller retail outlets on circuits throughout the suburbs.

Figure 4: Daily heavy-freight vehicle trip estimates for the supermarket sector – central metropolitan area.
These estimates are ‘order-of-magnitude’ based on the full range of discussions with representative freight-generating companies and transport operators. It should also be noted that there is some variation between trucking activity levels on different days of the week for most businesses, which is not captured here.

Regardless, the aggregated statistics confirm that about 40 per cent of the heavy movements (>1300/day) are bulk transfers towards the DC, with considerable variations across the three major chains. As the heavy vehicle movements are concentrated in the central-east part of Perth, their effects are localised on the traffic on Roe, Leach and Tonkin highways, as well as on the Mitchell and Kwinana freeways and Orrong Road, as shown in Figure 4. In terms of distribution, the data suggests that almost half of the movements are done with light goods vehicles (if accounting for small retailers) and the majority of trips are spatially distributed across the city.

The map at Figure 4 is a compilation of estimated daily truck numbers using roads linking rail terminals, DCs and stores for the three major supermarket chains. The map reflects inter-peak (9am to 4pm) traffic conditions. Although the truck volumes may appear a minor part of the total traffic volumes in Perth (hundreds compared to thousands and tens of thousands of vehicles daily on some arterial roads), their effect is spatially differentiated and the interaction of retail freight movements with the prevalent passenger traffic must be carefully considered. The map highlights the propagating effect of truck movements across the CBD area of Perth, even without considering the traffic due to other food services (hospitality, health establishments, conference centres and education) that require daily food supplies in the city.

**FOOD SERVICES SECTOR**

In addition to the grocery sector, there is considerable freight activity generated by the suppliers of other forms of prepared
food – for cafes, restaurants, hospitals, mining camps, conference centres and in the provisioning of shipping. This sector is known as the food services sector. Perth has several significant businesses working in this sector, and their locations and the scale of the trucking fleets is summarised in Table 3 (data from telephone interviews).

The statistics show that this sector is generating traffic comparable to the supply chains for the three major grocery supply chains, with their 200+ primarily light-goods vehicles. However, as these businesses are located in the industrial areas to the south and north of the city, rather than in the east, their movements are much more dispersed in space than the grocery supply-chain movements.

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bidvest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Logistics</td>
<td>Bibra Lake</td>
<td>30 +</td>
</tr>
<tr>
<td>• Belvista</td>
<td>South Fremantle</td>
<td></td>
</tr>
<tr>
<td>• Classic Meats</td>
<td>Osborne Park</td>
<td></td>
</tr>
<tr>
<td>PFD Foods</td>
<td>Banjup</td>
<td>30 +</td>
</tr>
<tr>
<td>Sealanes</td>
<td>Fremantle</td>
<td>30 +</td>
</tr>
<tr>
<td>Kailis</td>
<td>Canning Vale</td>
<td>20 +</td>
</tr>
<tr>
<td>MBL</td>
<td>Canning Vale</td>
<td>1 to 10</td>
</tr>
<tr>
<td>Atmos</td>
<td>Bentley</td>
<td>1 to 10</td>
</tr>
<tr>
<td>Elite Foods</td>
<td>Malaga</td>
<td>1 to 10</td>
</tr>
<tr>
<td>New West Foods</td>
<td>Malaga</td>
<td>1 to 10</td>
</tr>
<tr>
<td>Superstock</td>
<td>Balcatta</td>
<td>1 to 10</td>
</tr>
<tr>
<td>Pronto Fine Foods</td>
<td>Malaga</td>
<td>1 to 10</td>
</tr>
<tr>
<td>Springer Foods</td>
<td>Myaree</td>
<td>1 to 10</td>
</tr>
<tr>
<td>Variety Foods</td>
<td>Bayswater</td>
<td>1 to 10</td>
</tr>
<tr>
<td>Sinwa</td>
<td>Henderson</td>
<td>1 to 10</td>
</tr>
<tr>
<td>Westoz Food</td>
<td>Bayswater</td>
<td>1 to 10</td>
</tr>
<tr>
<td>Weststate Seafoods</td>
<td>Bibra Lake</td>
<td>1 to 10</td>
</tr>
</tbody>
</table>

Table 3: Food services sector companies in Perth
SUMMARY

In Perth, the supermarket sector is dominated by three supply chains: Woolworths, Coles and Metcash IGA.

The available data and survey information confirms the main differences between retail chains and independent retailers: whereas big chains rely on their scale economies and contribute to heavy point-to-point traffic between the port, DCs and then retailers (where they benefit from specially allocated docks for loading/unloading), smaller retailers depend on a much larger number of deliveries using much lighter vehicles.

In Perth, the Forrestfield/Airport area represents a freight-generating zone, with major DCs co-located there. The high dependence on the rail yards as origination location for freight, combined with the location of the retail DCs, means that most heavy vehicle movements take place on the short road lengths in that area. Distribution to stores from the DCs makes substantial use of the main highways connecting that zone to suburban areas, but there is little use of lesser roads by these heavy vehicles.

Grocery supply chains are amongst the most significant generators of freight on the Perth metropolitan road network, with potential growth areas in the central, eastern and southern parts of the city.

The location of an Aldi DC in the southern part of the city will slightly reduce the traffic flows from the Forrestfield/Airport precinct. The new development is in sync with the expected increase in demand in the Perth metropolitan area, associated with rising population. Forecasted areas of growth are distributed across the city and points to increased demand will correspond to new activity centres.

Currently, the highest heavy traffic due to the grocery bulk transfers and distributions occurs on Roe, Leach and Tonkin highways, the freeways and Orrong Road. Light commercial vehicles, servicing smaller producers, importers and processors, and the smaller retail outlets make many more trips than the heavier vehicles and utilise a more comprehensive road network.
Therefore, their impact on traffic congestion, environment (emissions) and road ‘wear and tear’ is more dispersed.

The food services sector contributes in a small way to the freight logistics in Perth, but, again, the origins and destinations are scattered across the city and the transport is usually conducted with small vehicles.

Given the scarcity of evidence for freight trip generation, surveys of establishments and supply chain operators remain a core data collection process for urban freight operations.

The challenge for building on this high-level analysis is to improve the means available for surveying the commercial road freight sector, overcoming confidentiality concerns and collating data that will be useful for road and urban planning purposes.

The experience in generating this chapter shows that a combination of traditional establishment surveys, broader industry data analysis and targeted interviews at the company level is important to achieving an understanding of unique road freight activity patterns and trends in any given geographical space. The grocery sector is a fairly well-defined segment of the economy – it is likely that a specific analytical methodology would need to be customised for the specific characteristics of each freight-generating sector of the urban economy.

ACKNOWLEDGEMENT

The research presented in this chapter was supported by the Planning and Transport Research Centre (PATREC).

NOTES

1. Industry information gathered by author interviews, 2015.

REFERENCES


Australian Bureau of Statistics (ABS). (2013a). 4102.0 Australian Social Trends,
Road Freight Activity in Perth’s Grocery Supply Chains


Lyons, G. (2002). Internet: Investigating new technology’s evolving role,


514